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SEATTLE + TACOMA

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10/23/2026

TO: PLAN HOLDERS LIST

SUBJECT: PROCUREMENT NO. 092026-1061
MAINTENANCE DREDGING AT PIERS 3 & 4 AND WUT

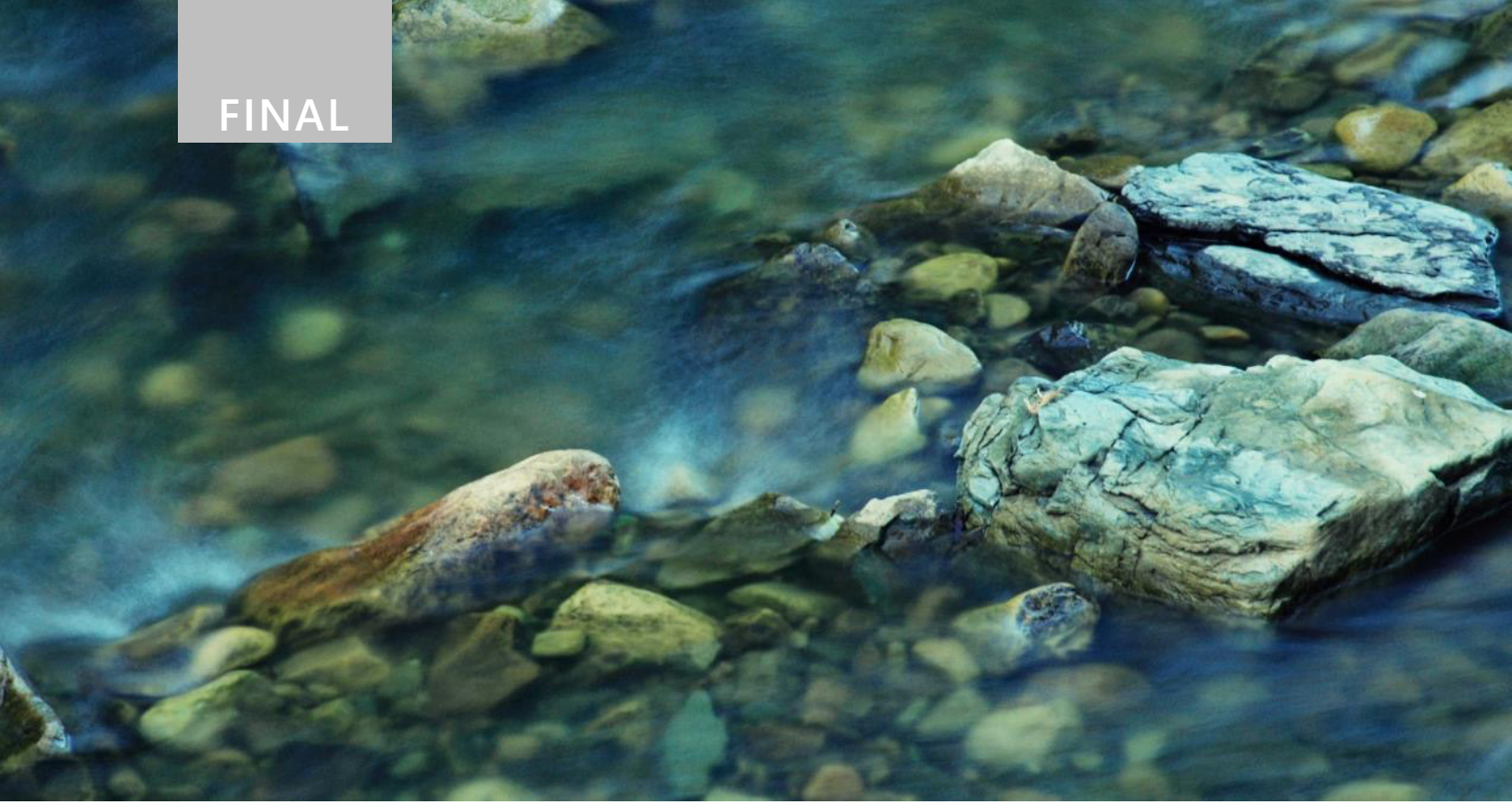
ADDENDUM NUMBER 02

This addendum is issued to amend the following:

Additional Information Attachment (Sediment Characterization Report):

See Attached.

FINAL



July 2025
Husky and Washington United Terminals Berth Deepening Sediment Characterization

ANCHOR QEA

Sediment Characterization Report

Prepared for the Port of Tacoma

FINAL

July 2025
Husky and Washington United Terminals Berth Deepening Sediment Characterization

Sediment Characterization Report

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FINAL

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ABBREVIATIONS

D/F	dioxins/furans
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Unit
DNR	Department of Natural Resources
ECHO	East Commencement Bay Habitat Opportunity
FNC	Federal Navigation Channel
Husky	Husky Terminal
mg/kg	milligram per kilogram
MLLW	mean lower low water
Port	Port of Tacoma
Project	Husky and Washington United Terminals Berth Deepening Sediment Characterization
QA	quality assurance
QC	quality control
SCO	sediment cleanup objective
SCR	Sediment Characterization Report
SMS	Sediment Management Standards
SQAPP	Sampling and Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers
WUT	Washington United Terminals

1 Introduction and Project Summary

This Sediment Characterization Report (SCR) presents the results of the sediment investigation performed pursuant to the *Sampling and Quality Assurance Project Plan* (SQAPP; Anchor QEA 2024a; Appendix A) for the Husky and Washington United Terminals Berth Deepening Sediment Characterization (Project), located on the western side of the Blair Waterway in Tacoma, Washington (Figure 1). The sediment investigation was designed and performed for improvements to modernize the Blair Waterway and associated container terminal berths as proposed by the Port of Tacoma (Port) and Northwest Seaport Alliance. The investigation was intended to collect data to support dredge design and dredged material management and disposal at a Dredged Material Management Program (DMMP) open-water disposal site or for beneficial use.

The Tacoma Harbor Deepening Program includes deepening of the federal navigation channel (FNC) by the U.S. Army Corps of Engineers (USACE) and deepening of the berthing areas at Husky Terminal (Husky) and Washington United Terminals (WUT) by the Port. Increasing the FNC dimensions would improve container ship navigation safety and access at adjacent terminals and remove draft restrictions for large vessels to accommodate modern deep draft ships. These proposed improvements will modernize the Blair Waterway and associated container terminal berths to accommodate newer, larger container vessels that are in use by ocean carriers.

The Port intends to deepen the berths at the Husky and WUT terminals to the same depth as the FNC, which is -57 feet mean lower low water (MLLW) plus a 2-foot overdredge (final elevation -59 feet MLLW). The FNC boundary identified by USACE in the pre-engineering design (PED) phase was used as the outer-most extent of the terminal berths for the SQAPP.[1] Side slopes for the berth deepening are assumed to extend into the FNC, using a 3-horizontal-to-1-vertical (3H:1V) slope ratio. The side slopes are included as part of this sediment characterization. A separate sediment characterization is being conducted to support FNC deepening, which will exclude the berth deepening areas identified in this SCR.

The dredged material management units (DMMUs), sampling locations, target coring depths, and chemical testing methods for this sediment investigation were selected in accordance with the most recent DMMP guidance (DMMP 2021) and the Sediment Cleanup User's Manual II (Ecology 2021) as documented in Appendix A. This SCR details the results of the investigation conducted in October and November 2024 to obtain a suitability determination from the DMMP for open-water disposal.

[1] The PED boundary features a narrower FNC near the Husky and WUT berths, resulting in larger berth areas. Using the narrower PED boundary represents a conservative approach that characterizes more material as part of the Husky and WUT berth deepening projects. USACE design evaluations may result in a wider FNC boundary that decreases the Project dredge area. Final definition of the berth deepening areas will occur in 2025 following establishment of the final FNC.

This SCR will also be used by regulatory agencies and stakeholders to support in-water or upland beneficial use placement.

The SCR is organized into the following sections:

- Section 1: Introduction and Project Summary
- Section 2: Sampling Methods, Observations, and Deviations
- Section 3: Quality Assurance/Quality Control
- Section 4: Sediment Testing Results
- Section 5: References

2 Sampling Methods, Observations, and Deviations

Sediment vibracores and box core samples were collected in accordance with the methods outlined in the SQAPP (Anchor QEA 2024a). A summary of sampling activities is described in this section, along with discussion of any deviations to the SQAPP. Table 1 provides a summary of DMMUs, sample locations within each DMMU, and sample collection information. Sample collection information includes attempt information, coordinates, mudlines, core penetrations, core recoveries, and sample intervals. Sediment core collection and processing logs, photographs, and field forms are included in Appendix B.

2.1 Sampling Vessel, Navigation, and Positioning

Samples were collected aboard the research vessel *Tieton*, operated by the subcontractor Gravity Marine Services. Sediment cores were collected using vibracore equipment for all DMMUs except Husky DMMU-1, which used a box core sampler for three locations at Husky to sample sediment on top of the rock keyway. A differential global positioning system unit located on the top of the A-frame was used for positioning (accuracy ±2 feet). The software was used to navigate to the proposed sampling stations and record the actual sampling position at the time of sampling. Coordinates were recorded digitally and on core collection field logs in feet to the second decimal place using North American Datum of 1983 State Plan South (Table 1 and Appendix B).

Most locations were sampled within 10 feet of the target location; however, due to difficulties encountered during sampling, the acceptable distance from the target location was expanded to 25 feet. Three locations were collected between 11 and 23 feet off station (HT-SC02 [box core], HT-SC22 [vibracore], and WUT-SC20 [vibracore]). Only one location was sampled greater than 25 feet from the target location. The first attempt for HT-SC03 (box core), which was selected for processing, was collected 32 feet from the target location due to access restrictions caused by a nearby ship's anchor lines. All locations remained within their respective DMMU boundaries.

The water elevation at each station was measured using a survey package that includes a real-time kinematic survey differential GPS and survey-grade fathometer. A survey reference marker was identified from the Washington State Reference marker network and used to calibrate the onboard real-time kinematic survey differential GPS for measurement of water elevation. As a quality control (QC) check, preliminary observed water levels (feet MLLW) for Tacoma, Washington (National Oceanic and Atmospheric Administration Station 9446484), were also checked, and water depth was measured using a lead line at the time of core and box core collection.

The mudline elevation (feet MLLW) was calculated by subtracting the water depth from the water level. At each sampling station, core collection logs recorded water depth, water level, and elevation to the nearest tenth (Table 1 and Appendix B).

2.2 DMMUs and Sampling Locations

DMMUs and sample locations are presented in Figures 2a and 2b. As described in the SQAPP (Anchor QEA 2024a), the dredge area at Husky was divided into five surface DMMUs and five subsurface DMMUs, and the dredge area at WUT was divided into four surface DMMUs and four subsurface DMMUs. Surface DMMUs are defined as the mudline to -55 feet MLLW, whereas subsurface DMMUs are defined as -55 feet to -59 feet MLLW. The Z-layer elevation is -59 to -61 feet MLLW.

The DMMUs were sampled in accordance with the characterization criteria for surface and subsurface material of a moderate rank (Anchor QEA 2024a). For this classification, one sediment field sample is required per 4,000 cubic yards, with laboratory analysis conducted for every 16,000 cubic yards of surface material and 24,000 cubic yards of subsurface material. Table 2 provides details on the DMMUs for each berth, including area, volume, minimum number of cores, and the number of cores collected.

The sampling and composite scheme developed in the SQAPP planned for a higher field sample density (greater than one sample per 4,000 cubic yards) than required by DMMP. This resulted in 28 collected surface DMMU cores at Husky (more than the required 17 surface DMMU cores) and 24 collected surface DMMU cores at WUT (more than the required 16 surface DMMU cores), respectively.

Due to limited core penetration and recovery as a result of dense subsurface sediment, coring in the subsurface interval was limited in one DMMU at Husky and two DMMUs at WUT. At Husky, six cores were required for subsurface DMMU-9, but only four cores had sufficient penetration and recovery to collect subsurface material for this DMMU. At WUT, six cores were required for subsurface DMMU-24 and DMMU-25, but only four and five cores, respectively, had sufficient penetration and recovery to collect subsurface material for this DMMU. Limited penetration and recovery at these locations is further discussed in Section 2.3.

2.3 Core Collection

Sediment cores from 51 discrete sampling locations were collected by vibracore between October 22 and November 13, 2024. Box core samples were collected from three discrete sample locations on November 14, 2024. Vibracores were advanced to a target depth of 16 feet below the mudline or until refusal using vibracore drilling methods. Box core samples were collected with penetration of 50 centimeters below the mudline or until refusal. Vibracore and box core samples were evaluated against Project acceptability criteria, with any non-compliant samples rejected. If acceptability criteria were not met, up to three attempts were made at each location, with the exception of HT-SC01, which had five attempts, and the final attempt was accepted.

Core acceptability deviations occurred due to recurring shallow refusal, which prevented the collection of all target intervals in most cores. Of the 51 accepted cores, 36 did not reach the

Z-interval, and 4 cores failed to reach both the Z-interval and B-interval (including HT-SC22, HT-SC23, WUT-SC06, and WUT-SC11). Additionally, recovery percentages were below 75% of the drive length in 19 of the 51 collected cores. A decision was made in field following consultation with the Dredged Material Management Office (DMMO) to accept the attempt with the highest recovery among the attempts at each location.

Box core sample acceptability deviations occurred for the three sample locations—HT-01, HT-02, and HT-03—because they were unable to achieve the target penetration depth of 50 centimeters. These locations, within DMMU-1, were sampled to characterize the sediment that has accumulated on the rock keyway at Husky 4 (Anchor QEA 2024a). Therefore, the limited recovery for these samples may reflect lower sedimentation on the rock keyway than what was anticipated from the bathymetry. The attempt with the highest recovery at these locations was accepted.

2.4 Sample Processing

Sediment cores were processed by Anchor QEA staff in an upland processing area following the procedures outlined in the SQAPP (Anchor QEA 2024a) and Table 4. Cores were processed using the vertical elevation (mudline) to identify intervals for the surface (A-interval), subsurface (B-interval), and Z-layer. Discrete samples were collected from all intervals, and A- and B-intervals were composited into surface and subsurface DMMU samples, respectively. Surface and subsurface DMMU composites were submitted for testing. Subsamples from discrete A- and B-intervals, along with the Z-layer, were archived for potential testing. Box core samples were processed on board the vessel by collecting representative material from the box core sampler. Box core samples were composited into a surface DMMU sample, and each discrete sample was also subsampled to archive material for potential testing.

Anchor QEA field staff took photos and recorded comprehensive sediment descriptions of each accepted core. Descriptions are documented in Appendix B, and photograph logs are provided in Appendix C. When required, cores underwent archaeological monitoring to identify potential cultural resources, which is documented in the Archaeological Monitoring Results memorandum provided in Appendix D. Once documented, each sample was homogenized to ensure consistency in color and texture. The samples collected were submitted to the laboratory for analysis or archival storage.

Material encountered was primarily dense, poorly graded sand overlain with approximately 0 to 1 feet of soft silt. Clay pockets were observed in some of the cores. Shell material was observed in the majority of the cores collected from WUT. Wood material was observed in approximately half of the cores collected from Husky.

Sample processing deviations included a reduced number of discrete samples submitted for grain size analyses. Sediment volume was prioritized for the DMMU composite samples, and three discrete

samples did not have enough volume to test for grain size due to inadequate core recovery. However, volume was sufficient to complete all planned analyses on collected composite samples. An additional deviation occurred due to a void in the core that collapsed during processing of the HT-SC20 B- and Z-layer intervals, causing material mixing from 4.7 to 7.1 feet. The B-layer (1.9 to 4.7 feet) was unaffected by this void and material mixing. The Z-layer was collected from the affected material between 4.7 to 7.1 feet.

2.5 Archaeological Monitoring

Sediment cores collected at depths at or shallower than -10 feet MLLW were monitored for archaeological resources in accordance with the Archaeological Monitoring and Inadvertent Discovery Plan (Anchor QEA 2024b). Monitoring was completed as required, and no cultural resources were identified, as detailed in Appendix D.

3 Quality Assurance/Quality Control

This section provides information on data quality, including field and laboratory QC measures, data validation findings, and completeness.

3.1 Field Quality Assurance/Quality Control

Anchor QEA personnel labeled samples in a consistent manner to ensure that field samples were traceable. Chain-of-custody forms were appropriately populated to provide all information necessary for the laboratory to conduct the required analyses properly. Samples were placed in coolers with ice and received at the laboratory within the recommended temperature range.

3.2 Laboratory Quality Assurance/Quality Control

Analytical chemistry data were validated at a Stage 2B (EPA 2009) level following procedures and requirements listed in the SQAPP. Grain size and Atterberg limits were reviewed for completeness at a Stage 1 (EPA 2009) validation level, and qualifiers were not assessed. The laboratory followed the specified analytical methods, all requested sample analyses were completed, and QA (quality assurance) / QC samples and procedures were analyzed at required frequencies. A summary of key findings includes the following:

- One non-detect 2,4-dimethylphenol result was rejected due to the laboratory QC samples recovering below the expanded lower acceptance limit. This analyte was not detected in any other sample.
- Twelve sulfide results were qualified as estimated, and one non-detect sulfide result was rejected due to the laboratory analyzing the samples past the method-specified hold time.
- Ten diethyl phthalate results and two mercury results were qualified as non-detects, and four total PeCDD results and one total TCDD result were qualified as estimated, due to detections in the associated method or calibration blanks.
- Some volatile organic compounds, pesticides, semivolatile organic compounds, polyaromatic hydrocarbons, tributyltin, dioxins/furans (D/F), metals, total organic carbon, and sulfide results were qualified as estimated due to calibration or laboratory QC results outside of method, laboratory, or Project-specified control limits.
- Some D/F congener results were qualified because they were reported as estimated maximum potential concentration results by the laboratory.

Almost all results are usable as reported or as qualified. One 2,4-dimethylphenol result was rejected due to laboratory QC recoveries, and one sulfide result was rejected due to hold-time exceedances. Analytical data completeness was greater than 99%, and Project completeness goals were met.

4 Sediment Testing Results

This section summarizes the results of sediment conventional and physical analyses and chemical analyses, including screening against DMMP and Sediment Management Standard (SMS) criteria.

4.1 Conventional and Physical Analyses

Eighteen composite samples were analyzed for conventional parameters, including total solids, total volatile solids, total organic carbon, ammonia, and sulfides, as detailed in the SQAPP. Conventional parameter results are shown in Tables 4 and 5 and are summarized as follows:

- Total organic carbon averaged 0.19%, ranging from 0.06% to 0.41%.
- Total solids averaged 80%, ranging from 73% to 85%.
- Total volatile solids averaged 1.4%, ranging from 1% to 1.8%.
- Ammonia concentration averaged 2.6 milligrams per kilogram (mg/kg), ranging from 0.55 to 8.67 mg/kg.
- Sulfide concentrations were variable, averaging 24 mg/kg and ranging between non-detect and 128 mg/kg.

Grain size was tested in 61 discrete samples, and three discrete samples were tested for Atterberg limits (liquid, plastic, and shrinkage limits). Results of the physical analyses are shown in Table 6 for grain size and in Table 7 for Atterberg limits. Grain size analysis indicates that the surface and subsurface intervals are a mixture of sand, mainly medium-grain sand with moderate amounts of coarse and fine sands and some silt. Surface sediment ranges between 65 to 96% sand (average of 84%) and 3.1 to 35% fines (clay and silt; average of 15%). Subsurface sediment ranges between 56 to 95% sand (average of 85%) and 5.8 to 44% fines (clay and silt; average of 14%). As shown in the core logs (Appendix B), native sediment (i.e., 90-100% sand with multi-colored grains [red and white], poorly graded or well graded) was generally encountered very close to the sediment surface, within 1 to 2 feet below mudline.

4.2 Chemical Analyses and Sample Results Screening

Samples were submitted to Analytical Resources, LLC, in Tukwila, Washington, for chemical analyses. Eighteen composite samples were analyzed for metals, tributyltin, semivolatile organic compounds, polycyclic aromatic hydrocarbons, pesticides, polychlorinated biphenyls, and D/F as detailed in the SQAPP. Analytical results are screened against DMMP criteria in Table 4 and against SMS criteria in Table 5. Due to low organic carbon in all samples (less than 0.5%), for SMS screening, all results were compared to dry-weight apparent-effects-threshold sediment cleanup objectives (SCOs) and cleanup screening levels. The laboratory analytical report and data validation report are included in Appendices E and F, respectively.

All results were below DMMP and SMS screening levels. Based on screening results, no Z-layers were tested.

5 Conclusions

Husky and WUT berth sediments were characterized for disposal and beneficial use as described in the SQAPP that was approved by the DMMP. The data presented in this SCR indicate that all berth material has been characterized according to DMMP guidance and agency direction. Further, all berth sediment testing results indicate that all material is suitable for open-water disposal, and no results exceed SMS SCOs or natural background D/F levels.

Sediment from this Project is proposed for aquatic beneficial reuse at the Port's East Commencement Bay Habitat Opportunity (ECHO) site. The ECHO site is located on Port-owned property and state-owned land managed by Department of Natural Resources (DNR) leased by the Port offshore of Marine View Drive. The purpose of ECHO is to create estuarine marsh and nearshore habitat on Port-owned property for juvenile salmonids and their prey sources, including juvenile Dungeness crab larvae. Similarly, the USACE is characterizing the adjoining FNC sediments for disposal or beneficial use further offshore on state-owned land managed by DNR and leased by the Port (USACE's ECHO). Both sampling programs were developed to evaluate suitability for open-water disposal and for aquatic beneficial reuse. Accordingly, the frequency, compositing, and testing regimes for open-water disposal and beneficial reuse were consistent between Port berth and USACE FNC characterization programs.

Per the Tacoma Harbor *Integrated Feasibility Report and Environmental Assessment* (USACE 2022), FNC sediment may be considered suitable for beneficial use if it meets all of the following criteria:

- Meets suitability requirements for open-water disposal per DMMP guidance
- Meets SMS criteria
- Total PAH is less than 2,000 micrograms per kilogram (RSET 2014)
- Total D/F TEQ is less than 4 parts per trillion

Based on our understanding, these criteria were confirmed in a meeting series hosted by the USACE with regulatory agencies and stakeholders that would determine suitability for aquatic beneficial use for FNC sediment placement at USACE's ECHO. We expect that the same sediment quality requirements of Port berth material for aquatic beneficial use placement at ECHO will be consistent with the adjoining site. All Port berth material achieves these criteria, suggesting that all berth material is appropriate for use at ECHO. At this time, the Port is not aware of any other finalized sediment quality guidelines for aquatic beneficial use evaluation. However, the Port intends to engage regulatory agencies and the Puyallup Tribe regarding placement of the Port's berth material to support the ECHO site design in April 2025. Further coordination with this group will determine the final criteria and volume of berth material appropriate for beneficial reuse at ECHO.

6 References

Anchor QEA, 2024a. *Sampling and Quality Assurance Project Plan.* Husky and Washington United Terminals Berth Deepening Sediment Characterization. Prepared for Port of Tacoma. October 2024.

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EPA (U.S. Environmental Protection Agency), 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use.* EPA Office of Solid Waste and Emergency Response. USEPA 540-R-08-005. January 2009.

RSET (Regional Sediment Evaluation Team), 2014. RSET Issue Paper: Proposed Sediment Screening Levels for PAHs for Protection of Salmonids. Prepared by Jeremy Buck (U.S. Fish and Wildlife Service) and Lyndal Johnson (National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center). Prepared for the RSET Agencies.

USACE (U.S. Army Corps of Engineers), 2022. *Final Integrated Feasibility Report and Environmental Assessment*. Tacoma Harbor, Washington Feasibility Study. June 2022.

Tables

Table 1

Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Accepted Attempt No.	Total No. of Attempts	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Drive Penetration (feet below mudline)	Core Collection Recovery Length (feet)	Core Collection Recovery (%)	Processed Core Length (feet)	Sample Upper Depth (feet below mudline)	Sample Lower Depth (feet below mudline)	Sample Upper Elevation (feet MLLW)	Sample Lower Elevation (feet MLLW)	Interval	Discrete Sample ID	Atterberg Limits Sample (interval)[3]
					Easting (feet)	Northing (feet)												
Husky Terminal																		
1	N/A	HT-SC01	4	4	1167156	712878	-56.9	0.8[1]	--	--	--	0	0.79	--	--	A	HT-SC01-241114	--
		HT-SC02	2	3	1166793	713254	-54.9	1.3[1]				0	1.25			A	HT-SC02-241114	--
		HT-SC03	1	3	1166493	713515	-54.2	1.3[1]				0	1.25			A	HT-SC03-241114	--
2	6	HT-SC04	1	1	1167627	712656	-51.0	6.7	5	75%	4.8	0	4	-51.0	-55.0	A	HT-SC04-00-04-241030	--
												4	4.8	-55.0	-55.8	B	HT-SC04-04-4.8-241030	--
		HT-SC05	1	1	1167497	712652	-51.4	7.5	6.8	91%	6.7	0	3.6	-51.4	-55.0	A	HT-SC05-00-3.6-241029	--
												3.6	6.7	-55.0	-58.1	B	HT-SC05-3.6-6.7-241029	--
		HT-SC06	1	1	1167422	712779	-51.9	6.4	5.5	86%	5.4	0	3.1	-51.9	-55.0	A	HT-SC06-00-3.1-241029	--
												3.1	5.4	-55.0	-57.3	B	HT-SC06-3.1-5.4-241029	--
		HT-SC07	1	1	1167279	712858	-52.2	5	4.5	90%	5.0	0	2.8	-52.2	-55.0	A	HT-SC07-00-2.8-241030	--
												2.8	5	-55.0	-57.2	B	HT-SC07-2.8-05-241030	--
		HT-SC08	1	1	1167341	712931	-51.0	6	5.4	90%	5.4	0	4	-51.0	-55.0	A	HT-SC08-00-04-241030	--
												4	5.4	-55.0	-56.4	B	HT-SC08-04-5.4-241030	--
3	7	HT-SC09	2	2	1167136	713004	-52.4	5.5	4.6	84%	4.6	0	2.7	-52.4	-55.1	A	HT-SC09-00-2.7-241030	--
												2.7	4.6	-55.1	-57.0	B	HT-SC09-2.7-4.6-241030	--
		HT-SC10	1	1	1167190	713080	-51.8	5.9	6.2	105%[2]	6.3	0	3.2	-51.8	-55.0	A	HT-SC10-00-3.2-241030	--
												3.2	6.3	-55.0	-58.1	B	HT-SC10-3.2-6.3-241030	--
		HT-SC11	1	1	1167045	713144	-52.5	12.0	11.9	99%	11.5	0	2.5	-52.5	-55.0	A	HT-SC11-00-2.5-241031	--
												2.5	6.5	-55.0	-59.0	B	HT-SC11-2.5-6.5-241031	5 to 6 feet
												6.5	8.5	-59.0	-61.0	Z	HT-SC11-6.5-8.5-241031	--
		HT-SC12	1	1	1166896	713231	-51.0	9.5	9.1	96%	8.3	0	4	-51.0	-55.0	A	HT-SC12-00-04-241031	--
												4	8	-55.0	-59.0	B	HT-SC12-04-08-241031	--
												8	8.3	-59.0	-59.3	Z	HT-SC12-08-8.3-241031	--
		HT-SC13	3	3	1166957	713303	-51.8	8	5.8	73%	5.0	0	3.2	-51.8	-55.0	A	HT-SC13-00-3.2-241101	--
												3.2	5	-55.0	-56.8	B	HT-SC13-3.2-05-241101	--
	8	HT-SC14	1	1	1166773	713476	-53.2	6.3	5.8	92%	5.6	0	1.8	-53.2	-55.0	A	HT-SC14-00-1.8-241031	--
												1.8	5.6	-55.0	-58.8	B	HT-SC14-1.8-5.6-241031	--
		HT-SC15	1	1	1166626	713482	-51.5	9	6.5	72%	6.3	0	3.5	-51.5	-55.0	A	HT-SC15-00-3.5-241031	--
												3.5	6.3	-55.0	-57.8	B	HT-SC15-3.5-6.3-241031	--
		HT-SC16	1	1	1166627	713617	-54.7	12.0	11.3	94%	9.4	0	0.3	-54.7	-55.0	A	HT-SC16-00-0.3-241031	--
												0.3	4.3	-55.0	-59.0	B	HT-SC16-0.3-4.3-241031	1.7 to 2.7 feet
												4.3	6.3	-59.0	-61.0	Z	HT-SC16-4.3-6.3-241031	--
		HT-SC17	3	3	1166484	713623	-53.3	8	5.6	70%	5.6	0	1.7	-53.3	-55.0	A	HT-SC17-00-1.7-241107	--
												1.7	5.6	-55.0	-58.9	B	HT-SC17-1.7-5.6-241107	--
		HT-SC18	1	1	1166426	713816	-56.4	8	6.4	80%	5.6	0	2.6	-56.4	-59.0	B	HT-SC18-00-2.6-241107	--
												2.6	4.6	-59.0	-61.0	Z	HT-SC18-2.6-4.6-241107	--

Table 1
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Accepted Attempt No.	Total No. of Attempts	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Drive Penetration (feet below mudline)	Core Collection Recovery Length (feet)	Core Collection Recovery (%)	Processed Core Length (feet)	Sample Upper Depth (feet below mudline)	Sample Lower Depth (feet below mudline)	Sample Upper Elevation (feet MLLW)	Sample Lower Elevation (feet MLLW)	Interval	Discrete Sample ID	Atterberg Limits Sample (interval)[3]
					Easting (feet)	Northing (feet)												
4	9	HT-SC19	3	3	1166227	713857	-51.7	8	6.7	84%	6.1	0	3.3	-51.7	-55.0	A	HT-SC19-00-3.3-241111	--
												3.3	6.1	-55.0	-57.8	B	HT-SC19-3.3-6.1-241111	--
		HT-SC20	1	1	1166294	713945	-53.1	8	7.4	93%	7.1	0	1.9	-53.1	-55.0	A	HT-SC20-00-1.9-241111	--
												1.9	4.7	-55.0	-57.8	B	HT-SC20-1.9-4.7-241111	--
												4.7	7.1	-57.8	-60.2	Z	HT-SC20-4.7-7.1-241111	--
		HT-SC21	1	3	1166076	714021	-52.1	8	5.7	71%	5.1	0	2.9	-52.1	-55.0	A	HT-SC21-00-2.9-241111	--
												2.9	5.1	-55.0	-57.2	B	HT-SC21-2.9-5.1-241111	--
		HT-SC22	2	3	1166149	714084	-51.7	8.0	4.2	53%	3.3	0	3.3	-51.7	-55.0	A	HT-SC22-00-3.3-241112	--
		HT-SC23	2	3	1165959	714276	-51.5	8.0	3.6	45%	3.0	0	3	-51.5	-54.5	A	HT-SC23-00-03-241112	--
		HT-SC24	2	2	1165882	714206	-51.2	8.0	7	88%	6.3	0	3.8	-51.2	-55.0	A	HT-SC24-00-3.8-241112	--
												3.8	6.3	-55.0	-57.5	B	HT-SC24-3.8-6.3-241112	--
5	10	HT-SC25	2	2	1165751	714335	-51.9	7.2	4.6	64%	4.4	0	3.1	-51.9	-55.0	A	HT-SC25-00-3.1-241028	--
												3.1	4.4	-55.0	-56.3	B	HT-SC25-3.1-4.4-241028	--
		HT-SC26	1	1	1165815	714416	-51.2	12.0	6.2	52%	5.8	0	3.8	-51.2	-55.0	A	HT-SC26-00-3.8-241028	--
												3.8	5.8	-55.0	-57.0	B	HT-SC26-3.8-5.8-241028	--
		HT-SC27	1	1	1165634	714428	-52.3	12.0	10.9	91%	10.3	0	2.7	-52.3	-55.0	A	HT-SC27-00-2.7-241025	--
												2.7	6.7	-55.0	-59.0	B	HT-SC27-2.7-6.7-241025	--
												6.7	8.7	-59.0	-61.0	Z	HT-SC27-6.7-8.7-241025	--
		HT-SC28	2	2	1165642	714571	-52.0	8.0	5	63%	4.6	0	3	-52.0	-55.0	A	HT-SC28-00-03-241025	--
												3	4.6	-55.0	-56.6	B	HT-SC28-03-4.6-241025	--
		HT-SC29	2	2	1165466	714605	-52.1	6.0	5.8	97%	5.8	0	2.9	-52.1	-55.0	A	HT-SC29-00-2.9-241028	--
												2.9	5.8	-55.0	-57.9	B	HT-SC29-2.9-5.8-241028	--
		HT-SC30	2	2	1165462	714751	-52.8	12.0	8.4	70%	8.8	0	2.2	-52.8	-55.0	A	HT-SC30-00-2.2-241025	0.0 to 0.6 feet
												2.2	6.2	-55.0	-59.0	B	HT-SC30-2.2-6.2-241025	--
												6.2	8.2	-59.0	-61.0	Z	HT-SC30-6.2-8.2-241025	--
Washington United Terminals																		
20	24	WUT-SC01	2	2	1172423	708196	-49.8	8	7.6	95%	7.0	0	5.2	-49.8	-55.0	A	WUT-SC01-00-5.2-241105	--
												5.2	7	-55.0	-56.8	B	WUT-SC01-5.2-07-241105	--
		WUT-SC02	2	2	1172329	708183	-48.5	7	6.9	99%	6.7	0	6.5	-48.5	-55.0	A	WUT-SC02-00-6.5-241105	--
												6.5	6.7	-55.0	-55.2	B	WUT-SC02-6.5-6.7-241105	--
		WUT-SC03	3	3	1172238	708266	-54.0	8	6.7	84%	6.3	0	1	-54.0	-55.0	A	WUT-SC03-00-01-241105	--
												1	5	-55.0	-59.0	B	WUT-SC03-01-05-241105	--
												5	6.3	-59.0	-60.3	Z	WUT-SC03-05-6.3-241105	--
		WUT-SC04	2	2	1172242	708376	-53.3	12	12	100%	11.2	0	1.7	-53.3	-55.0	A	WUT-SC04-00-1.7-241105	--
												1.7	5.7	-55.0	-59.0	B	WUT-SC04-1.7-5.7-241105	--
												5.7	7.7	-59.0	-61.0	Z	WUT-SC04-5.7-7.7-241105	--
		WUT-SC05	1	1	1172054	708455	-50.4	6.8	5.5	81%	5.9	0	4.6	-50.4	-55.0	A	WUT-SC05-00-4.6-241106	--
												4.6	5.9	-55.0	-56.3	B	WUT-SC05-4.6-5.9-241106	--
		WUT-SC06	2	3	1172059	708532	-51.8	4	3.7	93%	2.4	0	2.4	-51.8	-54.2	A	WUT-SC06-00-2.4-241106	--

Table 1
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Accepted Attempt No.	Total No. of Attempts	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Drive Penetration (feet below mudline)	Core Collection Recovery Length (feet)	Core Collection Recovery (%)	Processed Core Length (feet)	Sample Upper Depth (feet below mudline)	Sample Lower Depth (feet below mudline)	Sample Upper Elevation (feet MLLW)	Sample Lower Elevation (feet MLLW)	Interval	Discrete Sample ID	Atterberg Limits Sample (interval)[3]
					Easting (feet)	Northing (feet)												
21	25	WUT-SC07	2	2	1171840	708639	-50.4	8	7.5	94%	6.7	0	4.6	-50.4	-55.0	A	WUT-SC07-00-4.6-241101	--
												4.6	6.7	-55.0	-57.1	B	WUT-SC07-4.6-6.7-241101	--
		WUT-SC08	1	1	1171905	708697	-54.1	7.9	7.5	95%	6.3	0	0.9	-54.1	-55.0	A	WUT-SC08-00-0.9-241106	--
												0.9	4.9	-55.0	-59.0	B	WUT-SC08-0.9-4.9-241106	--
												4.9	6.3	-59.0	-60.4	Z	WUT-SC08-4.9-6.3-241106	--
		WUT-SC09	1	1	1171742	708855	-51.3	12	11.7	98%	7.6	0	3.7	-51.3	-55.0	A	WUT-SC09-00-3.7-241106	--
												3.7	7.6	-55.0	-58.9	B	WUT-SC09-3.7-7.6-241106	--
		WUT-SC10	1	1	1171684	708801	-51.2	8.4	7.7	92%	8.3	0	3.9	-51.2	-55.1	A	WUT-SC10-00-3.9-241107	--
												3.9	7.9	-55.1	-59.1	B	WUT-SC10-3.9-7.9-241107	--
												7.9	8.3	-59.1	-59.5	Z	WUT-SC10-7.9-8.3-241107	--
22		WUT-SC11	2	3	1171461	708943	-49.8	5.6	3.4	61%	3.7	0	3.7	-49.8	-53.5	A	WUT-SC11-00-3.7-241104	--
		WUT-SC12	2	3	1171522	709089	-52.1	7.3	4.3	59%	5.5	0	2.9	-52.1	-55.0	A	WUT-SC12-00-2.9-241104	--
												2.9	5.5	-55.0	-57.6	B	WUT-SC12-2.9-5.5-241104	--
	26	WUT-SC13	1	1	1171355	709130	-53.3	6.4	4.9	77%	5.7	0	1.7	-53.3	-55.0	A	WUT-SC13-00-1.7-241024	--
												1.7	5.7	-55.0	-59.0	B	WUT-SC13-1.7-5.7-241024	--
		WUT-SC14	2	2	1171368	709257	-53.8	8	7.7	96%	7.6	0	1.2	-53.8	-55.0	A	WUT-SC14-00-1.2-241024	--
												1.2	5.2	-55.0	-59.0	B	WUT-SC14-1.2-5.2-241024	--
												5.2	7.2	-59.0	-61.0	Z	WUT-SC14-5.2-7.2-241024	--
		WUT-SC15	1	1	1171155	709315	-50.6	7.5	7.1	95%	8.3	0	4.4	-50.6	-55.0	A	WUT-SC15-00-4.4-241025	--
												4.4	8.3	-55.0	-58.9	B	WUT-SC15-4.4-8.3-241025	--
		WUT-SC16	2	2	1171217	709380	-53.0	6.5	4.2	65%	4.3	0	2	-53.0	-55.0	A	WUT-SC16-00-02-241024	0.0 to 0.5 foot
												2	4.4	-55.0	-57.4	B	WUT-SC16-02-4.4-241024	--
		WUT-SC17	1	1	1171133	709463	-52.0	12	6	50%	7.0	0	3	-52.0	-55.0	A	WUT-SC17-00-03-241024	--
												3	7	-55.0	-59.0	B	WUT-SC17-03-07-241024	--
23		WUT-SC18	1	1	1170980	709407	-50.7	10.5	6.2	59%	7.0	0	4.3	-50.7	-55.0	A	WUT-SC18-00-4.3-241023	--
												4.3	7	-55.0	-57.7	B	WUT-SC18-4.3-07-241023	--
	27	WUT-SC19	1	1	1170836	709607	-51.2	10.5	8	76%	8.5	0	3.8	-51.2	-55.0	A	WUT-SC19-00-3.8-241023	--
												3.8	7.8	-55.0	-59.0	B	WUT-SC19-3.8-7.8-241023	--
												7.8	8.5	-59.0	-59.7	Z	WUT-SC19-7.8-8.5-241023	--
		WUT-SC20	2	2	1170877	709677	-53.6	12	6	50%	7.3	0	1.4	-53.6	-55.0	A	WUT-SC20-00-1.4-241023	--
												1.4	5.4	-55.0	-59.0	B	WUT-SC20-1.4-5.4-241023	--
												5.4	7.3	-59.0	-60.9	Z	WUT-SC20-5.4-7.3-241023	--
		WUT-SC21	1	1	1170683	709703	-51.0	5	5.2	104%[2]	5.2	0	4	-51.0	-55.0	A	WUT-SC21-00-04-241022	--
												4	5.2	-55.0	-56.2	B	WUT-SC21-04-5.2-241022	--
		WUT-SC22	3	3	1170810	709786	-53.1	12	8.5	71%	9.1	0	1.9	-53.1	-55.0	A	WUT-SC22-00-1.9-241023	--
												1.9	5.9	-55.0	-59.0	B	WUT-SC22-1.9-5.9-241023	--
												5.9	7.9	-59.0	-61.0	Z	WUT-SC22-5.9-7.9-241023	--
		WUT-SC23	1	1	1170568	709884	-52.0	12	7.3	61%	8.5	0	3	-52.0	-55.0	A	WUT-SC23-00-03-241023	--
												3	7.1	-55.0	-59.1	B	WUT-SC23-03-7.1-241023	--
												7.1	8.5	-59.1	-60.5	Z	WUT-SC23-7.1-8.5-241023	--
		WUT-SC24	1	1	1170557	710015	-51.3	12	7.5	63%	6.5	0	3.7	-51.3	-55.0	A	WUT-SC24-00-3.7-241022	--
												3.7	6.5	-55.0	-57.8	B	WUT-SC24-3.7-6.5-241022	--

Table 1
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Notes:

1. Recovery depth is provided for box core penetration depth.

2. Recovery greater than 100% may be due to expansion of sediment during coring. Slow, hard drive at this location.

3. The listed interval is an Atterberg Limits sample that was selected based on field observations of grain size and sample plasticity.

--: not applicable

DMMU: Dredged Material Management Unit
ID: identification

MLLW: mean lower low water

No.: number

Washington SP NAD83: Washington State Plane North American Datum of 1983

Table 2
Dredged Material Management Units Area, Volume, and Number of Cores

Terminal	Rank	Surface					Subsurface				
		DMMU	Area (ft^2)	Volume (cy)	Minimum Required Number of Cores	Number of Cores Collected	DMMU	Area (ft^2)	Volume (cy)	Minimum Required Number of Cores[a]	Number of Cores Collected
Husky	Moderate	1[b]	52,365	3,454	1	3	6	131,200	19,205	5	5
		2	121,146	14,074	4	5	7	96,963	15,647	4	5
		3	174,838	15,071	4	8	8	125,064	18,093	5	5
		4	135,365	14,776	4	6	9[c]	143,195	21,247	6	6
		5	135,795	13,373	4	6	10[c]	152,769	22,535	6	6
Husky Totals[d]			**619,509**	**60,748**	**17**	**28**	**--**	**649,191**	**96,727**	**26**	**27**
WUT	Moderate	20	124,620	13,016	4	6	24	157,375	23,156	6	6
		21	104,311	14,132	4	4	25	152,777	22,998	6	6
		22	143,968	14,787	4	7	26	155,417	23,106	6	6
		23	141,400	14,733	4	7	27	149,095	23,443	6	6
WUT Totals[d,e]			**514,299**	**56,668**	**16**	**24**	**--**	**614,664**	**92,703**	**24**	**24**

Notes:

a. Cores collected for overlapping surface and subsurface DMMUs as single cores targeting the deepest subsurface DMMU depths.

b. Husky DMMU 1 includes approximately 5,700 cy of rock within the DMMU footprint not slated for open-water disposal. The rock volume is not included in the dredge volume presented in the table.

c. Husky DMMU-9 and DMMU-10 include 374 and 504 cy, respectively, of additional sediment volume to be removed to support toe wall rock placement.

d. Total volume includes dredge area and side slopes in surface DMMUs and assumes a 3:1 daylight side-slope angle, except as noted on SQAPP figures.

e. There is an estimated additional 3,175 cy of riprap slope keyway rock that will be removed as part of WUT dredging, primarily from the area adjacent to DMMU-20 and DMMU-24 that is entirely rock to the surface. The rock volume is not included in the dredge volume presented in the table. Minor rock volumes from DMMU-21, DMMU-22, and DMMU-23 have also been excluded.

--: not applicable

cy: cubic yards

DMMU: Dredged Material Management Unit

ft^2: square feet

SQAPP: Sampling and Quality Assurance Project Plan

WUT: Washington United Terminals

Table 3
Summary of Samples for Chemical Analyses

DMMU and Z-Layer	Location ID	Discrete Sample ID	Composite Sample ID	Analyses									
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain Size[1]	Atterberg Limits[2]
Husky Terminal													
1	HT-SC01	HT-SC01-241114	HT-01CS-A	X	X	X	X	X	X	X	X	--	--
	HT-SC02	HT-SC02-241114										--	--
	HT-SC03	HT-SC03-241114										--	--
2	HT-SC04	HT-SC04-00-04-241030	HT-02CS-A	X	X	X	X	X	X	X	X	X	--
	HT-SC05	HT-SC05-00-3.6-241029										X	--
	HT-SC06	HT-SC06-00-3.1-241029										--	--
	HT-SC07	HT-SC07-00-2.8-241030										--	--
	HT-SC08	HT-SC08-00-04-241030										X	--
3	HT-SC09	HT-SC09-00-2.7-241030	HT-03CS-A	X	X	X	X	X	X	X	X	X	--
	HT-SC10	HT-SC10-00-3.2-241030										--	--
	HT-SC11	HT-SC11-00-2.5-241031										X	--
	HT-SC12	HT-SC12-00-04-241031										--	--
	HT-SC13	HT-SC13-00-3.2-241101										X	--
	HT-SC14	HT-SC14-00-1.8-241031										--	--
	HT-SC15	HT-SC15-00-3.5-241031										X	--
	HT-SC16	HT-SC16-00-0.3-241031										--	--
	HT-SC17	HT-SC17-00-1.7-241107										X	--
4	HT-SC19	HT-SC19-00-3.3-241111	HT-04CS-A	X	X	X	X	X	X	X	X	--	--
	HT-SC20	HT-SC20-00-1.9-241111										X	--
	HT-SC21	HT-SC21-00-2.9-241111										--	--
	HT-SC22	HT-SC22-00-3.3-241112										--	--
	HT-SC23	HT-SC23-00-03-241112										--	--
	HT-SC24	HT-SC24-00-3.8-241112										X	--

Table 3
Summary of Samples for Chemical Analyses

DMMU and Z-Layer	Location ID	Discrete Sample ID	Composite Sample ID	Analyses									
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain Size[1]	Atterberg Limits[2]
5	HT-SC25	HT-SC25-00-3.1-241028	HT-05CS-A	X	X	X	X	X	X	X	X	--	--
	HT-SC26	HT-SC26-00-3.8-241028										X	--
	HT-SC27	HT-SC27-00-2.7-241025										X	--
	HT-SC28	HT-SC28-00-03-241025										--	--
	HT-SC29	HT-SC29-00-2.9-241028										--	--
	HT-SC30	HT-SC30-00-2.2-241025										X	X (0–0.6 ft)
6	HT-SC04	HT-SC04-04-4.8-241030	HT-06CS-B	X	X	X	X	X	X	X	X	X	--
	HT-SC05	HT-SC05-3.6-6.7-241029										X	--
	HT-SC06	HT-SC06-3.1-5.4-241029										--	--
	HT-SC07	HT-SC07-2.8-05-241030										--	--
	HT-SC08	HT-SC08-04-5.4-241030										X	--
7	HT-SC09	HT-SC09-2.7-4.6-241030	HT-07CS-B	X	X	X	X	X	X	X	X	X	--
	HT-SC10	HT-SC10-3.2-6.3-241030										--	--
	HT-SC11	HT-SC11-2.5-6.5-241031										X	X (5–6 ft)
	HT-SC12	HT-SC12-04-08-241031										--	--
	HT-SC13	HT-SC13-3.2-05-241101										X	--
8	HT-SC14	HT-SC14-1.8-5.6-241031	HT-08CS-B	X	X	X	X	X	X	X	X	--	--
	HT-SC15	HT-SC15-3.5-6.3-241031										X	--
	HT-SC16	HT-SC16-0.3-4.3-241031										--	X (1.7–2.7 ft)
	HT-SC17	HT-SC17-1.7-5.6-241107										X	--
	HT-SC18	HT-SC18-00-2.6-241107										--	--
9	HT-SC19	HT-SC19-3.3-6.1-241111	HT-09CS-B	X	X	X	X	X	X	X	X	--	--
	HT-SC20	HT-SC20-1.9-4.7-241111										X	--
	HT-SC21	HT-SC21-2.9-5.1-241111										--	--
	HT-SC24	HT-SC24-3.8-6.3-241112										X	--

Table 3
Summary of Samples for Chemical Analyses

DMMU and Z-Layer	Location ID	Discrete Sample ID	Composite Sample ID	Analyses									
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain Size[1]	Atterberg Limits[2]
10	HT-SC25	HT-SC25-3.1-4.4-241028	HT-10CS-B	X	X	X	X	X	X	X	X	--	--
	HT-SC26	HT-SC26-3.8-5.8-241028										X	--
	HT-SC27	HT-SC27-2.7-6.7-241025										X	--
	HT-SC28	HT-SC28-03-4.6-241025										--	--
	HT-SC29	HT-SC29-2.9-5.8-241028										--	--
	HT-SC30	HT-SC30-2.2-6.2-241025										X	--
Z-Layer Samples (all DMMUs)	HT-SC11	HT-SC11-6.5-8.5-241031	--	--	--	--	--	--	--	--	--	X	--
	HT-SC12	HT-SC12-08-8.3-241031	--	--	--	--	--	--	--	--	--	--	--
	HT-SC16	HT-SC16-4.3-6.3-241031	--	--	--	--	--	--	--	--	--	--	--
	HT-SC18	HT-SC18-2.6-4.6-241107	--	--	--	--	--	--	--	--	--	--	--
	HT-SC20	HT-SC20-4.7-7.1-241111	--	--	--	--	--	--	--	--	--	--[3]	--
	HT-SC27	HT-SC27-6.7-8.7-241025	--	--	--	--	--	--	--	--	--	X	--
	HT-SC30	HT-SC30-6.2-8.2-241025	--	--	--	--	--	--	--	--	--	X	--
Washington United Terminals													
20	WUT-SC01	WUT-SC01-00-5.2-241105	WUT-20CS-A	X	X	X	X	X	X	X	X	X	--
	WUT-SC02	WUT-SC02-00-6.5-241105										--	--
	WUT-SC03	WUT-SC03-00-01-241105										--	--
	WUT-SC04	WUT-SC04-00-1.7-241105										X	--
	WUT-SC05	WUT-SC05-00-4.6-241106										X	--
	WUT-SC06	WUT-SC06-00-2.4-241106										--	--
21	WUT-SC07	WUT-SC07-00-4.6-241101	WUT-21CS-A	X	X	X	X	X	X	X	X	--	--
	WUT-SC08	WUT-SC08-00-0.9-241106										X	--
	WUT-SC09	WUT-SC09-00-3.7-241106										--	--
	WUT-SC10	WUT-SC10-00-3.9-241107										X	--

Table 3
Summary of Samples for Chemical Analyses

DMMU and Z-Layer	Location ID	Discrete Sample ID	Composite Sample ID	Analyses									
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain Size[1]	Atterberg Limits[2]
22	WUT-SC11	WUT-SC11-00-3.7-241104	WUT-22CS-A	X	X	X	X	X	X	X	X	X	--
	WUT-SC12	WUT-SC12-00-2.9-241104										--	--
	WUT-SC13	WUT-SC13-00-1.7-241024										--	--
	WUT-SC14	WUT-SC14-00-1.2-241024										X	--
	WUT-SC15	WUT-SC15-00-4.4-241025										--	--
	WUT-SC16	WUT-SC16-00-02-241024										--	X (0–0.5 ft)
	WUT-SC17	WUT-SC17-00-03-241024										--	--
23	WUT-SC18	WUT-SC18-00-4.3-241023	WUT-23CS-A	X	X	X	X	X	X	X	X	X	--
	WUT-SC19	WUT-SC19-00-3.8-241023										--	--
	WUT-SC20	WUT-SC20-00-1.4-241023										X	--
	WUT-SC21	WUT-SC21-00-04-241022										X	--
	WUT-SC22	WUT-SC22-00-1.9-241023										--	--
	WUT-SC23	WUT-SC23-00-03-241023										--	--
	WUT-SC24	WUT-SC24-00-3.7-241022										X	--
24	WUT-SC01	WUT-SC01-5.2-07-241105	WUT-24CS-B	X	X	X	X	X	X	X	X	X	--
	WUT-SC02	WUT-SC02-6.5-6.7-241105										--	--
	WUT-SC03	WUT-SC03-01-05-241105										--	--
	WUT-SC04	WUT-SC04-1.7-5.7-241105										X	--
	WUT-SC05	WUT-SC05-4.6-5.9-241106										X	--
25	WUT-SC07	WUT-SC07-4.6-6.7-241101	WUT-25CS-B	X	X	X	X	X	X	X	X	--	--
	WUT-SC08	WUT-SC08-0.9-4.9-241106										X	--
	WUT-SC09	WUT-SC09-3.7-7.6-241106										--	--
	WUT-SC10	WUT-SC10-3.9-7.9-241107										X	--
	WUT-SC12	WUT-SC12-2.9-5.5-241104										--	--

Table 3
Summary of Samples for Chemical Analyses

DMMU and Z-Layer	Location ID	Discrete Sample ID	Composite Sample ID	Analyses									
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain Size[1]	Atterberg Limits[2]
26	WUT-SC13	WUT-SC13-1.7-5.7-241024	WUT-26CS-B	X	X	X	X	X	X	X	X	--	--
	WUT-SC14	WUT-SC14-1.2-5.2-241024										X	--
	WUT-SC15	WUT-SC15-4.4-8.3-241025										--	--
	WUT-SC16	WUT-SC16-02-4.4-241024										--	--
	WUT-SC17	WUT-SC17-03-07-241024										--	--
	WUT-SC18	WUT-SC18-4.3-07-241023										--[3]	--
27	WUT-SC19	WUT-SC19-3.8-7.8-241023	WUT-27CS-B	X	X	X	X	X	X	X	X	--	--
	WUT-SC20	WUT-SC20-1.4-5.4-241023										X	--
	WUT-SC21	WUT-SC21-04-5.2-241022										--[3]	--
	WUT-SC22	WUT-SC22-1.9-5.9-241023										--	--
	WUT-SC23	WUT-SC23-03-7.1-241023										--	--
	WUT-SC24	WUT-SC24-3.7-6.5-241022										X	--
Z-Layer Samples	WUT-SC03	WUT-SC03-05-6.3-241105	--	--	--	--	--	--	--	--	--	--	--
	WUT-SC04	WUT-SC04-5.7-7.7-241105	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC08	WUT-SC08-4.9-6.3-241106	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC10	WUT-SC10-7.9-8.3-241107	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC14	WUT-SC14-5.2-7.2-241024	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC19	WUT-SC19-7.8-8.5-241023	--	--	--	--	--	--	--	--	--	--	--
	WUT-SC20	WUT-SC20-5.4-7.3-241023	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC22	WUT-SC22-5.9-7.9-241023	--	--	--	--	--	--	--	--	--	--	--
	WUT-SC23	WUT-SC23-7.1-8.5-241023	--	--	--	--	--	--	--	--	--	--	--

Table 3
Summary of Samples for Chemical Analyses

Notes:

1. Grain size testing was conducted on discrete samples.

2. Atterberg testing was conducted on up to 25% of representative discrete samples selected based on field observations of grain size and plasticity.

3. Grain size testing stated in the SQAPP was not performed. Sample was not collected due to volume limitations.

--: not applicable

D/F: dioxins/furans

DMMU: Dredged Material Management Unit

ft: feet

ID: identification

NH_3: ammonia

PCB: polychlorinated biphenyl

S^{2-}: sulfide

SVOC: semivolatile organic compound

TOC: total organic carbon

TS: total solids

TVS: total volatile solids

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07
						Surface or Subsurface	Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface
						Location ID	HT-01CS-A	HT-02CS-A	HT-03CS-A	HT-04CS-A	HT-05CS-A	HT-06CS-B	HT-07CS-B
						Sample Date	11/14/2024	10/30/2024	11/7/2024	11/12/2024	10/29/2024	10/30/2024	11/1/2024
						Sample ID	HT-01CS-A-241114	HT-02CS-A-241030	HT-03CS-A-241107	HT-04CS-A-241112	HT-05CS-A-241029	HT-06CS-B-241030	HT-07CS-B-241101
						Matrix	SE	SE	SE	SE	SE	SE	SE
Conventional Parameters (mg/kg)													
Ammonia as nitrogen	SM4500NH3H	--	--	--	--		**3.92**	**0.89**	**2.99**	**0.93**	**1.44**	**0.55**	**2.16**
Sulfide	SM4500S2D	--	--	--	--		**128**	**1.9 J**	**11.2 J**	**49.0**	**41.4 J**	1.08 UJ	**2.26 J**
Conventional Parameters (pct)													
Total organic carbon	SW9060AM	--	--	--	--		**0.41**	**0.25**	**0.18**	**0.32**	**0.22**	**0.2**	**0.15**
Total solids	SM2540G	--	--	--	--		**66.76**	**76.62**	**75.21**	**80.06**	**76.57**	**84.48**	**81.31**
Total volatile solids	PSEP-TVS	--	--	--	--		**2.56**	**1.46**	**1.55**	**1.80**	**1.52**	**1.14**	**1.58**
Metals (mg/kg)													
Antimony	SW6020	--	150	--	200		0.29 U	0.26 UJ	0.26 U	0.25 U	0.26 UJ	0.23 UJ	0.24 U
Arsenic	SW6020	--	57	507.1	700		**3.12**	**1.56 J**	**2.09**	**2.10**	**2.17 J**	**1.03 J**	**1.63**
Cadmium	SW6020	--	5.1	--	14		**0.07 J**	0.13 U	0.13 U	**0.05 J**	0.13 U	0.12 U	0.12 U
Chromium	SW6020	--	260	--	--		**11.0**	**8.7 J**	**9.77**	**11.1**	**8.56 J**	**7.59 J**	**9.74**
Copper	SW6020	--	390	--	1300		**21.6**	**11.8**	**13.8**	**16.8**	**14.2**	**8.65**	**13.1**
Lead	SW6020	--	450	975	1200		**3.66**	**1.49**	**2.34**	**2.77**	**2.8 J**	**1.04 J**	**1.86**
Mercury	SW7471B	--	0.41	1.5	2.3		**0.0184 J**	**0.00829 J**	**0.0164 J**	**0.0190 J**	**0.0211 J**	0.0264 U	**0.0120 J**
Selenium	SW6020	--	--	3	--		**0.59 J**	**0.24 J**	**0.54 J**	**0.52 J**	**0.4 J**	**0.34 J**	**0.57 J**
Silver	SW6020	--	6.1	--	8.4		**0.05 J**	**0.04 J**	**0.04 J**	**0.05 J**	**0.06 J**	**0.03 J**	**0.03 J**
Zinc	SW6020	--	410	--	3800		**31.4**	**18.8**	**24.2**	**24.4**	**21.2**	**16.3**	**21.2**
Organometals (µg/kg)													
Tributyltin (ion)	SW8270ESIM	--	--	73	--		3.85 U	3.86 UJ	**6.81**	3.84 U	3.85 UJ	3.84 UJ	**2.78 J**
Semivolatile Organics (µg/kg)													
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	--	64		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
1,2-Dichlorobenzene	SW8270ESIM	--	35	--	110		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
1,4-Dichlorobenzene	SW8270ESIM	--	110	--	120		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
2,4-Dimethylphenol	SW8270ESIM	--	29	--	210		20.0 U	20.0 UJ	20.0 UJ	20.0 UJ	19.9 UJ	20.0 UJ	20.0 UJ
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	--	77		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	--	3600		**6.6**	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
Benzoic acid	SW8270ESIM	--	650	--	760		**75.9 J**	99.9 UJ	100 U	**54.0 J**	99.3 UJ	99.8 UJ	100 U
Benzyl alcohol	SW8270ESIM	--	57	--	870		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	20.0 UJ	20.0 U
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	--	8300		**58.9**	50.0 U	50.0 U	50.0 U	49.7 U	49.9 U	50.0 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	--	970		**6.0**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	--	5100		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Di-n-octyl phthalate	SW8270E	--	6200	--	6200		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Diethyl phthalate	SW8270ESIM	--	200	--	1200		**12.7 J**	20 U	20.0 U	20 U	19.9 U	20 U	20.0 U
Dimethyl phthalate	SW8270ESIM	--	71	--	1400		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-01 Surface HT-01CS-A 11/14/2024 HT-01CS-A-241114 SE	HT-02 Surface HT-02CS-A 10/30/2024 HT-02CS-A-241030 SE	HT-03 Surface HT-03CS-A 11/7/2024 HT-03CS-A-241107 SE	HT-04 Surface HT-04CS-A 11/12/2024 HT-04CS-A-241112 SE	HT-05 Surface HT-05CS-A 10/29/2024 HT-05CS-A-241029 SE	HT-06 Subsurface HT-06CS-B 10/30/2024 HT-06CS-B-241030 SE	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE
Hexachlorobenzene	SW8270ESIM	--	22	168	230		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	--	270		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U
n-Nitrosodiphenylamine	SW8270ESIM	--	28	--	130		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	SW8270ESIM	--	400	504	690		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	29.5 UJ	20.0 U
Phenol	SW8270ESIM	--	420	--	1200		**6.9**	5.0 UJ	**9.9**	5.0 U	5.0 UJ	**21.4 J**	**5.2**
Polycyclic Aromatic Hydrocarbons (µg/kg)													
1-Methylnaphthalene	SW8270E	--	--	--	--		**--**	**--**	**--**	**--**	**--**	**--**	**--**
2-Methylnaphthalene	SW8270E	--	670	--	1900		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthene	SW8270E	--	500	--	2000		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthylene	SW8270E	--	560	--	1300		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	20.0 UJ	20.0 U
Anthracene	SW8270E	--	960	--	13000		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)anthracene	SW8270E	--	1300	--	5100		**10.9 J**	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)pyrene	SW8270E	--	1600	--	3600		**13.1 J**	20.0 U	**11.4 J**	20.0 U	**14.2 J**	20.0 U	20.0 U
Benzo(b,j,k)fluoranthenes	SW8270E	--	--	--	--		40.0 U	40.0 U	40.0 U	40.0 U	39.7 U	39.9 U	40.0 U
Benzo(g,h,i)perylene	SW8270E	--	670	--	3200		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Carbazole	SW8270E	--	--	--	--		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Chrysene	SW8270E	--	1400	--	21000		**14.7 J**	20.0 U	**12.3 J**	**11.1 J**	**13.9 J**	20.0 U	20.0 U
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	--	1900		**3.0 J**	5.0 U	10.0 U	5.0 U	5.0 U	5.0 U	10.0 U
Dibenzofuran	SW8270E	--	540	--	1700		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Fluoranthene	SW8270E	--	1700	4600	30000		**19.1 J**	**15.8 J**	**15.3 J**	**12.4 J**	**17.8 J**	20.0 U	**17.8 J**
Fluorene	SW8270E	--	540	--	3600		20.0 U	20.0 U	20.0 U	20.0 UJ	19.9 U	20.0 U	20.0 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	--	4400		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Naphthalene	SW8270E	--	2100	--	2400		20.0 U	**20.5 J**	20.0 U	20.0 U	19.9 UJ	**10.3 J**	20.0 U
Phenanthrene	SW8270E	--	1500	--	21000		**12.8 J**	**14.7 J**	**11.8 J**	20.0 U	**10.7 J**	20.0 U	**10.6 J**
Pyrene	SW8270E	--	2600	11980	16000		**21.7**	**27.5**	**25.2**	**17.8 J**	**25.3**	**10.7 J**	**15.8 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	--	9900		40.0 U	40.0 U	40.0 U	40.0 U	39.7 U	39.9 U	40.0 U
Total HPAH (DMMP) (U = 0 max limit)	Calculated	--	12000	--	69000		**83 J**	**43.3 J**	**64.2 J**	**41.3 J**	**71.2 J**	**10.7 J**	**33.6 J**
Total LPAH (DMMP) (U = 0 max limit)	Calculated	--	5200	--	29000		**12.8 J**	**35.2 J**	**11.8 J**	20.0 UJ	**10.7 J**	**10.3 J**	**10.6 J**
Pesticides (µg/kg)													
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ	1.00 UJ
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ	1.00 UJ
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ	1.00 UJ
4,4'-DDD (p,p'-DDD)	SW8081B	--	16	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	9	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDT (p,p'-DDT)	SW8081B	--	12	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	**0.93 J**	1.00 U
Aldrin	SW8081B	--	9.5	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-01 Surface HT-01CS-A 11/14/2024 HT-01CS-A-241114 SE	HT-02 Surface HT-02CS-A 10/30/2024 HT-02CS-A-241030 SE	HT-03 Surface HT-03CS-A 11/7/2024 HT-03CS-A-241107 SE	HT-04 Surface HT-04CS-A 11/12/2024 HT-04CS-A-241112 SE	HT-05 Surface HT-05CS-A 10/29/2024 HT-05CS-A-241029 SE	HT-06 Subsurface HT-06CS-B 10/30/2024 HT-06CS-B-241030 SE	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dieldrin	SW8081B	--	1.9	--	1700		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U	1.00 U
Endrin ketone	SW8081B	--	--	--	--		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U	1.00 U
Heptachlor	SW8081B	--	1.5	--	270		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Nonachlor, cis-	SW8081B	--	--	--	--		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U	1.00 U
Nonachlor, trans-	SW8081B	--	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ	1.00 UJ
Oxychlordane	SW8081B	--	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ	1.00 UJ
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	50	69		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	**0.93 J**	1.00 U
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	2.8	37	--		1.00 U	1 UJ	1.00 UJ	1.00 UJ	1 UJ	1 UJ	1.00 UJ
Total DDx (U = 0 max limit)	Calculated	--	--	--	--		1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	**0.93 J**	1.00 UJ
D/F (ng/kg)													
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--	--		**206**	**62.1**	**198**	**147**	**138**	**18.9**	**74.2**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--	--		**9.97**	**3.22**	**5.71**	**6.84**	**8.71**	**0.915 J**	**2.19 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--	--		**25.0**	**6.84**	**18.4**	**15.8**	**18.2**	**2.38 J**	**7.04**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		**5.36**	**1.63 J**	**2.67**	**3.92 J**	**3.94**	**0.743 J**	**1.23**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		**0.673 JEMPC**	0.0020 U	0.312 U	**0.394 J**	**0.691 J**	0.0020 U	0.309 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.395 U	0.022 U	0.230 U	0.183 U	0.027 U	0.016 U	0.281 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		**0.859 J**	**0.461 J**	**0.397 J**	**0.923 J**	**1.38**	0.010 U	0.146 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		**1.18**	0.024 U	**0.890 J**	**0.788 J**	**0.949 J**	**0.127 J**	**0.323 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		**0.529 JEMPC**	0.018 U	**0.240 J**	0.137 U	**0.461 J**	0.010 U	0.133 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		**0.691 J**	0.025 U	**0.488 J**	**0.594 J**	**0.505 J**	0.018 U	0.304 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.363 U	0.021 U	0.207 U	**0.248 J**	0.026 U	0.013 U	0.198 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--	--		0.410 U	0.135 U	0.323 U	0.175 U	0.105 U	0.073 U	0.278 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--	--		**0.471 J**	**0.223 J**	**0.174 J**	**0.443 J**	**0.832 J**	0.0070 U	0.159 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.268 U	0.017 U	0.146 U	0.128 U	**0.268 J**	0.010 U	0.140 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--	--		0.348 U	0.090 U	0.186 U	0.170 U	**0.393 J**	0.073 U	0.169 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--	--		0.309 U	0.103 U	0.144 U	0.105 U	0.123 U	0.077 U	0.134 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--	--		**0.550 JEMPC**	**0.138 J**	0.239 U	**0.389 J**	**0.84 J**	0.010 U	0.183 U
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--	--		**56.4**	**14.3**	**41.5**	**42.2**	**42.6**	**5.09**	**15.8**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--	--		**14.8**	**2.95**	**9.20**	**10.9**	**12.2**	**1.32**	**3.84**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--	--		**4.77**	**1.07**	**4.87**	**3.56**	**4.96**	**0.575 J**	**0.440 J**
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--	--		**3.14**	**1.58**	**4.37**	**2.80**	**6.51**	**0.275 J**	**1.68**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--	--		**1.32**	-- U	**0.202 J**	**0.142 J**	**0.45 J**	-- U	-- U
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--	--		**2.02**	-- U	**1.14**	**0.977 J**	**1.63**	-- U	**0.127 J**

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-01 Surface HT-01CS-A 11/14/2024 HT-01CS-A-241114 SE	HT-02 Surface HT-02CS-A 10/30/2024 HT-02CS-A-241030 SE	HT-03 Surface HT-03CS-A 11/7/2024 HT-03CS-A-241107 SE	HT-04 Surface HT-04CS-A 11/12/2024 HT-04CS-A-241112 SE	HT-05 Surface HT-05CS-A 10/29/2024 HT-05CS-A-241029 SE	HT-06 Subsurface HT-06CS-B 10/30/2024 HT-06CS-B-241030 SE	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--	--		-- U	-- U	-- U	**0.875 J**	**0.75**	**0.134 J**	**0.268 J**
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--	--		-- U	-- U	-- U	**0.646 J**	**1.5**	-- U	-- U
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	4	10	--		**0.770 J**	**0.171 J**	**0.479 J**	**0.555 J**	**0.86 J**	**0.0499 J**	**0.138 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	4	10	--		**1.23 J**	**0.310 J**	**0.783 J**	**0.743 J**	**0.97 J**	**0.140 J**	**0.442 J**
PCB Aroclors (mg/kg-OC)													
Aroclor 1016	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1221	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1232	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1242	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1248	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1254	SW8082A	--	--	--	--		0.98 U	**1.7**	2.2 U	1.3 U	**1.6 J**	2.0 U	2.7 U
Aroclor 1260	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1262	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Aroclor 1268	SW8082A	--	--	--	--		0.98 U	1.6 U	2.2 U	1.3 U	1.8 U	2.0 U	2.7 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	--	38	--		0.98 U	**1.7**	2.2 U	1.3 U	**1.6 J**	2 U	2.7 U
PCB Aroclors (µg/kg)													
Aroclor 1016	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1221	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1232	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1242	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1248	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1254	SW8082A	--	--	--	--		4.0 U	**4.3**	4.0 U	4.0 U	**3.6 J**	4.0 U	4.0 U
Aroclor 1260	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1262	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1268	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	130	--	3100		4.0 U	**4.3**	4.0 U	4.0 U	**3.6 J**	4 U	4.0 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE
Conventional Parameters (mg/kg)												
Ammonia as nitrogen	SM4500NH3H	--	--	--	--		**8.67**	**1.92**	**7.22**	**1.32**	0.44 U	**0.57**
Sulfide	SM4500S2D	--	--	--	--		**16.8 J**	**2.66**	**1.79 J**	**5.30**	**3.54**	**16.3**
Conventional Parameters (pct)												
Total organic carbon	SW9060AM	--	--	--	--		**0.25**	**0.06**	**0.24**	**0.15**	**0.16**	**0.11**
Total solids	SM2540G	--	--	--	--		**73.73**	**83.59**	**80.51**	**82.88**	**83.39**	**80.03**
Total volatile solids	PSEP-TVS	--	--	--	--		**1.67**	**1.34**	**1.27**	**1.15**	**1.14**	**1.25**
Metals (mg/kg)												
Antimony	SW6020	--	150	--	200		0.25 U	0.22 U	0.24 UJ	0.23 U	0.24 U	0.24 U
Arsenic	SW6020	--	57	507.1	700		**1.51**	**0.94**	**1.12 J**	**2.81**	**3.17**	**3.28**
Cadmium	SW6020	--	5.1	--	14		0.13 U	0.11 U	**0.1 J**	**0.04 J**	**0.04 J**	0.12 U
Chromium	SW6020	--	260	--	--		**9.63**	**8.16**	**9.49 J**	**12.0**	**9.18**	**7.63**
Copper	SW6020	--	390	--	1300		**16.3**	**11.2**	**10.4**	**14.6**	**15.1**	**12.0**
Lead	SW6020	--	450	975	1200		**1.67**	**1.30**	**1.38**	**2.25**	**2.22**	**1.68**
Mercury	SW7471B	--	0.41	1.5	2.3		**0.0235 J**	**0.00900 J**	**0.0135 J**	**0.0110 J**	**0.0148 J**	**0.0104 J**
Selenium	SW6020	--	--	3	--		**0.55 J**	**0.39 J**	**0.41 J**	**0.52 J**	**0.49 J**	**0.42 J**
Silver	SW6020	--	6.1	--	8.4		**0.04 J**	0.22 U	**0.03 J**	**0.04 J**	**0.04 J**	**0.03 J**
Zinc	SW6020	--	410	--	3800		**22.4**	**18.4**	**22.1**	**24.4**	**25.9**	**18.5**
Organometals (µg/kg)												
Tributyltin (ion)	SW8270ESIM	--	--	73	--		3.84 U	3.85 U	3.85 UJ	3.86 U	3.85 U	**19.0**
Semivolatile Organics (µg/kg)												
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	--	64		5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	SW8270ESIM	--	35	--	110		5.0 U	5.0 U	5.0 UJ	**2.7 J**	5.0 U	5.0 U
1,4-Dichlorobenzene	SW8270ESIM	--	110	--	120		5.0 U	5.0 U	5.0 UJ	**3.1 J**	5.0 U	5.0 U
2,4-Dimethylphenol	SW8270ESIM	--	29	--	210		20.0 UJ	19.9 U	20.0 UJ	20.0 U	20.0 U	19.9 U
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	--	77		5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	--	3600		5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
Benzoic acid	SW8270ESIM	--	650	--	760		100 U	499 UJ	99.9 UJ	99.9 U	99.9 U	99.6 U
Benzyl alcohol	SW8270ESIM	--	57	--	870		20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U	19.9 U
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	--	8300		50.0 U	49.9 U	50.0 U	49.9 U	50.0 U	49.8 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	--	970		5.0 U	19.9 U	5.0 U	**3.4 J**	5.0 U	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	--	5100		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Di-n-octyl phthalate	SW8270E	--	6200	--	6200		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Diethyl phthalate	SW8270ESIM	--	200	--	1200		20.0 U	21.9 U	20 U	20.0 U	20.0 U	19.9 U
Dimethyl phthalate	SW8270ESIM	--	71	--	1400		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE
Hexachlorobenzene	SW8270ESIM	--	22	168	230		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	--	270		5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	SW8270ESIM	--	28	--	130		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	SW8270ESIM	--	400	504	690		20.0 U	20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 U
Phenol	SW8270ESIM	--	420	--	1200		**8.3**	5.0 U	5.0 UJ	**5.1**	**6.9**	**10.4**
Polycyclic Aromatic Hydrocarbons (µg/kg)												
1-Methylnaphthalene	SW8270E	--	--	--	--		**--**	**--**	**--**	**--**	**--**	**--**
2-Methylnaphthalene	SW8270E	--	670	--	1900		20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U	19.9 U
Acenaphthene	SW8270E	--	500	--	2000		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Acenaphthylene	SW8270E	--	560	--	1300		20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U	19.9 U
Anthracene	SW8270E	--	960	--	13000		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Benzo(a)anthracene	SW8270E	--	1300	--	5100		20.0 U	19.9 U	20.0 U	**12.0 J**	20.0 U	19.9 U
Benzo(a)pyrene	SW8270E	--	1600	--	3600		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Benzo(b,j,k)fluoranthenes	SW8270E	--	--	--	--		40.0 U	39.9 U	40.0 U	39.9 U	40.0 U	39.9 U
Benzo(g,h,i)perylene	SW8270E	--	670	--	3200		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Carbazole	SW8270E	--	--	--	--		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Chrysene	SW8270E	--	1400	--	21000		20.0 U	19.9 U	20.0 U	**19.0 J**	20.0 U	19.9 U
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	--	1900		10.0 U	5.0 U	5.0 U	10.0 U	10.0 U	10.0 U
Dibenzofuran	SW8270E	--	540	--	1700		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Fluoranthene	SW8270E	--	1700	4600	30000		20.0 U	19.9 U	20.0 U	**45.1**	20.0 U	**18.0 J**
Fluorene	SW8270E	--	540	--	3600		20.0 U	19.9 UJ	20.0 U	20.0 U	20.0 U	19.9 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	--	4400		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Naphthalene	SW8270E	--	2100	--	2400		20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U	19.9 U
Phenanthrene	SW8270E	--	1500	--	21000		20.0 U	19.9 U	20.0 U	20.0 U	20.0 U	19.9 U
Pyrene	SW8270E	--	2600	11980	16000		20.0 U	19.9 U	20.0 U	**50.0**	**11.2 J**	**14.2 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	--	9900		40.0 U	39.9 U	40.0 U	39.9 U	40.0 U	39.9 U
Total HPAH (DMMP) (U = 0 max limit)	Calculated	--	12000	--	69000		40.0 U	39.9 U	40.0 U	**126 J**	**11.2 J**	**32.2 J**
Total LPAH (DMMP) (U = 0 max limit)	Calculated	--	5200	--	29000		20.0 U	19.9 UJ	20.0 UJ	20.0 U	20.0 U	19.9 U
Pesticides (µg/kg)												
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--	--		1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U	1.00 U
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--	--		1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U	1.00 U
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--	--		1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U	1.00 U
4,4'-DDD (p,p'-DDD)	SW8081B	--	16	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	9	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDT (p,p'-DDT)	SW8081B	--	12	--	--		1.00 U	1.00 U	1.00 U	**0.71 J**	1.00 U	1.00 U
Aldrin	SW8081B	--	9.5	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dieldrin	SW8081B	--	1.9	--	1700		1.00 U	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U
Endrin ketone	SW8081B	--	--	--	--		1.00 U	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U
Heptachlor	SW8081B	--	1.5	--	270		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Nonachlor, cis-	SW8081B	--	--	--	--		1.00 U	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U
Nonachlor, trans-	SW8081B	--	--	--	--		1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U	1.00 U
Oxychlordane	SW8081B	--	--	--	--		1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U	1.00 U
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	50	69		1.00 U	1.00 U	1.00 U	**0.71 J**	1.00 U	1.00 U
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	2.8	37	--		1.00 UJ	1.00 UJ	1 UJ	1.00 U	1.00 U	1.00 U
Total DDx (U = 0 max limit)	Calculated	--	--	--	--		1.00 UJ	1.00 UJ	1.00 UJ	**0.71 J**	1.00 U	1.00 U
D/F (ng/kg)												
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--	--		**11.1**	**3.34 J**	**32**	**388**	**218**	**118**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--	--		0.396 U	0.361 U	**2.34 J**	**10.5**	**7.34**	**4.53**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--	--		**0.779 J**	**0.235 J**	**4.31**	**36.1**	**22.3**	**11.6**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		**0.216 J**	0.144 UJ	**1.43**	**4.61**	**3.98**	**2.22**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		0.314 U	0.224 UJ	0.0030 U	**0.356 JEMPC**	0.481 U	0.255 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.236 U	0.199 U	0.024 U	**0.374 JEMPC**	0.224 U	0.185 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.146 U	0.119 U	**0.642 J**	**0.990 J**	**1.11**	**0.681 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.247 U	0.231 U	0.026 U	**1.34 EMPC**	**1.05**	**0.586 JEMPC**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.152 U	0.120 U	0.017 U	**0.311 JEMPC**	0.198 U	0.155 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.263 U	0.234 U	0.027 U	**0.558 J**	**0.503 JEMPC**	**0.337 JEMPC**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.190 U	0.173 U	0.024 U	**0.294 JEMPC**	0.241 U	0.200 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--	--		0.223 U	0.168 U	0.102 U	**0.259 JEMPC**	0.227 U	0.254 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--	--		0.199 U	0.189 U	**0.321 J**	**0.329 JEMPC**	**0.288 JEMPC**	**0.309 JEMPC**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.153 U	0.115 U	0.017 U	0.170 U	0.196 U	0.156 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--	--		0.216 U	0.201 U	0.094 U	**0.202 JEMPC**	**0.306 JEMPC**	**0.180 JEMPC**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--	--		0.168 U	0.118 U	0.111 U	0.151 U	0.172 U	0.152 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--	--		0.170 U	0.168 U	**0.321 J**	**0.378 JEMPC**	**0.423 JEMPC**	**0.212 JEMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--	--		**2.83**	**0.235 J**	**9.77**	**78.0**	**52.5**	**26.4**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--	--		-- U	-- U	**3.1**	**16.2**	**12.5**	**7.48**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--	--		**0.186 J**	-- U	**0.471 J**	**8.15**	**3.22**	-- U
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--	--		-- U	-- U	**1.2**	**7.15**	**5.84**	**3.83**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--	--		-- U	-- U	**0.278 J**	-- U	-- U	-- U
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--	--		**0.178 J**	-- U	-- U	**0.182 J**	**1.00**	**0.107 J**

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--	--		-- U	-- U	-- U	**0.413 J**	**0.656 J**	**0.321 J**
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--	--		-- U	-- U	**0.321 J**	**0.126 J**	**0.501 J**	-- U
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	4	10	--		**0.0133 J**	**0.00335 J**	**0.17 J**	**1.28 J**	**0.739 J**	**0.420 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	4	10	--		**0.324 J**	**0.249 J**	**0.30 J**	**1.37 J**	**0.984 J**	**0.659 J**
PCB Aroclors (mg/kg-OC)												
Aroclor 1016	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1221	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1232	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1242	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1248	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1254	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1260	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1262	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Aroclor 1268	SW8082A	--	--	--	--		1.6 U	6.7 U	1.7 U	2.7 U	2.5 U	3.6 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	--	38	--		1.6 U	6.7 U	2 U	2.7 U	2.5 U	3.6 U
PCB Aroclors (µg/kg)												
Aroclor 1016	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1221	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1232	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1242	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1248	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1254	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1260	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1262	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1268	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	130	--	3100		4.0 U	4.0 U	4 U	4.0 U	4.0 U	4.0 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	SM4500NH3H	--	--	--	--		**3.23**	**1.61**	**0.58**	0.40 U	**4.16**
Sulfide	SM4500S2D	--	--	--	--		**1.40**	**1.72**	1.06 U	1.1 UJ	**78.4**
Conventional Parameters (pct)											
Total organic carbon	SW9060AM	--	--	--	--		**0.14**	**0.09**	**0.15**	**0.19 J**	**0.21**
Total solids	SM2540G	--	--	--	--		**81.28**	**84.95**	**85.41**	**85.38**	**77.09**
Total volatile solids	PSEP-TVS	--	--	--	--		**1.29**	**1.02**	**1.07**	**1.3**	**1.49**
Metals (mg/kg)											
Antimony	SW6020	--	150	--	200		0.24 U	0.22 U	0.22 U	0.23 U	0.25 U
Arsenic	SW6020	--	57	507.1	700		**3.75**	**2.42**	**2.32**	**2.62**	**4.30**
Cadmium	SW6020	--	5.1	--	14		**0.06 J**	**0.03 J**	0.11 U	0.12 U	**0.09 J**
Chromium	SW6020	--	260	--	--		**8.21**	**8.63**	**8.95**	**8.29**	**9.26**
Copper	SW6020	--	390	--	1300		**13.3**	**13.8**	**12.8**	**10.9**	**17.7**
Lead	SW6020	--	450	975	1200		**1.76**	**1.83**	**1.64**	**1.26**	**2.61**
Mercury	SW7471B	--	0.41	1.5	2.3		**0.0148 J**	**0.0103 J**	**0.00997 J**	**0.00631 J**	**0.0213 J**
Selenium	SW6020	--	--	3	--		**0.45 J**	**0.50 J**	**0.50 J**	**0.37 J**	**0.44 J**
Silver	SW6020	--	6.1	--	8.4		**0.04 J**	**0.03 J**	**0.03 J**	**0.03 J**	**0.05 J**
Zinc	SW6020	--	410	--	3800		**23.1**	**22.8**	**22.2**	**18.6**	**25.6**
Organometals (µg/kg)											
Tributyltin (ion)	SW8270ESIM	--	--	73	--		3.85 U	3.85 U	3.81 U	3.85 UJ	3.85 U
Semivolatile Organics (µg/kg)											
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	--	64		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	SW8270ESIM	--	35	--	110		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
1,4-Dichlorobenzene	SW8270ESIM	--	110	--	120		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
2,4-Dimethylphenol	SW8270ESIM	--	29	--	210		20.0 U	20.0 U	19.9 U	**-- R**	20.0 U
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	--	77		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	--	3600		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzoic acid	SW8270ESIM	--	650	--	760		100 U	99.9 U	99.6 U	99.9 UJ	99.9 U
Benzyl alcohol	SW8270ESIM	--	57	--	870		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	--	8300		50.0 U	49.9 U	49.8 U	**62.0**	50.0 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	--	970		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	--	5100		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Di-n-octyl phthalate	SW8270E	--	6200	--	6200		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Diethyl phthalate	SW8270ESIM	--	200	--	1200		**21.8**	20.0 U	19.9 U	22.9 U	**24.8**
Dimethyl phthalate	SW8270ESIM	--	71	--	1400		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

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Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Hexachlorobenzene	SW8270ESIM	--	22	168	230		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	--	270		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	SW8270ESIM	--	28	--	130		5.0 U	5.0 U	5.0 U	5.0 UJ	**2.5 J**
Pentachlorophenol	SW8270ESIM	--	400	504	690		20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U
Phenol	SW8270ESIM	--	420	--	1200		5.0 U	**8.2**	**8.4**	5.0 UJ	5.0 U
Polycyclic Aromatic Hydrocarbons (µg/kg)											
1-Methylnaphthalene	SW8270E	--	--	--	--		20.0 U	**--**	**--**	**--**	20.0 U
2-Methylnaphthalene	SW8270E	--	670	--	1900		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthene	SW8270E	--	500	--	2000		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthylene	SW8270E	--	560	--	1300		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Anthracene	SW8270E	--	960	--	13000		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)anthracene	SW8270E	--	1300	--	5100		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)pyrene	SW8270E	--	1600	--	3600		20.0 U	20.0 U	19.9 U	20.0 U	**10.3 J**
Benzo(b,j,k)fluoranthenes	SW8270E	--	--	--	--		40.0 U	40.0 U	39.9 U	40.0 U	40.0 U
Benzo(g,h,i)perylene	SW8270E	--	670	--	3200		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Carbazole	SW8270E	--	--	--	--		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Chrysene	SW8270E	--	1400	--	21000		20.0 U	20.0 U	19.9 U	20.0 U	**11.2 J**
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	--	1900		5.0 U	10.0 U	10.0 U	**5.0 J**	5.0 U
Dibenzofuran	SW8270E	--	540	--	1700		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Fluoranthene	SW8270E	--	1700	4600	30000		20.0 U	**16.0 J**	19.9 U	20.0 U	**11.1 J**
Fluorene	SW8270E	--	540	--	3600		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	--	4400		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Naphthalene	SW8270E	--	2100	--	2400		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Phenanthrene	SW8270E	--	1500	--	21000		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Pyrene	SW8270E	--	2600	11980	16000		20.0 U	**17.3 J**	19.9 U	**15.1 J**	**15.6 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	--	9900		40.0 U	40.0 U	39.9 U	40.0 U	40.0 U
Total HPAH (DMMP) (U = 0 max limit)	Calculated	--	12000	--	69000		40.0 U	**33.3 J**	39.9 U	**20 J**	**48.2 J**
Total LPAH (DMMP) (U = 0 max limit)	Calculated	--	5200	--	29000		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Pesticides (µg/kg)											
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
4,4'-DDD (p,p'-DDD)	SW8081B	--	16	--	--		1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	9	--	--		1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
4,4'-DDT (p,p'-DDT)	SW8081B	--	12	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aldrin	SW8081B	--	9.5	--	--		0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Dieldrin	SW8081B	--	1.9	--	1700		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Endrin ketone	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Heptachlor	SW8081B	--	1.5	--	270		0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--	--		0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Nonachlor, cis-	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 U	1.00 U
Nonachlor, trans-	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Oxychlordane	SW8081B	--	--	--	--		1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	50	69		1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	2.8	37	--		1.00 U	1.00 U	1.00 U	1 UJ	1.00 U
Total DDx (U = 0 max limit)	Calculated	--	--	--	--		1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
D/F (ng/kg)											
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--	--		**110**	**308**	**94.0**	**66.5**	**276**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--	--		**4.70 EMPC**	**5.34**	**2.85**	**1.86 J**	**14.9**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--	--		**10.2**	**29.4**	**8.97**	**4.08**	**30.0**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		**2.43**	**3.61**	**1.54**	**0.874 J**	**6.63**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	--		0.407 U	0.253 U	0.240 U	0.0020 U	0.552 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.293 U	**0.302 JEMPC**	0.217 U	0.022 U	0.374 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		**0.537 JEMPC**	**0.714 J**	**0.554 JEMPC**	0.012 U	**2.43**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.324 U	**1.52**	**0.391 J**	0.025 U	**1.29 EMPC**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.259 U	0.156 U	**0.127 J**	0.012 U	**0.906 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	--		0.336 U	**0.454 JEMPC**	**0.268 JEMPC**	0.025 U	**0.501 JEMPC**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.348 U	0.205 U	0.254 U	0.018 U	0.313 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--	--		0.264 U	**0.265 J**	0.203 U	0.085 U	0.449 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--	--		0.182 U	**0.168 JEMPC**	**0.270 JEMPC**	0.0090 U	**0.637 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	--		0.249 U	0.154 U	0.180 U	0.012 U	0.228 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--	--		0.205 U	0.186 U	0.190 U	**0.144 J**	**0.366 JEMPC**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--	--		0.173 U	0.136 U	0.149 U	0.113 U	0.214 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--	--		0.163 U	0.185 U	**0.222 J**	0.014 U	**0.352 JEMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--	--		**24.1**	**62.9**	**20.2**	**9.74**	**65.9**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--	--		**6.88**	**11.2**	**4.97**	**1.76**	**20.9**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--	--		**1.84**	**4.84**	**1.19**	**0.518 J**	**4.09**
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--	--		**1.81**	**6.27**	**1.42**	-- U	**9.90**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--	--		**0.302**	**0.530 J**	-- U	**0.168**	**0.318**
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--	--		-- U	**1.18**	-- U	-- U	**1.64**

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Chemical	Method	D/F TEF	DMMP SL	DMMP BT	DMMP ML	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--	--		-- U	**0.177 J**	-- U	-- U	-- U
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--	--		-- U	**0.145 J**	**0.222 J**	-- U	-- U
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	4	10	--		**0.21 J**	**0.993 J**	**0.298 J**	**0.113 J**	**1.13 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	4	10	--		**0.57 J**	**1.13 J**	**0.537 J**	**0.219 J**	**1.51 J**
PCB Aroclors (mg/kg-OC)											
Aroclor 1016	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1221	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1232	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1242	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1248	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1254	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1260	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	**1.8 J**	1.9 U
Aroclor 1262	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Aroclor 1268	SW8082A	--	--	--	--		2.9 U	4.4 U	2.7 U	2.2 U	1.9 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	--	38	--		2.9 U	4.4 U	2.7 U	**1.8 J**	1.9 U
PCB Aroclors (µg/kg)											
Aroclor 1016	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1221	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1232	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1242	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1248	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1254	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1260	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	**3.4 J**	4.0 U
Aroclor 1262	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1268	SW8082A	--	--	--	--		4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Total DMMP PCB Aroclors (U = 0 max limit)	Calculated	--	130	--	3100		4.0 U	4.0 U	4.0 U	**3.4 J**	4.0 U

Table 4
Sediment Core Sample Analytical Results Compared to DMMP Criteria

Notes:

Detected concentration is greater than DMMP SL screening level

Detected concentration is greater than DMMP BT screening level

Detected concentration is greater than DMMP ML screening level

Non-detected concentration is above one or more identified screening levels

Bold: Detected result

Analysis included total solids, total volatile solids, total organic carbon, ammonia, sulfide, metals, butyltins, semivolatile organic compounds, pesticides, PCBs, and D/F.

Calculated values have been rounded to laboratory-reported significant digits.

EMPC: Estimated maximum possible concentration

J: Estimated value

R: Rejected

U: Compound analyzed for but not detected above detection limit

UJ: Compound analyzed for, but not detected above estimated detection limit

--: not applicable/no data

µg/kg: microgram per kilogram

BT: bioccumulation trigger

D/F: dioxins/furans

D/F TEF: total dioxin/furan TEQ 2005 (mammal) (TEF)

DDx: total dichlorodiphenyltrichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyldichloroethane

DMMP: Dredged Material Management Program

DMMU: Dredged Material Management Unit

HPAH: high-molecular-weight polycyclic aromatic hydrocarbon

ID: identification

LPAH: low molecular weight polycyclic aromatic hydrocarbon

mg/kg: milligram per kilogram

ML: maximum level

ng/kg: nanogram per kilogram

OC: organic carbon

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

pct: percent

QC: quality control

SE: sediment

SL: screening level

TEQ: toxic equivalence

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06
					Surface or Subsurface	Surface	Surface	Surface	Surface	Surface	Subsurface
					Location ID	HT-01CS-A	HT-02CS-A	HT-03CS-A	HT-04CS-A	HT-05CS-A	HT-06CS-B
					Sample Date	11/14/2024	10/30/2024	11/7/2024	11/12/2024	10/29/2024	10/30/2024
					Sample ID	HT-01CS-A-241114	HT-02CS-A-241030	HT-03CS-A-241107	HT-04CS-A-241112	HT-05CS-A-241029	HT-06CS-B-241030
					Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	SM4500NH3H	--	--	--		**3.92**	**0.89**	**2.99**	**0.93**	**1.44**	**0.55**
Sulfide	SM4500S2D	--	--	--		**128**	**1.9 J**	**11.2 J**	**49.0**	**41.4 J**	1.08 UJ
Conventional Parameters (pct)											
Total organic carbon	SW9060AM	--	--	--		**0.41**	**0.25**	**0.18**	**0.32**	**0.22**	**0.2**
Total solids	D2216 / SM2540G	--	--	--		**66.76**	**76.62**	**75.21**	**80.06**	**76.57**	**84.48**
Total volatile solids	PSEP-TVS	--	--	--		**2.56**	**1.46**	**1.55**	**1.80**	**1.52**	**1.14**
Metals (mg/kg)											
Antimony	SW6020	--	--	--		0.29 U	0.26 UJ	0.26 U	0.25 U	0.26 UJ	0.23 UJ
Arsenic	SW6020	--	57	93		**3.12**	**1.56 J**	**2.09**	**2.10**	**2.17 J**	**1.03 J**
Cadmium	SW6020	--	5.1	6.7		**0.07 J**	0.13 U	0.13 U	**0.05 J**	0.13 U	0.12 U
Chromium	SW6020	--	260	270		**11.0**	**8.7 J**	**9.77**	**11.1**	**8.56 J**	**7.59 J**
Copper	SW6020	--	390	390		**21.6**	**11.8**	**13.8**	**16.8**	**14.2**	**8.65**
Lead	SW6020	--	450	530		**3.66**	**1.49**	**2.34**	**2.77**	**2.8 J**	**1.04 J**
Mercury	SW7471B	--	0.41	0.59		**0.0184 J**	**0.00829 J**	**0.0164 J**	**0.0190 J**	**0.0211 J**	0.0264 U
Selenium	SW6020	--	--	--		**0.59 J**	**0.24 J**	**0.54 J**	**0.52 J**	**0.4 J**	**0.34 J**
Silver	SW6020	--	6.1	6.1		**0.05 J**	**0.04 J**	**0.04 J**	**0.05 J**	**0.06 J**	**0.03 J**
Zinc	SW6020	--	410	960		**31.4**	**18.8**	**24.2**	**24.4**	**21.2**	**16.3**
Organometals (µg/kg)											
Tributyltin (ion)	SW8270ESIM	--	--	--		3.85 U	3.86 UJ	**6.81**	3.84 U	3.85 UJ	3.84 UJ
Semivolatile Organics (µg/kg)											
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	51		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
1,2-Dichlorobenzene	SW8270ESIM	--	35	50		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
1,4-Dichlorobenzene	SW8270ESIM	--	110	110		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
2,4-Dimethylphenol	SW8270ESIM	--	29	29		20.0 U	20.0 UJ	20.0 UJ	20.0 UJ	19.9 UJ	20.0 UJ
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	63		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	670		**6.6**	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
Benzoic acid	SW8270ESIM	--	650	650		**75.9 J**	99.9 UJ	100 U	**54.0 J**	99.3 UJ	99.8 UJ
Benzyl alcohol	SW8270ESIM	--	57	73		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	20.0 UJ
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	1900		**58.9**	50.0 U	50.0 U	50.0 U	49.7 U	49.9 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	900		**6.0**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	1400		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Di-n-octyl phthalate	SW8270E	--	6200	6200		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Diethyl phthalate	SW8270ESIM	--	200	1200		**12.7 J**	20 U	20.0 U	20 U	19.9 U	20 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-01 Surface HT-01CS-A 11/14/2024 HT-01CS-A-241114 SE	HT-02 Surface HT-02CS-A 10/30/2024 HT-02CS-A-241030 SE	HT-03 Surface HT-03CS-A 11/7/2024 HT-03CS-A-241107 SE	HT-04 Surface HT-04CS-A 11/12/2024 HT-04CS-A-241112 SE	HT-05 Surface HT-05CS-A 10/29/2024 HT-05CS-A-241029 SE	HT-06 Subsurface HT-06CS-B 10/30/2024 HT-06CS-B-241030 SE
Dimethyl phthalate	SW8270ESIM	--	71	160		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobenzene	SW8270ESIM	--	22	70		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	120		5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 UJ	5.0 UJ
n-Nitrosodiphenylamine	SW8270ESIM	--	28	40		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	SW8270ESIM	--	360	690		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	29.5 UJ
Phenol	SW8270ESIM	--	420	1200		**6.9**	5.0 UJ	**9.9**	5.0 U	5.0 UJ	**21.4 J**
Polycyclic Aromatic Hydrocarbons (µg/kg)											
1-Methylnaphthalene	SW8270E	--	--	--		**--**	**--**	**--**	**--**	**--**	**--**
2-Methylnaphthalene	SW8270E	--	670	670		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Acenaphthene	SW8270E	--	500	500		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Acenaphthylene	SW8270E	--	1300	1300		20.0 U	20.0 UJ	20.0 U	20.0 U	19.9 UJ	20.0 UJ
Anthracene	SW8270E	--	960	960		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Benzo(a)anthracene	SW8270E	--	1300	1600		**10.9 J**	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Benzo(a)pyrene	SW8270E	--	1600	1600		**13.1 J**	20.0 U	**11.4 J**	20.0 U	**14.2 J**	20.0 U
Benzo(b,j,k)fluoranthenes	SW8270E	--	3200	3600		40.0 U	40.0 U	40.0 U	40.0 U	39.7 U	39.9 U
Benzo(g,h,i)perylene	SW8270E	--	670	720		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Carbazole	SW8270E	--				20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Chrysene	SW8270E	--	1400	2800		**14.7 J**	20.0 U	**12.3 J**	**11.1 J**	**13.9 J**	20.0 U
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	230		**3.0 J**	5.0 U	10.0 U	5.0 U	5.0 U	5.0 U
Dibenzofuran	SW8270E	--	540	540		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Fluoranthene	SW8270E	--	1700	2500		**19.1 J**	**15.8 J**	**15.3 J**	**12.4 J**	**17.8 J**	20.0 U
Fluorene	SW8270E	--	540	540		20.0 U	20.0 U	20.0 U	20.0 UJ	19.9 U	20.0 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	690		20.0 U	20.0 U	20.0 U	20.0 U	19.9 U	20.0 U
Naphthalene	SW8270E	--	2100	2100		20.0 U	**20.5 J**	20.0 U	20.0 U	19.9 UJ	**10.3 J**
Phenanthrene	SW8270E	--	1500	1500		**12.8 J**	**14.7 J**	**11.8 J**	20.0 U	**10.7 J**	20.0 U
Pyrene	SW8270E	--	2600	3300		**21.7**	**27.5**	**25.2**	**17.8 J**	**25.3**	**10.7 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	3600		40.0 U	40.0 U	40.0 U	40.0 U	39.7 U	39.9 U
Total HPAH (SMS) (U = 0 max limit)	Calculated	--	12000	17000		**83 J**	**43.3 J**	**64.2 J**	**41.3 J**	**71.2 J**	**10.7 J**
Total LPAH (SMS) (U = 0 max limit)	Calculated	--	5200	5200		**12.8 J**	**35.2 J**	**11.8 J**	20.0 UJ	**10.7 J**	**10.3 J**
Pesticides (µg/kg)											
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ
4,4'-DDD (p,p'-DDD)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06
					Surface or Subsurface	Surface	Surface	Surface	Surface	Surface	Subsurface
					Location ID	HT-01CS-A	HT-02CS-A	HT-03CS-A	HT-04CS-A	HT-05CS-A	HT-06CS-B
					Sample Date	11/14/2024	10/30/2024	11/7/2024	11/12/2024	10/29/2024	10/30/2024
					Sample ID	HT-01CS-A-241114	HT-02CS-A-241030	HT-03CS-A-241107	HT-04CS-A-241112	HT-05CS-A-241029	HT-06CS-B-241030
					Matrix	SE	SE	SE	SE	SE	SE
4,4'-DDT (p,p'-DDT)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	**0.93 J**
Aldrin	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dieldrin	SW8081B	--	--	--		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U
Endrin ketone	SW8081B	--	--	--		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U
Heptachlor	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Nonachlor, cis-	SW8081B	--	--	--		1.00 U	1.0 U	1.00 U	1.00 U	1.0 U	1.0 U
Nonachlor, trans-	SW8081B	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ
Oxychlordane	SW8081B	--	--	--		1.00 U	1.0 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.0 UJ
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	**0.93 J**
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	--	--		1.00 U	1 UJ	1.00 UJ	1.00 UJ	1 UJ	1 UJ
Total DDx (U = 0 max limit)	Calculated	--	--	--		1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	**0.93 J**
D/F (ng/kg)											
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--		**206**	**62.1**	**198**	**147**	**138**	**18.9**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--		**9.97**	**3.22**	**5.71**	**6.84**	**8.71**	**0.915 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--		**25.0**	**6.84**	**18.4**	**15.8**	**18.2**	**2.38 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--		**5.36**	**1.63 J**	**2.67**	**3.92 J**	**3.94**	**0.743 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--		**0.673 JEMPC**	0.0020 U	0.312 U	**0.394 J**	**0.691 J**	0.0020 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		0.395 U	0.022 U	0.230 U	0.183 U	0.027 U	0.016 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		**0.859 J**	**0.461 J**	**0.397 J**	**0.923 J**	**1.38**	0.010 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		**1.18**	0.024 U	**0.890 J**	**0.788 J**	**0.949 J**	**0.127 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		**0.529 JEMPC**	0.018 U	**0.240 J**	0.137 U	**0.461 J**	0.010 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		**0.691 J**	0.025 U	**0.488 J**	**0.594 J**	**0.505 J**	0.018 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		0.363 U	0.021 U	0.207 U	**0.248 J**	0.026 U	0.013 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--		0.410 U	0.135 U	0.323 U	0.175 U	0.105 U	0.073 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--		**0.471 J**	**0.223 J**	**0.174 J**	**0.443 J**	**0.832 J**	0.0070 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		0.268 U	0.017 U	0.146 U	0.128 U	**0.268 J**	0.010 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--		0.348 U	0.090 U	0.186 U	0.170 U	**0.393 J**	0.073 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--		0.309 U	0.103 U	0.144 U	0.105 U	0.123 U	0.077 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--		**0.550 JEMPC**	**0.138 J**	0.239 U	**0.389 J**	**0.84 J**	0.010 U
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--		**56.4**	**14.3**	**41.5**	**42.2**	**42.6**	**5.09**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--		**14.8**	**2.95**	**9.20**	**10.9**	**12.2**	**1.32**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--		**4.77**	**1.07**	**4.87**	**3.56**	**4.96**	**0.575 J**

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06
					Surface or Subsurface	Surface	Surface	Surface	Surface	Surface	Subsurface
					Location ID	HT-01CS-A	HT-02CS-A	HT-03CS-A	HT-04CS-A	HT-05CS-A	HT-06CS-B
					Sample Date	11/14/2024	10/30/2024	11/7/2024	11/12/2024	10/29/2024	10/30/2024
					Sample ID	HT-01CS-A-241114	HT-02CS-A-241030	HT-03CS-A-241107	HT-04CS-A-241112	HT-05CS-A-241029	HT-06CS-B-241030
					Matrix	SE	SE	SE	SE	SE	SE
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--		**3.14**	**1.58**	**4.37**	**2.80**	**6.51**	**0.275 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--		**1.32**	-- U	**0.202 J**	**0.142 J**	**0.45 J**	-- U
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--		**2.02**	-- U	**1.14**	**0.977 J**	**1.63**	-- U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--		-- U	-- U	-- U	**0.875 J**	**0.75**	**0.134 J**
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--		-- U	-- U	-- U	**0.646 J**	**1.5**	-- U
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	--	--		**0.770 J**	**0.171 J**	**0.479 J**	**0.555 J**	**0.86 J**	**0.0499 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	--	--		**1.23 J**	**0.310 J**	**0.783 J**	**0.743 J**	**0.97 J**	**0.140 J**
PCB Aroclors (µg/kg)											
Aroclor 1016	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1221	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1232	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1242	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1248	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1254	SW8082A	--	--	--		4.0 U	**4.3**	4.0 U	4.0 U	**3.6 J**	4.0 U
Aroclor 1260	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1262	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1268	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Total PCB Aroclors (SMS Marine 2019) (U = 0 max limit)	Calculated	--	130	1000		4.0 U	**4.3**	4.0 U	4.0 U	**3.6 J**	4 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	SM4500NH3H	--	--	--		**2.16**	**8.67**	**1.92**	**7.22**	**1.32**	0.44 U
Sulfide	SM4500S2D	--	--	--		**2.26 J**	**16.8 J**	**2.66**	**1.79 J**	**5.30**	**3.54**
Conventional Parameters (pct)											
Total organic carbon	SW9060AM	--	--	--		**0.15**	**0.25**	**0.06**	**0.24**	**0.15**	**0.16**
Total solids	D2216 / SM2540G	--	--	--		**81.31**	**73.73**	**83.59**	**80.51**	**82.88**	**83.39**
Total volatile solids	PSEP-TVS	--	--	--		**1.58**	**1.67**	**1.34**	**1.27**	**1.15**	**1.14**
Metals (mg/kg)											
Antimony	SW6020	--	--	--		0.24 U	0.25 U	0.22 U	0.24 UJ	0.23 U	0.24 U
Arsenic	SW6020	--	57	93		**1.63**	**1.51**	**0.94**	**1.12 J**	**2.81**	**3.17**
Cadmium	SW6020	--	5.1	6.7		0.12 U	0.13 U	0.11 U	**0.1 J**	**0.04 J**	**0.04 J**
Chromium	SW6020	--	260	270		**9.74**	**9.63**	**8.16**	**9.49 J**	**12.0**	**9.18**
Copper	SW6020	--	390	390		**13.1**	**16.3**	**11.2**	**10.4**	**14.6**	**15.1**
Lead	SW6020	--	450	530		**1.86**	**1.67**	**1.30**	**1.38**	**2.25**	**2.22**
Mercury	SW7471B	--	0.41	0.59		**0.0120 J**	**0.0235 J**	**0.00900 J**	**0.0135 J**	**0.0110 J**	**0.0148 J**
Selenium	SW6020	--	--	--		**0.57 J**	**0.55 J**	**0.39 J**	**0.41 J**	**0.52 J**	**0.49 J**
Silver	SW6020	--	6.1	6.1		**0.03 J**	**0.04 J**	0.22 U	**0.03 J**	**0.04 J**	**0.04 J**
Zinc	SW6020	--	410	960		**21.2**	**22.4**	**18.4**	**22.1**	**24.4**	**25.9**
Organometals (µg/kg)											
Tributyltin (ion)	SW8270ESIM	--	--	--		**2.78 J**	3.84 U	3.85 U	3.85 UJ	3.86 U	3.85 U
Semivolatile Organics (µg/kg)											
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	51		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U
1,2-Dichlorobenzene	SW8270ESIM	--	35	50		5.0 U	5.0 U	5.0 U	5.0 UJ	**2.7 J**	5.0 U
1,4-Dichlorobenzene	SW8270ESIM	--	110	110		5.0 U	5.0 U	5.0 U	5.0 UJ	**3.1 J**	5.0 U
2,4-Dimethylphenol	SW8270ESIM	--	29	29		20.0 UJ	20.0 UJ	19.9 U	20.0 UJ	20.0 U	20.0 U
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	63		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	670		5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U
Benzoic acid	SW8270ESIM	--	650	650		100 U	100 U	499 UJ	99.9 UJ	99.9 U	99.9 U
Benzyl alcohol	SW8270ESIM	--	57	73		20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	1900		50.0 U	50.0 U	49.9 U	50.0 U	49.9 U	50.0 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	900		5.0 U	5.0 U	19.9 U	5.0 U	**3.4 J**	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	1400		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Di-n-octyl phthalate	SW8270E	--	6200	6200		20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Diethyl phthalate	SW8270ESIM	--	200	1200		20.0 U	20.0 U	21.9 U	20 U	20.0 U	20.0 U

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Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE
				DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix						
Dimethyl phthalate	SW8270ESIM	--	71	160	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobenzene	SW8270ESIM	--	22	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	120	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U
n-Nitrosodiphenylamine	SW8270ESIM	--	28	40	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	SW8270ESIM	--	360	690	20.0 U	20.0 U	20.0 U	20.0 UJ	20.0 U	20.0 U
Phenol	SW8270ESIM	--	420	1200	**5.2**	**8.3**	5.0 U	5.0 UJ	**5.1**	**6.9**
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	SW8270E	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**
2-Methylnaphthalene	SW8270E	--	670	670	20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U
Acenaphthene	SW8270E	--	500	500	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Acenaphthylene	SW8270E	--	1300	1300	20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U
Anthracene	SW8270E	--	960	960	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Benzo(a)anthracene	SW8270E	--	1300	1600	20.0 U	20.0 U	19.9 U	20.0 U	**12.0 J**	20.0 U
Benzo(a)pyrene	SW8270E	--	1600	1600	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Benzo(b,j,k)fluoranthenes	SW8270E	--	3200	3600	40.0 U	40.0 U	39.9 U	40.0 U	39.9 U	40.0 U
Benzo(g,h,i)perylene	SW8270E	--	670	720	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Carbazole	SW8270E	--			20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Chrysene	SW8270E	--	1400	2800	20.0 U	20.0 U	19.9 U	20.0 U	**19.0 J**	20.0 U
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	230	10.0 U	10.0 U	5.0 U	5.0 U	10.0 U	10.0 U
Dibenzofuran	SW8270E	--	540	540	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Fluoranthene	SW8270E	--	1700	2500	**17.8 J**	20.0 U	19.9 U	20.0 U	**45.1**	20.0 U
Fluorene	SW8270E	--	540	540	20.0 U	20.0 U	19.9 UJ	20.0 U	20.0 U	20.0 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	690	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Naphthalene	SW8270E	--	2100	2100	20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U	20.0 U
Phenanthrene	SW8270E	--	1500	1500	**10.6 J**	20.0 U	19.9 U	20.0 U	20.0 U	20.0 U
Pyrene	SW8270E	--	2600	3300	**15.8 J**	20.0 U	19.9 U	20.0 U	**50.0**	**11.2 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	3600	40.0 U	40.0 U	39.9 U	40.0 U	39.9 U	40.0 U
Total HPAH (SMS) (U = 0 max limit)	Calculated	--	12000	17000	**33.6 J**	40.0 U	39.9 U	40.0 U	**126 J**	**11.2 J**
Total LPAH (SMS) (U = 0 max limit)	Calculated	--	5200	5200	**10.6 J**	20.0 U	19.9 UJ	20.0 UJ	20.0 U	20.0 U
Pesticides (µg/kg)										
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U
4,4'-DDD (p,p'-DDD)	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	HT-07 Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE	HT-08 Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	HT-09 Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	HT-10 Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	WUT-20 Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	WUT-21 Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE
				DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix						
4,4'-DDT (p,p'-DDT)	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.00 U	**0.71 J**	1.00 U
Aldrin	SW8081B	--	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dieldrin	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.0 U	1.00 U	1.00 U
Endrin ketone	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.0 U	1.00 U	1.00 U
Heptachlor	SW8081B	--	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Nonachlor, cis-	SW8081B	--	--	--	1.00 U	1.00 U	1.00 U	1.0 U	1.00 U	1.00 U
Nonachlor, trans-	SW8081B	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U
Oxychlordane	SW8081B	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.0 UJ	1.00 U	1.00 U
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	--	1.00 U	1.00 U	1.00 U	1.00 U	**0.71 J**	1.00 U
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1 UJ	1.00 U	1.00 U
Total DDx (U = 0 max limit)	Calculated	--	--	--	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	**0.71 J**	1.00 U
D/F (ng/kg)										
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--	**74.2**	**11.1**	**3.34 J**	**32**	**388**	**218**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--	**2.19 J**	0.396 U	0.361 U	**2.34 J**	**10.5**	**7.34**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--	**7.04**	**0.779 J**	**0.235 J**	**4.31**	**36.1**	**22.3**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	**1.23**	**0.216 J**	0.144 UJ	**1.43**	**4.61**	**3.98**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--	0.309 U	0.314 U	0.224 UJ	0.0030 U	**0.356 JEMPC**	0.481 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	0.281 U	0.236 U	0.199 U	0.024 U	**0.374 JEMPC**	0.224 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	0.146 U	0.146 U	0.119 U	**0.642 J**	**0.990 J**	**1.11**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	**0.323 J**	0.247 U	0.231 U	0.026 U	**1.34 EMPC**	**1.05**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	0.133 U	0.152 U	0.120 U	0.017 U	**0.311 JEMPC**	0.198 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--	0.304 U	0.263 U	0.234 U	0.027 U	**0.558 J**	**0.503 JEMPC**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	0.198 U	0.190 U	0.173 U	0.024 U	**0.294 JEMPC**	0.241 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--	0.278 U	0.223 U	0.168 U	0.102 U	**0.259 JEMPC**	0.227 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--	0.159 U	0.199 U	0.189 U	**0.321 J**	**0.329 JEMPC**	**0.288 JEMPC**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--	0.140 U	0.153 U	0.115 U	0.017 U	0.170 U	0.196 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--	0.169 U	0.216 U	0.201 U	0.094 U	**0.202 JEMPC**	**0.306 JEMPC**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--	0.134 U	0.168 U	0.118 U	0.111 U	0.151 U	0.172 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--	0.183 U	0.170 U	0.168 U	**0.321 J**	**0.378 JEMPC**	**0.423 JEMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--	**15.8**	**2.83**	**0.235 J**	**9.77**	**78.0**	**52.5**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--	**3.84**	-- U	-- U	**3.1**	**16.2**	**12.5**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--	**0.440 J**	**0.186 J**	-- U	**0.471 J**	**8.15**	**3.22**

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix HT-07	HT-08	HT-09	HT-10	WUT-20	WUT-21
					Subsurface HT-07CS-B 11/1/2024 HT-07CS-B-241101 SE	Subsurface HT-08CS-B 11/7/2024 HT-08CS-B-241107 SE	Subsurface HT-09CS-B 11/12/2024 HT-09CS-B-241112 SE	Subsurface HT-10CS-B 10/29/2024 HT-10CS-B-241029 SE	Surface WUT-20CS-A 11/6/2024 WUT-20CS-A-241106 SE	Surface WUT-21CS-A 11/7/2024 WUT-21CS-A-241107 SE
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--	**1.68**	-- U	-- U	**1.2**	**7.15**	**5.84**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--	-- U	-- U	-- U	**0.278 J**	-- U	-- U
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--	**0.127 J**	**0.178 J**	-- U	-- U	**0.182 J**	**1.00**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--	**0.268 J**	-- U	-- U	-- U	**0.413 J**	**0.656 J**
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--	-- U	-- U	-- U	**0.321 J**	**0.126 J**	**0.501 J**
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	--	--	**0.138 J**	**0.0133 J**	**0.00335 J**	**0.17 J**	**1.28 J**	**0.739 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	--	--	**0.442 J**	**0.324 J**	**0.249 J**	**0.30 J**	**1.37 J**	**0.984 J**
PCB Aroclors (µg/kg)										
Aroclor 1016	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1221	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1232	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1242	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1248	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1254	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1260	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1262	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Aroclor 1268	SW8082A	--	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Total PCB Aroclors (SMS Marine 2019) (U = 0 max limit)	Calculated	--	130	1000	4.0 U	4.0 U	4.0 U	4 U	4.0 U	4.0 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU	WUT-22	WUT-23	WUT-24	WUT-25	WUT-26	WUT-27
					Surface or Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface
					Location ID	WUT-22CS-A	WUT-23CS-A	WUT-24CS-B	WUT-25CS-B	WUT-26CS-B	WUT-27CS-B
					Sample Date	11/4/2024	10/24/2024	11/6/2024	11/7/2024	10/25/2024	10/24/2024
					Sample ID	WUT-22CS-A-241104	WUT-23CS-A-241024	WUT-24CS-B-241106	WUT-25CS-B-241107	WUT-26CS-B-241025	WUT-27CS-B-241024
					Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (mg/kg)											
Ammonia as nitrogen	SM4500NH3H	--	--	--		**0.57**	**3.23**	**1.61**	**0.58**	0.40 U	**4.16**
Sulfide	SM4500S2D	--	--	--		**16.3**	**1.40**	**1.72**	1.06 U	1.1 UJ	**78.4**
Conventional Parameters (pct)											
Total organic carbon	SW9060AM	--	--	--		**0.11**	**0.14**	**0.09**	**0.15**	**0.19 J**	**0.21**
Total solids	D2216 / SM2540G	--	--	--		**80.03**	**81.28**	**84.95**	**85.41**	**85.38**	**77.09**
Total volatile solids	PSEP-TVS	--	--	--		**1.25**	**1.29**	**1.02**	**1.07**	**1.3**	**1.49**
Metals (mg/kg)											
Antimony	SW6020	--	--	--		0.24 U	0.24 U	0.22 U	0.22 U	0.23 U	0.25 U
Arsenic	SW6020	--	57	93		**3.28**	**3.75**	**2.42**	**2.32**	**2.62**	**4.30**
Cadmium	SW6020	--	5.1	6.7		0.12 U	**0.06 J**	**0.03 J**	0.11 U	0.12 U	**0.09 J**
Chromium	SW6020	--	260	270		**7.63**	**8.21**	**8.63**	**8.95**	**8.29**	**9.26**
Copper	SW6020	--	390	390		**12.0**	**13.3**	**13.8**	**12.8**	**10.9**	**17.7**
Lead	SW6020	--	450	530		**1.68**	**1.76**	**1.83**	**1.64**	**1.26**	**2.61**
Mercury	SW7471B	--	0.41	0.59		**0.0104 J**	**0.0148 J**	**0.0103 J**	**0.00997 J**	**0.00631 J**	**0.0213 J**
Selenium	SW6020	--	--	--		**0.42 J**	**0.45 J**	**0.50 J**	**0.50 J**	**0.37 J**	**0.44 J**
Silver	SW6020	--	6.1	6.1		**0.03 J**	**0.04 J**	**0.03 J**	**0.03 J**	**0.03 J**	**0.05 J**
Zinc	SW6020	--	410	960		**18.5**	**23.1**	**22.8**	**22.2**	**18.6**	**25.6**
Organometals (µg/kg)											
Tributyltin (ion)	SW8270ESIM	--	--	--		**19.0**	3.85 U	3.85 U	3.81 U	3.85 UJ	3.85 U
Semivolatile Organics (µg/kg)											
1,2,4-Trichlorobenzene	SW8270ESIM	--	31	51		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	SW8270ESIM	--	35	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
1,4-Dichlorobenzene	SW8270ESIM	--	110	110		5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
2,4-Dimethylphenol	SW8270ESIM	--	29	29		19.9 U	20.0 U	20.0 U	19.9 U	**-- R**	20.0 U
2-Methylphenol (o-Cresol)	SW8270ESIM	--	63	63		5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4-Methylphenol (p-Cresol)	SW8270ESIM	--	670	670		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzoic acid	SW8270ESIM	--	650	650		99.6 U	100 U	99.9 U	99.6 U	99.9 UJ	99.9 U
Benzyl alcohol	SW8270ESIM	--	57	73		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Bis(2-ethylhexyl)phthalate	SW8270E	--	1300	1900		49.8 U	50.0 U	49.9 U	49.8 U	**62.0**	50.0 U
Butylbenzyl phthalate	SW8270E / SW8270ESIM	--	63	900		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	SW8270E	--	1400	1400		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Di-n-octyl phthalate	SW8270E	--	6200	6200		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Diethyl phthalate	SW8270ESIM	--	200	1200		19.9 U	**21.8**	20.0 U	19.9 U	22.9 U	**24.8**

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Dimethyl phthalate	SW8270ESIM	--	71	160		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobenzene	SW8270ESIM	--	22	70		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	SW8270ESIM	--	11	120		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	SW8270ESIM	--	28	40		5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	**2.5 J**
Pentachlorophenol	SW8270ESIM	--	360	690		19.9 U	20.0 U	20.0 U	19.9 U	20.0 UJ	20.0 U
Phenol	SW8270ESIM	--	420	1200		**10.4**	5.0 U	**8.2**	**8.4**	5.0 UJ	5.0 U
Polycyclic Aromatic Hydrocarbons (µg/kg)											
1-Methylnaphthalene	SW8270E	--	--	--		**--**	20.0 U	**--**	**--**	**--**	20.0 U
2-Methylnaphthalene	SW8270E	--	670	670		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthene	SW8270E	--	500	500		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Acenaphthylene	SW8270E	--	1300	1300		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Anthracene	SW8270E	--	960	960		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)anthracene	SW8270E	--	1300	1600		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Benzo(a)pyrene	SW8270E	--	1600	1600		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	**10.3 J**
Benzo(b,j,k)fluoranthenes	SW8270E	--	3200	3600		39.9 U	40.0 U	40.0 U	39.9 U	40.0 U	40.0 U
Benzo(g,h,i)perylene	SW8270E	--	670	720		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Carbazole	SW8270E	--				19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Chrysene	SW8270E	--	1400	2800		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	**11.2 J**
Dibenzo(a,h)anthracene	SW8270ESIM	--	230	230		10.0 U	5.0 U	10.0 U	10.0 U	**5.0 J**	5.0 U
Dibenzofuran	SW8270E	--	540	540		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Fluoranthene	SW8270E	--	1700	2500		**18.0 J**	20.0 U	**16.0 J**	19.9 U	20.0 U	**11.1 J**
Fluorene	SW8270E	--	540	540		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Indeno(1,2,3-c,d)pyrene	SW8270E	--	600	690		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Naphthalene	SW8270E	--	2100	2100		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Phenanthrene	SW8270E	--	1500	1500		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Pyrene	SW8270E	--	2600	3300		**14.2 J**	20.0 U	**17.3 J**	19.9 U	**15.1 J**	**15.6 J**
Total Benzofluoranthenes (b,j,k) (U = 0 max limit)	Calculated	--	3200	3600		39.9 U	40.0 U	40.0 U	39.9 U	40.0 U	40.0 U
Total HPAH (SMS) (U = 0 max limit)	Calculated	--	12000	17000		**32.2 J**	40.0 U	**33.3 J**	39.9 U	**20 J**	**48.2 J**
Total LPAH (SMS) (U = 0 max limit)	Calculated	--	5200	5200		19.9 U	20.0 U	20.0 U	19.9 U	20.0 U	20.0 U
Pesticides (µg/kg)											
2,4'-DDD (o,p'-DDD)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
2,4'-DDE (o,p'-DDE)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
2,4'-DDT (o,p'-DDT)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
4,4'-DDD (p,p'-DDD)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
4,4'-DDE (p,p'-DDE)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU	WUT-22	WUT-23	WUT-24	WUT-25	WUT-26	WUT-27
					Surface or Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface
					Location ID	WUT-22CS-A	WUT-23CS-A	WUT-24CS-B	WUT-25CS-B	WUT-26CS-B	WUT-27CS-B
					Sample Date	11/4/2024	10/24/2024	11/6/2024	11/7/2024	10/25/2024	10/24/2024
					Sample ID	WUT-22CS-A-241104	WUT-23CS-A-241024	WUT-24CS-B-241106	WUT-25CS-B-241107	WUT-26CS-B-241025	WUT-27CS-B-241024
					Matrix	SE	SE	SE	SE	SE	SE
4,4'-DDT (p,p'-DDT)	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aldrin	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Chlordane, alpha- (Chlordane, cis-)	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Chlordane, beta- (Chlordane, trans-)	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Dieldrin	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Endrin ketone	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Heptachlor	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Hexachlorocyclohexane (BHC), beta-	SW8081B	--	--	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U
Nonachlor, cis-	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 U	1.00 U
Nonachlor, trans-	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Oxychlordane	SW8081B	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.0 UJ	1.00 U
Sum 4,4 DDT, DDE, DDD (U = 0 max limit)	Calculated	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
Total Chlordane (DMMP) (U = 0 max limit)	Calculated	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1 UJ	1.00 U
Total DDx (U = 0 max limit)	Calculated	--	--	--		1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
D/F (ng/kg)											
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.0003	--	--		**118**	**110**	**308**	**94.0**	**66.5**	**276**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0003	--	--		**4.53**	**4.70 EMPC**	**5.34**	**2.85**	**1.86 J**	**14.9**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.01	--	--		**11.6**	**10.2**	**29.4**	**8.97**	**4.08**	**30.0**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--		**2.22**	**2.43**	**3.61**	**1.54**	**0.874 J**	**6.63**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.01	--	--		0.255 U	0.407 U	0.253 U	0.240 U	0.0020 U	0.552 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		0.185 U	0.293 U	**0.302 JEMPC**	0.217 U	0.022 U	0.374 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		**0.681 J**	**0.537 JEMPC**	**0.714 J**	**0.554 JEMPC**	0.012 U	**2.43**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		**0.586 JEMPC**	0.324 U	**1.52**	**0.391 J**	0.025 U	**1.29 EMPC**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		0.155 U	0.259 U	0.156 U	**0.127 J**	0.012 U	**0.906 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.1	--	--		**0.337 JEMPC**	0.336 U	**0.454 JEMPC**	**0.268 JEMPC**	0.025 U	**0.501 JEMPC**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		0.200 U	0.348 U	0.205 U	0.254 U	0.018 U	0.313 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	1	--	--		0.254 U	0.264 U	**0.265 J**	0.203 U	0.085 U	0.449 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.03	--	--		**0.309 JEMPC**	0.182 U	**0.168 JEMPC**	**0.270 JEMPC**	0.0090 U	**0.637 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.1	--	--		0.156 U	0.249 U	0.154 U	0.180 U	0.012 U	0.228 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.3	--	--		**0.180 JEMPC**	0.205 U	0.186 U	0.190 U	**0.144 J**	**0.366 JEMPC**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	1	--	--		0.152 U	0.173 U	0.136 U	0.149 U	0.113 U	0.214 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.1	--	--		**0.212 JEMPC**	0.163 U	0.185 U	**0.222 J**	0.014 U	**0.352 JEMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	--	--	--		**26.4**	**24.1**	**62.9**	**20.2**	**9.74**	**65.9**
Total Heptachlorodibenzofuran (HpCDF)	E1613B	--	--	--		**7.48**	**6.88**	**11.2**	**4.97**	**1.76**	**20.9**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	--	--	--		-- U	**1.84**	**4.84**	**1.19**	**0.518 J**	**4.09**

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Chemical	Method	Total D/F TEF	Marine AET SCOs	Marine CSL SCOs	DMMU Surface or Subsurface Location ID Sample Date Sample ID Matrix	WUT-22 Surface WUT-22CS-A 11/4/2024 WUT-22CS-A-241104 SE	WUT-23 Surface WUT-23CS-A 10/24/2024 WUT-23CS-A-241024 SE	WUT-24 Subsurface WUT-24CS-B 11/6/2024 WUT-24CS-B-241106 SE	WUT-25 Subsurface WUT-25CS-B 11/7/2024 WUT-25CS-B-241107 SE	WUT-26 Subsurface WUT-26CS-B 10/25/2024 WUT-26CS-B-241025 SE	WUT-27 Subsurface WUT-27CS-B 10/24/2024 WUT-27CS-B-241024 SE
Total Hexachlorodibenzofuran (HxCDF)	E1613B	--	--	--		**3.83**	**1.81**	**6.27**	**1.42**	-- U	**9.90**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	--	--	--		-- U	**0.302**	**0.530 J**	-- U	**0.168**	**0.318**
Total Pentachlorodibenzofuran (PeCDF)	E1613B	--	--	--		**0.107 J**	-- U	**1.18**	-- U	-- U	**1.64**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	--	--	--		**0.321 J**	-- U	**0.177 J**	-- U	-- U	-- U
Total Tetrachlorodibenzofuran (TCDF)	E1613B	--	--	--		-- U	-- U	**0.145 J**	**0.222 J**	-- U	-- U
Total D/F TEQ 2005 (Mammal) (U = 0 max limit)	Calculated	--	--	--		**0.420 J**	**0.21 J**	**0.993 J**	**0.298 J**	**0.113 J**	**1.13 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2 max limit)	Calculated	--	--	--		**0.659 J**	**0.57 J**	**1.13 J**	**0.537 J**	**0.219 J**	**1.51 J**
PCB Aroclors (µg/kg)											
Aroclor 1016	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1221	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1232	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1242	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1248	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1254	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1260	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	**3.4 J**	4.0 U
Aroclor 1262	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Aroclor 1268	SW8082A	--	--	--		4.0 U	4.0 U	4.0 U	4.0 U	4.2 U	4.0 U
Total PCB Aroclors (SMS Marine 2019) (U = 0 max limit)	Calculated	--	130	1000		4.0 U	4.0 U	4.0 U	4.0 U	**3.4 J**	4.0 U

Table 5
Sediment Core Sample Analytical Results Compared to SMS Criteria for Beneficial Use

Notes:

TOC out of range

Detected concentration is greater than Marine AET SCO

Detected concentration is greater than Marine AET CSL

Non-detected concentration is above one or more identified screening levels

Bold: Detected result

Calculated values have been rounded to laboratory-reported significant digits.

Organic carbon normalized results are not reported if TOC concentration of the sample is outside of 0.5% to 3.5%.

EMPC: Estimated maximum possible concentration

J: Estimated value

R: Rejected

U: Compound analyzed for but not detected above detection limit

UJ: Compound analyzed for but not detected above estimated detection limit

--: not applicable/no data

µg/kg: microgram per kilogram

AET: apparent effects threshold

CSL: cleanup screening level

D/F: dioxins/furans

D/F TEF: total dioxin/furan TEQ 2005 (mammal) (TEF)

DDx: total dichlorodiphenyltrichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyldichloroethane

DMMP: Dredged Material Management Program

DMMU: Dredged Material Management Unit

HPAH: high-molecular-weight polycyclic aromatic hydrocarbon

LPAH: low molecular weight polycylic aromatic hydrocarbon

mg/kg: milligram per kilogram

ng/kg: nanogram per kilogram

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

pct: percent

SCO: sediment cleanup objective

SE: sediment

TEQ: toxic equivalence

TOC: total organic carbon

Table 6
Sediment Core Sample Grain Size Results

	DMMU	2	6	2	6	2	6	3	7
	Surface or Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface
	Location ID	HT-SC04		HT-SC05		HT-SC08		HT-SC09	
	Sample Date	10/30/2024		10/29/2024		10/30/2024		10/30/2024	
	Sample ID	HT-SC04-00-04-241030	HT-SC04-04-4.8-241030	HT-SC05-00-3.6-241029	HT-SC05-3.6-6.7-241029	HT-SC08-00-04-241030	HT-SC08-04-5.4-241030	HT-SC09-00-2.7-241030	HT-SC09-2.7-4.6-241030
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE
Chemical	Method								
Grain Size (pct)									
Clay, coarse	D422	**0.5**	**0.2**	**0.5**	**0.2**	**0.6**	**0.2**	**0.2**	**0.7**
Clay, fine	D422	**2.9**	**2.3**	**3**	**2.3**	**3**	**2.4**	**3.7**	**3.4**
Clay, medium	D422	**0.3**	0.10 U	**0.3**	0.10 U	**0.3**	0.10 U	0.10 U	**0.3**
Gravel, coarse	D422	0.10 U	0.10 U	0.10 U	0.10 U	**0.3**	**0.1**	**0.1**	0.10 U
Gravel, medium	D422	0.10 U	0.10 U	0.10 U	**0.2**	**0.6**	**0.4**	**0.3**	**0.5**
Gravel, very coarse	D422	0.10 U	0.10 U	**0.2**	0.10 U	**0.5**	**0.1**	0.10 U	**0.1**
Sand, coarse	D422	**3.1**	**4.9**	**7.3**	**22.1**	**14.4**	**12.2**	**6.8**	**8.9**
Sand, fine	D422	**22.1**	**16.1**	**29**	**12.3**	**18.2**	**19**	**21.6**	**14.6**
Sand, medium	D422	**50.5**	**68.8**	**37.5**	**50.4**	**40.9**	**43.7**	**50**	**58.1**
Sand, very coarse	D422	**0.2**	0.10 U	**0.6**	**0.5**	**1.6**	**1.4**	**0.6**	**0.6**
Sand, very fine	D422	**11.9**	**4.5**	**14.9**	**5.9**	**12**	**14.5**	**7.9**	**5.9**
Silt, coarse	D422	**5.2**	**1.1**	**3.5**	**2.1**	**3.6**	**2**	**2.1**	**2.7**
Silt, fine	D422	**1.7**	**0.8**	**1.1**	**1**	**1.1**	**1.4**	**2.1**	**1**
Silt, medium	D422	**0.8**	0.10 U	**1.7**	**1.6**	**1.4**	**1.6**	**2.7**	**1.3**
Silt, very fine	D422	**0.7**	**1.4**	**0.4**	**1.4**	**1.6**	**1**	**1.8**	**1.9**
Total fines (clay and silt)		12.1	5.8	10.5	8.6	11.6	8.6	12.6	11.3
Total gravel		0	0	0.2	0.2	1.4	0.6	0.4	0.6
Total sand		87.8	94.3	89.3	91.2	87.1	90.8	86.9	88.1

Table 6
Sediment Core Sample Grain Size Results

	DMMU	3	7	Z-Layer	3	7	3	8	3	8
	Surface or Subsurface	Surface	Subsurface	Z-Layer	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface
	Location ID	HT-SC11			HT-SC13		HT-SC15		HT-SC17	
	Sample Date	10/31/2024			11/1/2024		10/31/2024		11/7/2024	
	Sample ID	HT-SC11-00-2.5-241031	HT-SC11-2.5-6.5-241031	HT-SC11-6.5-8.5-241031	HT-SC13-00-3.2-241101	HT-SC13-3.2-05-241101	HT-SC15-00-3.5-241031	HT-SC15-3.5-6.3-241031	HT-SC17-00-1.7-241107	HT-SC17-1.7-5.6-241107
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE
Chemical	Method									
Grain Size (pct)										
Clay, coarse	D422	**0.6**	**1.6**	**2.8**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Clay, fine	D422	**2.9**	**3.4**	**3.9**	**2.4**	**2.2**	**2.3**	**2.3**	**1.1**	**1.1**
Clay, medium	D422	**0.3**	**0.9**	**1.6**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
Gravel, coarse	D422	0.10 U	0.10 U	0.10 U	**0.1**	0.10 U	0.10 U	0.10 U	**0.1**	**0.1**
Gravel, medium	D422	**0.5**	**0.1**	**0.1**	**0.1**	0.10 U	**0.1**	0.10 U	**0.7**	**0.3**
Gravel, very coarse	D422	0.10 U	0.10 U	**0.1**	0.10 U	0.10 U	**0.1**	0.10 U	**0.1**	**0.5**
Sand, coarse	D422	**5.4**	**4.8**	**1.2**	**8**	**10.6**	**4.8**	**0.1**	**15.1**	**4.2**
Sand, fine	D422	**25.6**	**17.6**	**6.7**	**26**	**17.4**	**33.9**	**21.6**	**11.5**	**31.8**
Sand, medium	D422	**44**	**16.4**	**8.3**	**39.6**	**49.7**	**27.2**	**46.1**	**65.4**	**50**
Sand, very coarse	D422	**1.2**	**0.4**	**0.2**	**0.5**	**0.5**	**0.4**	0.10 U	**2.1**	**0.8**
Sand, very fine	D422	**11.7**	**19.8**	**39.6**	**14.6**	**10.8**	**15.6**	**16**	**1.9**	**6.8**
Silt, coarse	D422	**4.1**	**19.6**	**14.3**	**2**	**2.1**	**7.8**	**6.4**	**0.1**	**2**
Silt, fine	D422	**1.4**	**4.4**	**6.5**	**3.1**	**3.1**	**3.6**	**3**	**0.6**	**1.2**
Silt, medium	D422	**1.3**	**8.3**	**11.6**	**1.5**	**2.1**	**2.5**	**2.9**	0.10 U	0.10 U
Silt, very fine	D422	**1.1**	**2.5**	**3.2**	**1.2**	**0.7**	**1**	**0.9**	**0.5**	**0.5**
Total fines (clay and silt)		11.7	40.7	43.9	11	11	18	16.3	3.1	5.6
Total gravel		0.5	0.1	0.2	0.2	0	0.2	0	0.9	0.9
Total sand		87.9	59	56	88.7	89	81.9	83.8	96	93.6

Table 6
Sediment Core Sample Grain Size Results

	DMMU	4	9	4	9	5	10	5	10	Z-Layer
	Surface or Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Z-Layer
	Location ID	HT-SC20		HT-SC24		HT-SC26		HT-SC27		
	Sample Date	11/11/2024		11/12/2024		10/28/2024		10/25/2024		
	Sample ID	HT-SC20-00-1.9-241111	HT-SC20-1.9-4.7-241111	HT-SC24-00-3.8-241112	HT-SC24-3.8-6.3-241112	HT-SC26-00-3.8-241028	HT-SC26-3.8-5.8-241028	HT-SC27-00-2.7-241025	HT-SC27-2.7-6.7-241025	HT-SC27-6.7-8.7-241025
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE
Chemical	Method									
Grain Size (pct)										
Clay, coarse	D422	**0.6**	**0.5**	**0.3**	**0.1**	**0.7**	**0.4**	**1.9**	**1.1**	**0.4**
Clay, fine	D422	**1.6**	**1.1**	**2.5**	**1.2**	**2.8**	**3.7**	**3.1**	**3.5**	**3.9**
Clay, medium	D422	**0.3**	**0.3**	0.10 U	0.10 U	**0.3**	0.10 U	**1.2**	**0.6**	0.10 U
Gravel, coarse	D422	**0.1**	0.10 U	0.10 U	**0.1**	0.10 U	**0.1**	**0.1**	**0.1**	0.10 U
Gravel, medium	D422	**0.1**	0.10 U	**0.1**	**0.1**	**0.5**	**0.1**	**0.2**	**0.1**	0.10 U
Gravel, very coarse	D422	**0.1**	**0.1**	0.10 U	**0.2**	**0.1**	0.10 U	**0.1**	0.10 U	0.10 U
Sand, coarse	D422	**10.5**	**1.5**	**2.8**	**6.9**	**28.5**	**29.8**	**12.2**	**1.7**	**2.2**
Sand, fine	D422	**22.6**	**27.4**	**13.7**	**14.5**	**6.2**	**3**	**16.4**	**26.8**	**21.6**
Sand, medium	D422	**38.9**	**57.1**	**42.4**	**69.6**	**40.7**	**28.4**	**41.5**	**22.5**	**26.5**
Sand, very coarse	D422	**1.1**	0.10 U	**0.6**	**0.6**	**2.2**	**2**	**0.9**	**0.2**	**0.1**
Sand, very fine	D422	**12**	**6.9**	**13.1**	**3.3**	**5.5**	**14.1**	**9.1**	**18.6**	**25.4**
Silt, coarse	D422	**7.8**	**2.8**	**15.1**	**1.7**	**4.1**	**8.7**	**3.8**	**12.4**	**10.9**
Silt, fine	D422	**1.4**	**0.8**	**3.1**	**0.4**	**2.5**	**3.3**	**3.5**	**4.3**	**2.9**
Silt, medium	D422	**1.8**	**0.7**	**3.8**	**0.6**	**4.3**	**3.9**	**4.4**	**6.4**	**3.6**
Silt, very fine	D422	**1.4**	**0.9**	**2.6**	**0.7**	**1.7**	**2.6**	**1.5**	**1.8**	**2.4**
Total fines (clay and silt)		14.9	7.1	27.4	4.7	16.4	22.6	19.4	30.1	24.1
Total gravel		0.3	0.1	0.1	0.4	0.6	0.2	0.4	0.2	0
Total sand		85.1	92.9	72.6	94.9	83.1	77.3	80.1	69.8	75.8

Table 6
Sediment Core Sample Grain Size Results

DMMU		5	10	Z-Layer	20	24	20	24	Z-Layer
Surface or Subsurface		Surface	Subsurface	Z-Layer	Surface	Subsurface	Surface	Subsurface	Z-Layer
Location ID		HT-SC30			WUT-SC01		WUT-SC04		
Sample Date		10/25/2024			11/5/2024		11/5/2024		
Sample ID		HT-SC30-00-2.2-241025	HT-SC30-2.2-6.2-241025	HT-SC30-6.2-8.2-241025	WUT-SC01-00-5.2-241105	WUT-SC01-5.2-07-241105	WUT-SC04-00-1.7-241105	WUT-SC04-1.7-5.7-241105	WUT-SC04-5.7-7.7-241105
Matrix		SE	SE	SE	SE	SE	SE	SE	SE
Chemical	Method								
Grain Size (pct)									
Clay, coarse	D422	**1.5**	**1.8**	**1.2**	**0.8**	**0.4**	**0.4**	**0.1**	0.10 U
Clay, fine	D422	**5.1**	**3.6**	**5.6**	**4.2**	**3.2**	**3.7**	**3.9**	**4**
Clay, medium	D422	**0.7**	**1**	**0.6**	**0.5**	**0.3**	**0.3**	0.10 U	0.10 U
Gravel, coarse	D422	**0.1**	0.10 U	0.10 U	**0.1**	**0.9**	**0.1**	0.10 U	**0.2**
Gravel, medium	D422	**0.1**	0.10 U	**0.1**	**0.2**	**3.8**	**1.8**	**0.4**	**2.9**
Gravel, very coarse	D422	0.10 U	0.10 U	0.10 U	0.10 U	**0.6**	0.10 U	**1**	0.10 U
Sand, coarse	D422	**1.1**	**1.2**	**17**	**14.5**	**37.4**	**44.9**	**48.1**	**43.5**
Sand, fine	D422	**24.9**	**36.3**	**9.5**	**8.1**	**5.6**	**3.4**	**3.8**	**3.9**
Sand, medium	D422	**7.5**	**6.7**	**29.2**	**65.5**	**29.5**	**26.7**	**31.1**	**27.9**
Sand, very coarse	D422	**0.1**	**0.1**	**2.3**	**1.8**	**16.5**	**17**	**10.1**	**16**
Sand, very fine	D422	**31.1**	**22.8**	**12**	**2.7**	**0.7**	**1.1**	**0.8**	**0.9**
Silt, coarse	D422	**11.3**	**13.4**	**10.5**	**0.1**	**0.6**	**0.1**	**0.1**	**0.3**
Silt, fine	D422	**6.7**	**5.7**	**3.8**	**1.1**	**0.6**	0.10 U	0.10 U	**0.4**
Silt, medium	D422	**6.3**	**4.9**	**5.1**	**0.3**	0.10 U	**0.6**	0.10 U	0.10 U
Silt, very fine	D422	**3.7**	**2.5**	**3**	0.10 U	0.10 U	0.10 U	**0.5**	**0.2**
Total fines (clay and silt)		35.3	32.9	29.8	7	5.1	5.1	4.6	4.9
Total gravel		0.2	0	0.1	0.3	5.3	1.9	1.4	3.1
Total sand		64.7	67.1	70	92.6	89.7	93.1	93.9	92.2

Table 6
Sediment Core Sample Grain Size Results

DMMU	20	24	21	25	Z-Layer	21	25	Z-Layer
Surface or Subsurface	Surface	Subsurface	Surface	Subsurface	Z-Layer	Surface	Subsurface	Z-Layer
Location ID	WUT-SC05		WUT-SC08			WUT-SC10		
Sample Date	11/6/2024		11/6/2024			11/7/2024		
Sample ID	WUT-SC05-00-4.6-241106	WUT-SC05-4.6-5.9-241106	WUT-SC08-00-0.9-241106	WUT-SC08-0.9-4.9-241106	WUT-SC08-4.9-6.3-241106	WUT-SC10-00-3.9-241107	WUT-SC10-3.9-7.9-241107	WUT-SC10-7.9-8.3-241107
Matrix	SE	SE	SE	SE	SE	SE	SE	SE
Chemical / Method								
Grain Size (pct)								
Clay, coarse D422	**0.8**	**0.5**	**0.2**	**0.1**	0.10 U	**1**	**1**	**0.5**
Clay, fine D422	**6.8**	**5.2**	**3.3**	**3.5**	**3.5**	**4.5**	**3.3**	**2.2**
Clay, medium D422	**0.3**	**0.3**	0.10 U	0.10 U	0.10 U	**0.6**	**0.6**	**0.3**
Gravel, coarse D422	**0.1**	0.10 U	0.10 U	**0.1**	0.10 U	**0.4**	0.10 U	**0.3**
Gravel, medium D422	**0.3**	**0.5**	**0.8**	**0.2**	**0.5**	**0.5**	**1.1**	**1.8**
Gravel, very coarse D422	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	**0.7**	**0.6**
Sand, coarse D422	**21**	**26.7**	**44.6**	**36.4**	**37.9**	**25.7**	**30.6**	**29.6**
Sand, fine D422	**9.4**	**9.2**	**5.8**	**13.1**	**9.2**	**9.2**	**10.1**	**6.3**
Sand, medium D422	**40.9**	**43**	**31.9**	**39.5**	**40.9**	**43.2**	**37**	**43.6**
Sand, very coarse D422	**3.2**	**4.5**	**8.9**	**3.4**	**4.3**	**3.6**	**6.3**	**6.8**
Sand, very fine D422	**6.5**	**4.4**	**2**	**1.4**	**2**	**4.3**	**3.7**	**3.3**
Silt, coarse D422	**1.7**	**0.7**	**0.7**	**0.5**	**0.5**	**0.4**	**0.1**	**1.2**
Silt, fine D422	**4**	**1.8**	**0.7**	**0.5**	**0.7**	**3**	**2.3**	**2.1**
Silt, medium D422	**2.7**	**2**	0.10 U	**0.5**	**0.5**	**1.7**	**1.8**	**0.5**
Silt, very fine D422	**2.4**	**1.2**	**1.3**	**0.7**	0.10 U	**1.8**	**1.4**	**0.9**
Total fines (clay and silt)	18.7	11.7	6.2	5.8	5.2	13	10.5	7.7
Total gravel	0.4	0.5	0.8	0.3	0.5	0.9	1.8	2.7
Total sand	81	87.8	93.2	93.8	94.3	86	87.7	89.6

Table 6
Sediment Core Sample Grain Size Results

DMMU	22	22	26	Z-Layer	23	23	27	Z-Layer
Surface or Subsurface	Surface	Surface	Subsurface	Z-Layer	Surface	Surface	Subsurface	Z-Layer
Location ID	WUT-SC11	WUT-SC14			WUT-SC18	WUT-SC20		
Sample Date	11/4/2024	10/24/2024			10/23/2024	10/23/2024		
Sample ID	WUT-SC11-00-3.7-241104	WUT-SC14-00-1.2-241024	WUT-SC14-1.2-5.2-241024	WUT-SC14-5.2-7.2-241024	WUT-SC18-00-4.3-241023	WUT-SC20-00-1.4-241023	WUT-SC20-1.4-5.4-241023	WUT-SC20-5.4-7.3-241023
Matrix	SE	SE	SE	SE	SE	SE	SE	SE
Chemical / Method								
Grain Size (pct)								
Clay, coarse D422	**0.9**	**0.6**	**0.5**	**0.1**	**1.7**	**2.2**	**2.1**	**2.1**
Clay, fine D422	**3.2**	**5**	**3.9**	**4.8**	**7.2**	**10**	**6.4**	**5.8**
Clay, medium D422	**0.6**	**0.3**	**0.3**	0.10 U	**1**	**1.1**	**1.2**	**1.2**
Gravel, coarse D422	**0.2**	0.10 U	**0.2**	**0.1**	**1.8**	**0.1**	**0.2**	**0.1**
Gravel, medium D422	**1.2**	**0.3**	**1.4**	**3**	**6**	**0.4**	**1.2**	**1.3**
Gravel, very coarse D422	**0.8**	**0.2**	**0.2**	**0.7**	**2.1**	0.10 U	**0.5**	**0.5**
Sand, coarse D422	**20.3**	**27.2**	**32.5**	**36.6**	**10.2**	**15.6**	**27.2**	**25.1**
Sand, fine D422	**11.2**	**4.3**	**8.8**	**6.1**	**14.2**	**6.1**	**5.3**	**8.6**
Sand, medium D422	**50.7**	**52.3**	**42.2**	**35.2**	**37.8**	**39.9**	**43.1**	**42.5**
Sand, very coarse D422	**2.4**	**3.3**	**6.6**	**11.5**	**3.9**	**1.6**	**3.7**	**4.7**
Sand, very fine D422	**3.7**	**2.8**	**0.9**	**0.8**	**7**	**5.5**	**2.7**	**2.5**
Silt, coarse D422	**0.7**	**2.8**	**0.3**	0.10 U	**0.3**	**0.7**	**0.7**	**0.1**
Silt, fine D422	**1.8**	0.10 U	**1.6**	**0.4**	**3**	**7**	**1.4**	**1.7**
Silt, medium D422	**1.6**	0.10 U	0.10 U	0.10 U	**1.9**	**5.3**	**2.3**	**1.8**
Silt, very fine D422	**0.7**	**1**	**0.7**	**0.7**	**2**	**4.5**	**2.1**	**2.1**
Total fines (clay and silt)	9.5	9.7	7.3	6	17.1	30.8	16.2	14.8
Total gravel	2.2	0.5	1.8	3.8	9.9	0.5	1.9	1.9
Total sand	88.3	89.9	91	90.2	73.1	68.7	82	83.4

Table 6
Sediment Core Sample Grain Size Results

DMMU	23	23	27
Surface or Subsurface	Surface	Surface	Subsurface
Location ID	WUT-SC21	WUT-SC24	
Sample Date	10/22/2024	10/22/2024	
Sample ID	WUT-SC21-00-04-241022	WUT-SC24-00-3.7-241022	WUT-SC24-3.7-6.5-241022
Matrix	SE	SE	SE
Chemical / Method			
Grain Size (pct)			
Clay, coarse D422	**2.1**	**1**	**0.2**
Clay, fine D422	**5.6**	**3.3**	**4.8**
Clay, medium D422	**1.2**	**0.6**	0.10 U
Gravel, coarse D422	**0.3**	**0.7**	**0.3**
Gravel, medium D422	**1.7**	**1.9**	**1.2**
Gravel, very coarse D422	**0.2**	**0.6**	**1.4**
Sand, coarse D422	**18.2**	**17.7**	**16.5**
Sand, fine D422	**13.3**	**7.3**	**14.3**
Sand, medium D422	**36.2**	**46.5**	**44.4**
Sand, very coarse D422	**3.9**	**3.6**	**3.1**
Sand, very fine D422	**8.9**	**7.3**	**5.8**
Silt, coarse D422	**1.4**	**4.1**	**2.6**
Silt, fine D422	**2**	**1.7**	**2.2**
Silt, medium D422	**2.6**	**2.1**	**1.7**
Silt, very fine D422	**2.3**	**1.5**	**1.5**
Total fines (clay and silt)	17.2	14.3	13
Total gravel	2.2	3.2	2.9
Total sand	80.5	82.4	84.1

Table 6
Sediment Core Sample Grain Size Results

Notes:

Totals calculated based on detected results.

Bold: Detected result

DMMU: Dredged Material Management Unit

J: Estimated value

NA N: The sample was deemed to be non-plastic due to the material not being workable down to 1/8" ribbons without breaking apart.

pct: percent

SE: sediment

U: Compound analyzed for but not detected above de

Table 7

Sediment Core Sample Atterberg Limits Results

	DMMU	11	8	5	22
	Surface or Subsurface	Subsurface	Subsurface	Surface	Surface
	Location ID	HT-SC11	HT-SC16-GEO	HT-SC30	WUT-SC16
	Sample Date	10/31/2024	10/31/2024	10/25/2024	10/24/2024
	Sample ID	HT-SC11-05-06-241031	HT-SC16-1.7-2.7-241031	HT-SC30-00-0.6-241025	WUT-SC16-00-0.5-241024
	Matrix	SE	SE	SE	SE
Chemical	Method				
Conventional Parameters (pct)					
Plastic limit	D4318	**NA N**	**24.7**	**29.4**	**23.8**
Plasticity index	D4318	**NA N**	**11.6**	**9.2**	**18.5**
Liquid limit	D4318	**NA N**	**36.3**	**38.6**	**42.3**

Notes:

Bold: Detected result

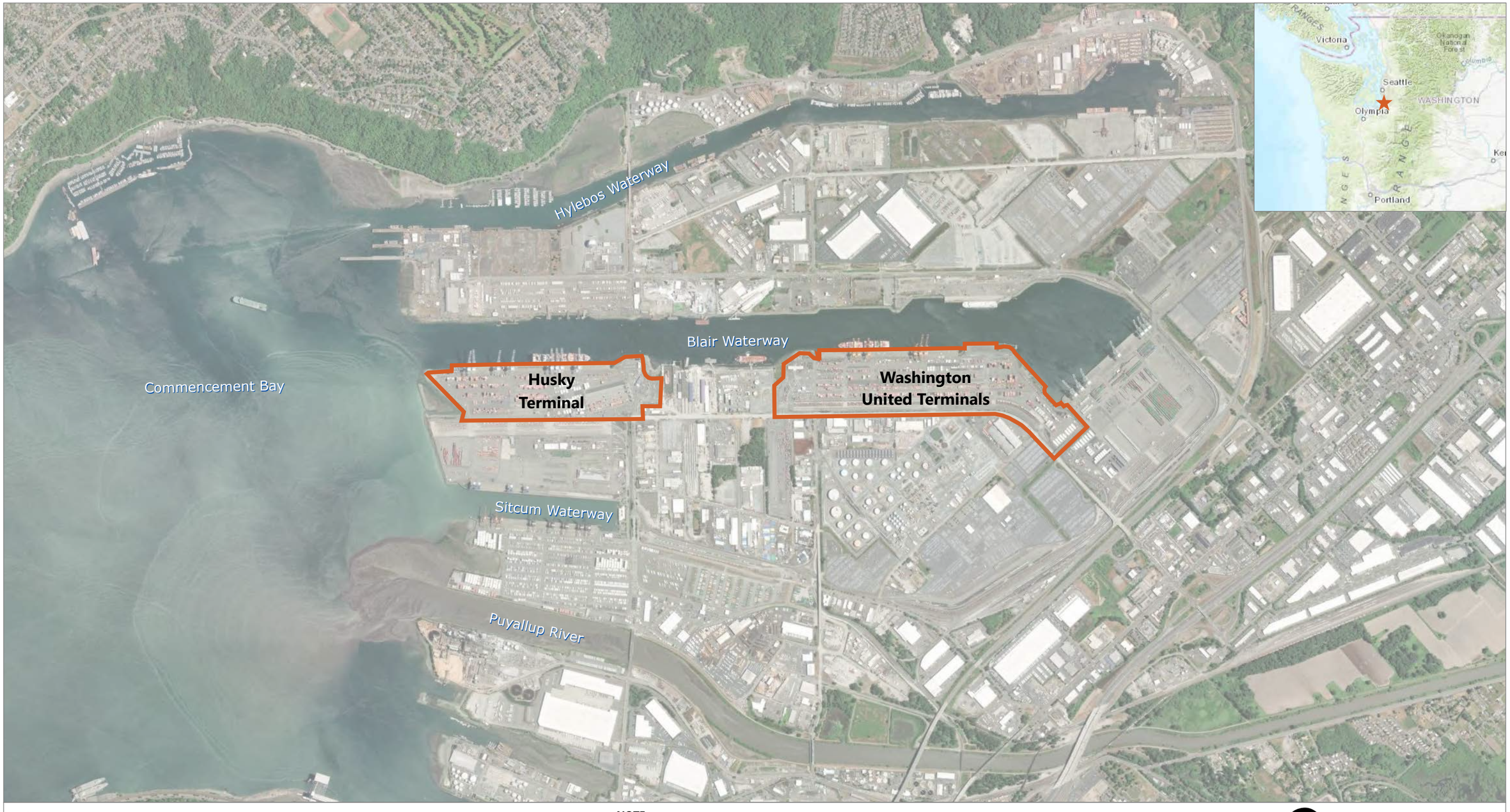
DMMU: Dredged Material Management Unit

NA N: The sample was deemed to be non-plastic due to the material not being workable down to 1/8-inch ribbons without breaking apart.

pct: percent

SE: sediment

Figures



LEGEND:

Property Boundary

NOTE:
1. Imagery sources: World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, and NPS; World Imagery: Maxar

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Feet

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ANCHOR QEA

Figure 1
Project Sites and Vicinity
Sediment Characterization Report
Husky and Washington United Terminals Berth Deepening Sediment Characterization

FINAL



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

LEGEND:

- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- -55 Existing Contours (1' & 5' Intervals)
- Outfall
- DMMU-1 Surface DMMU
- DMMU-6 Subsurface DMMU
- Proposed Sediment Core Location
- Actual Sediment Core Location

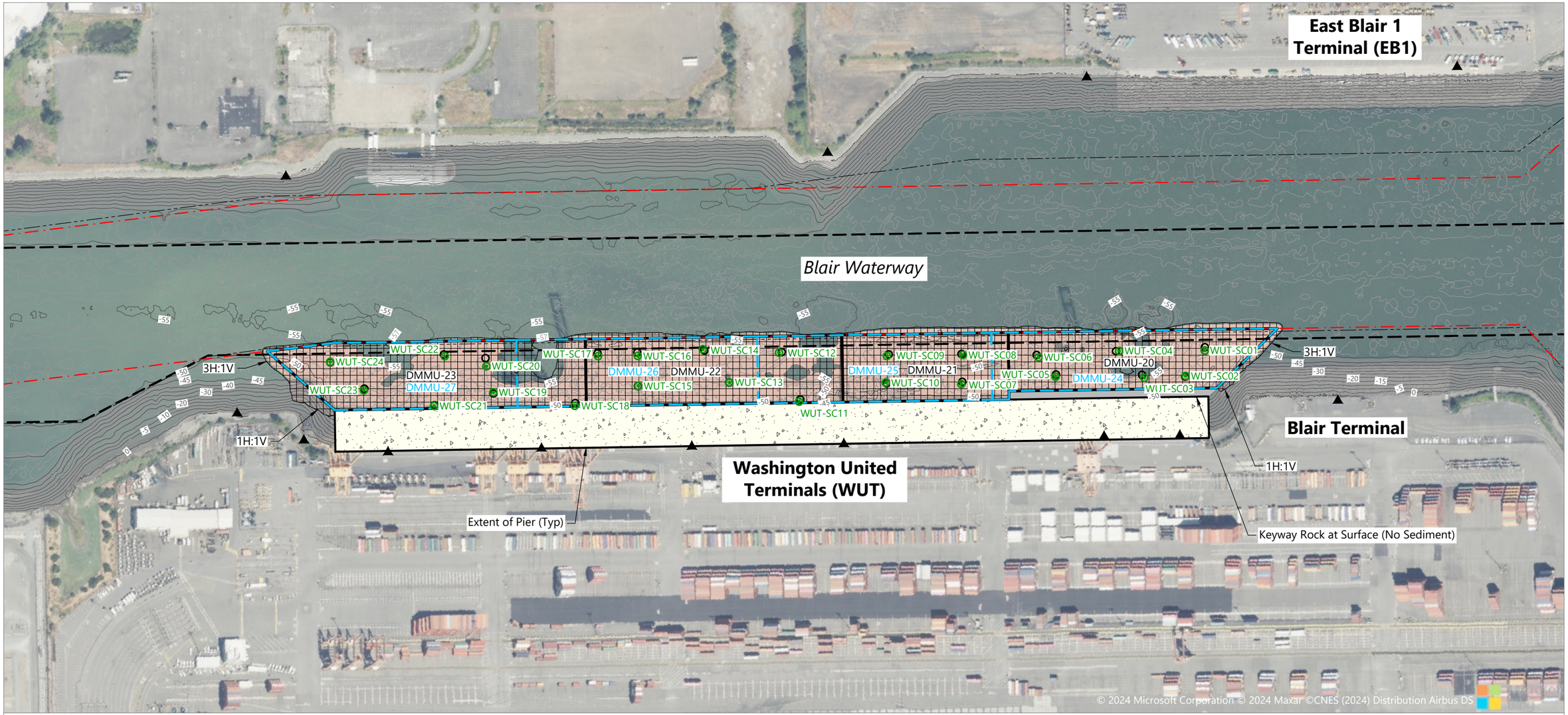
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Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-003 (Dredge Plan-Sediment Charactization).dwg Figure 2a

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Figure 2a
Proposed and Actual Sampling Locations: Husky Terminal

FINAL



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
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USACE: U.S. Army Corps of Engineers

LEGEND:

- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- -55 Existing Contours (1' & 5' Intervals)
- Outfall
- DMMU-1 Surface DMMU
- DMMU-6 Subsurface DMMU
- Proposed Sediment Core Location
- Actual Sediment Core Location

0 300 Feet

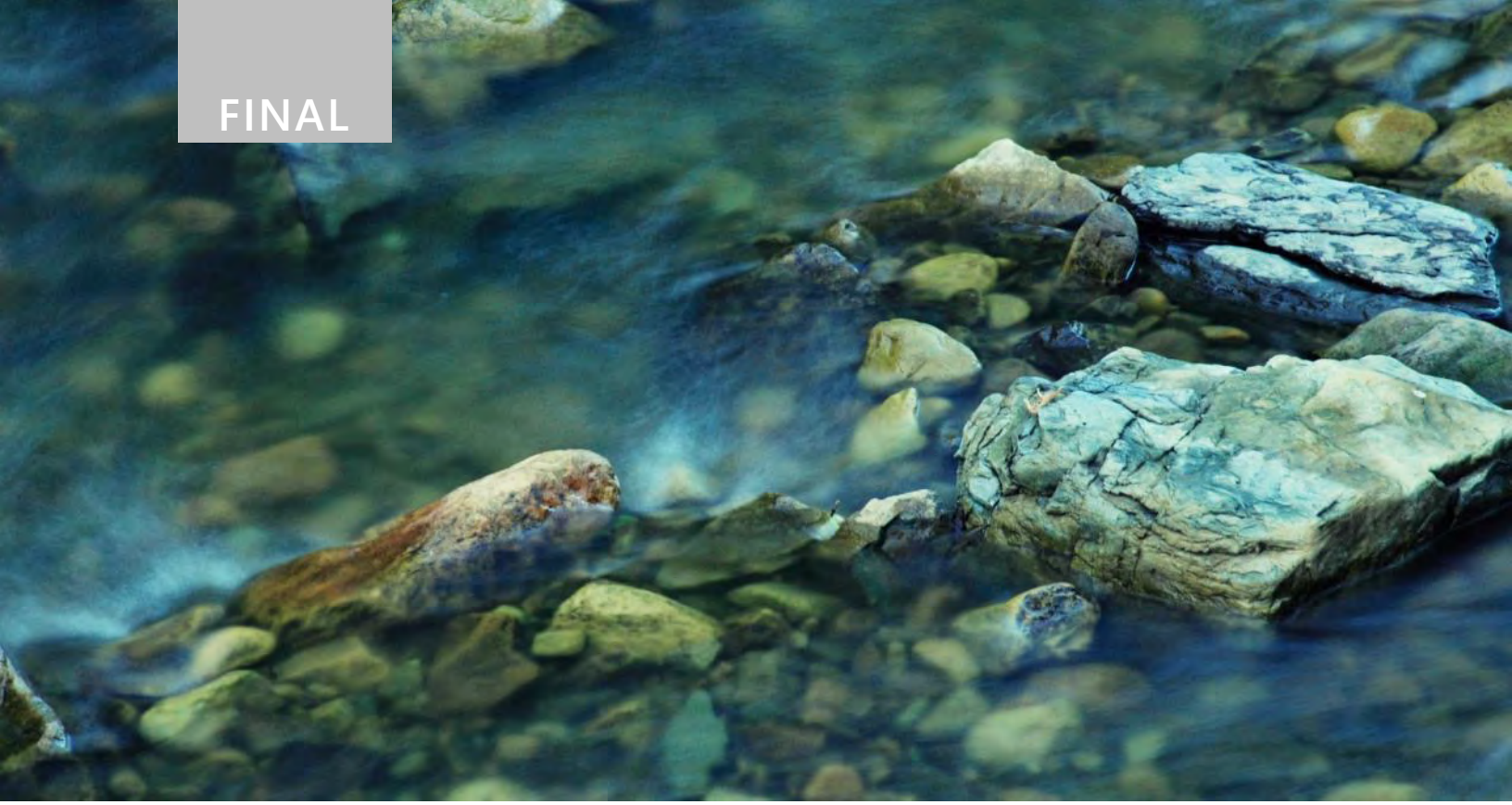
Publish Date: 2025/03/28 11:43 AM | User: jbigsby
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-003 (Dredge Plan-Sediment Charactization).dwg Figure 2b

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Figure 2b
Proposed and Actual Sampling Locations: Washington United Terminals
Sediment Characterization Report
Husky and Washington United Terminals Berth Deepening Sediment Characterization

Appendix A
Sampling and Quality Assurance Project Plan

FINAL



October 2024
Husky and Washington United Terminals Berth Deepening Sediment Characterization

ANCHOR QEA

Sampling and Quality Assurance Project Plan

Prepared for Port of Tacoma

FINAL

October 2024
Husky and Washington United Terminals Berth Deepening Sediment Characterization

Sampling and Quality Assurance Project Plan

Prepared for
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Tacoma, Washington 98421

Prepared by
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1201 3rd Avenue, Suite 2600
Seattle, Washington 98101

FINAL

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APPENDICES

Appendix A	Historical Sediment Chemistry
Appendix B	Structural As-Builts
Appendix C	Field Forms

ABBREVIATIONS

ARL	Analytical Resources, LLC
ASTM	ASTM International
BT	bioaccumulation trigger
CB N/T	Commencement Bay Nearshore/Tideflats
CCV	continuing calibration verifications
CDF	confined disposal facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeters
cy	cubic yards
D/F	dioxins/furans
DGPS	differential global positioning system
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Unit
DQO	Data Quality Objective
Ecology	Washington State Department of Ecology
EDL	estimated detection limit
EIM	Environment Information Management
EPA	U.S. Environmental Protection Agency
EQuIS	Environmental Quality Information System
FC	Field Coordinator
FNC	Federal Navigation Channel
HAZWOPER	Hazardous Waste Operations and Emergency Response
H:V	horizontal to vertical
HCBD	hexachlorobutadiene
HDPE	high-density polyethylene
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
Husky	Husky Terminal
ID	identification
IDW	investigation-derived waste
ISGP	Industrial Stormwater General Permit
LCS	laboratory control sample
MD	matrix duplicate
MDL	minimum detection limit
MIDP	Archaeological Monitoring and Inadvertent Discovery Plan
MLLW	mean lower low water

MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
NAD83	North American Datum of 1983
NCD	Nearshore Confined Disposal
ng/kg	nanograms per kilogram
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Act
PAH	polycyclic aromatic hydrocarbon
PARIS	Water Quality Permitting and Reporting Information System
PCB	polychlorinated biphenyl
PED	pre-engineering design
PM	Project Manager
Port	Port of Tacoma
pptr	part per trillion
PSAMP	Puget Sound Assessment and Monitoring Program
PSEP	Puget Sound Estuary Program
PTFE	polytetrafluoroethylene
QA/QC	Quality Assurance/Quality Control
RL	reporting limit
RPD	relative percent difference
SCO	Soil Cleanup Objective
SIC	standard industrial classification
SL	screening level
SOP	standard operating procedure
SQAPP	Sampling Quality Assurance Project Plan
SRM	standard reference material
SVOC	semivolatile organic compound
TBT	tributyltin
TEQ	Toxic Equivalency Quotient
TOC	total organic carbon
TS	total solids
USACE	U.S. Army Corps of Engineers
USOR	U.S. Oil and Refining Co.
UWI	Urban Water Initiative

WUT	Washington United Terminals

1 Introduction

On behalf of the Port of Tacoma (Port), Anchor QEA has prepared this Sampling and Quality Assurance Project Plan (SQAPP) that details sample collection methods and analytical protocols for sediment sample collection activities in the Husky Terminal (Husky) and Washington United Terminals (WUT) berthing areas located on the western side of the Blair Waterway (Figure 1).

The Port and Northwest Seaport Alliance are proposing improvements to modernize the Blair Waterway and associated container terminal berths to accommodate newer, larger container vessels that are in use by ocean carriers. The Tacoma Harbor Deepening Program includes deepening of the federal navigation channel (FNC) by the U.S. Army Corps of Engineers (USACE) and deepening of the berthing areas at Husky and WUT by the Port. Increasing the federal channel dimensions would improve container ship navigation safety and access at adjacent terminals and remove draft restrictions for large vessels to accommodate modern deep draft ships. The Port intends to deepen the berths at the Husky and WUT terminals to the same depth as the FNC. This SQAPP details the sediment characterization approach and procedures to obtain a suitability determination from the Dredged Material Management Program (DMMP) for dredged material that would be removed if the Husky and WUT berthing areas are deepened.

This SQAPP was prepared based on the plan for the Husky and WUT terminal berths to be deepened to -57 feet mean lower low water (MLLW) plus a 2-foot overdredge (final elevation to -59 feet MLLW), which is the same elevation planned for deepening the FNC. The FNC boundary identified by USACE in the pre-engineering design (PED) phase is used as the outer-most extent of the terminal berths for this SQAPP.[1] Side slopes for the berth deepening are assumed to extend into the FNC, using a 3 horizontal to 1 vertical (3H:1V) slope ratio, which are included as part of this SQAPP. A separate SQAPP is being developed to support FNC deepening for all other FNC deepening areas, which will exclude the berth deepening areas identified in this SQAPP.

This SQAPP addresses the components for a tiered chemical and biological sediment characterization. The dredge material management units (DMMUs), sampling locations, target boring depths, and chemical testing methods have been selected in accordance with the most recent DMMP guidance (DMMP 2021) and Sediment Cleanup User's Manual II (Ecology 2021). Data will be used to support planning for disposal of dredged material (open-water, beneficial use, and upland) as well as to estimate leave surface (Z-layer) conditions.

[1] The PED boundary is a conservative boundary that assumes a narrower FNC near the Husky and WUT berths, but the preliminary engineering and design evaluations by USACE may result in a wider FNC boundary that is closer to the terminals. Using the narrower PED boundary assumes larger berth areas, which results in more material characterized as part of the Husky and WUT berth deepening projects. Final definition of the berth deepening areas will occur in 2025 following establishment of the new FNC boundary.

This SQAPP addresses project team responsibilities, the conceptual sampling approach including dredge plan and project ranking, sampling and analytical procedures, data quality, and data reporting procedures. Available relevant chemical data from the vicinity of the site are provided in Appendix A. Structural as-builts for the berthing areas are provided in Appendix B. Field collection forms are provided in Appendix C.

1.1 Site Information and History

The Blair Waterway is located within the Port's Industrial Development District adjacent to Commencement Bay in Tacoma, Washington. The Blair Waterway, originally called the Wapato Waterway, was constructed from Commencement Bay to East 11th Street in the 1920s through 1940s by dredging intertidal and shallow subtidal lands and filling adjacent lands to construct uplands. The Rivers and Harbors Act of 1935, enacted on August 30, 1935, authorized the federal government to assume operations and maintenance responsibility for a channel 700 feet in width and 30 feet deep (-30 feet MLLW). In 1949, Wapato Waterway was renamed the Port Industrial Waterway. In 1952, the Port extended a 250-foot-wide by 30-foot-deep (-30 feet MLLW) channel to Lincoln Avenue. In 1953, the USACE initiated a study to determine the feasibility of extending and improving the waterway to Lincoln Avenue. The study was favorable and recommended authorization of a channel 800 feet wide by 30 feet deep (-30 feet MLLW), except for a 150-foot-wide restriction at the East 11th Street Bridge. The Rivers and Harbors Act of 1954, enacted September 3, 1954, authorized the recommended project, and construction was completed in 1956. In 1955, the Seattle District USACE initiated a study to determine the feasibility of extending the waterway beyond Lincoln Avenue. This study was favorable, and Congress authorized construction of the project through the Rivers and Harbors and Flood Control Act of 1962, enacted October 23, 1962. This authorization completed the Blair Waterway to its present-day geographical boundaries. Renamed the Blair Waterway in 1969, the waterway is approximately 2.6 miles long, with a turning basin at the head of the navigation channel. Since its creation, the Blair Waterway has been actively operated, managed, and maintained as an industrial and commercial navigable waterway. Between 1999 and 2000, the FNC was deepened to -51 feet MLLW and is currently maintained at this elevation (see Section 2). Information and history for Husky and WUT are included in Sections 1.1.1 and 1.1.2.

1.1.1 Husky Terminal

Husky includes Terminals 3 and 4 (also known as Berths 3 and 4), which have been constructed in stages, ending in 2005. Prior to that time, the area was the location of Piers 1, 2, and 3, located adjacent to Slips 1, 2, and 3. Slip 1 was formerly located farthest north along the Blair Waterway, with Slip 3 located to the south near East 11th Street. Slip 3 was filled between 1965 and 1970, and Slip 2 was filled in the 1980s with dredged material from the Blair Waterway.

In the late 1990s, the East 11th Street Bridge was removed to provide a 300-foot-wide channel with a depth of -48 feet MLLW at the Blair Bridge reach, and cutting back the southern shoreline to provide a 355-foot-wide channel with a depth of -48 feet MLLW at the Blair Bridge reach. This dredging work was completed in March 1998. As discussed in Section 2.2.1.1, Blair Waterway was widened again in 2004 along the southern shoreline in the vicinity where the Blair Bridge and the East 11th Street right-of-way previously existed to accommodate a 450-feet wide navigation channel.

Slip 1 was converted to a nearshore confined disposal facility (CDF) in 2005. Sediments removed during cleanup of the Hylebos Waterway were isolated with 9 feet of clean fill, which was followed by paving and construction of Husky. Additional discussion of the CDF is included in Section 2.2.2.1.

Pier 4, which initially extended out into the waterway, was reconfigured to align with Pier 3 in 2013. During characterization of sediments and bank cutback material to support the project, high levels of tributyltin (TBT) were identified, and a cleanup was performed under U.S. Environmental Protection Agency (EPA) oversight, as described further in Section 2.2.2.2. The new alignment of Pier 4 was constructed to support a deeper berth and included installation of a rock keyway with a top elevation of -56 feet MLLW (Appendix B).

1.1.2 Washington United Terminals

WUT includes a single berth that was developed in stages starting in 1973. In 1973, the Port proposed a 600-foot-long by 100-foot-wide concrete pier on the west side of the Blair Waterway south of Lincoln Avenue on the northwestern end of the WUT site (Dames and Moore 1973). In 1974, investigations referenced a proposed assembly and barge loading facility of portable pump stations to be used at the 30 acres at Marshall Avenue and Port of Tacoma Road at the southeastern end of the current WUT property (Geolabs-Washington 1974).

In the mid-1990s, portions of the WUT site consisted of gravel and concrete surfaces with utilities and pipelines for industrial purposes. Murray Pacific Log Yard used paved portions of the site for container storage and handling (GeoEngineers 1993). In 1993, the pier on the northwest portion of WUT was documented as 1,200 feet long and 100 feet wide (GeoEngineers 1993).

The West Blair Terminal Development included the construction of a 144-foot-wide and 2,000-foot-long cargo terminal west of the existing Blair Terminal (GeoEngineers 1994). The slope was removed along with a small portion of the log yard, and dredging deepened berth elevations from -35 feet to -52 feet below the existing surface of the log yard. Riprap was then placed over the dredge slope (GeoEngineers 1994). In 1997, the development of Hyundai Merchant Marine Terminal was initiated, including construction of the wharf, which was completed in 1999 (Berger/Abam et al. 1998; Cardno et al. 2012). The Hyundai Terminal Intermodal Yard (also referred to as the Washinton United

Terminal Intermodal Yard) was expanded in 2000. The expansion extended the property southward to include the rest of the current WUT property boundary (GeoEngineers 2000).

In 2009 and 2010, the Port extended the berthing length by constructing a 600-foot by 100-foot extension to the south (Anchor Environmental 2008). The work was completed in 2011 and required existing bank cutback and demolition of an existing 600-foot dock. A *Facility Condition Assessment* from 2012 describes the WUT wharf measurements of approximately 2,600 feet long and 121.5 feet wide (Cardno et al. 2012).

2 Existing Data Summary

The Blair Waterway has been studied since the early 1980s as part of the Commencement Bay industrialized area due to contamination in water, sediments, and upland areas (EPA 2024). As part of the Commencement Bay Nearshore/Tideflats (CB N/T) Superfund site, contamination had been documented in nearshore areas from industrial and waste materials, including arsenic, lead, zinc, cadmium, copper, mercury, and various organic compounds (polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs], and phthalates; EPA 2020a). From 1993 to 1995, the entire Blair Waterway navigation channel and certain berth areas were dredged as part of the Sitcum Waterway Remediation Project to remove contaminated sediments as well as improve navigation depth and capacity. After completion, the EPA removed the Blair Waterway from the National Priorities List in 1996.

Since approximately 1995, 18 deepening, maintenance, and development projects have occurred in the Blair Waterway, which have required sediment sampling to support suitability determinations issued by the DMMP. Other environmental investigations have been performed in the Blair Waterway in the vicinity of the Husky and WUT berths. Dredge material suitability determinations, the Washington State Department of Ecology's (Ecology's) Environmental Information Management (EIM) database, and historical reports were reviewed to understand potential sources of contamination to Husky and WUT berth sediments. A large amount of historical data is available, much of which includes studies of material removed through previous dredge events. Therefore, data generated within the last 20 years was considered relevant for understanding potential sources of contamination. Historical samples shown in Figure 2 represent samples collected between 2004 and 2022. Studies conducted in the 1980s associated with the listing of the CB N/T Superfund site and many years of subsequent study and cleanup are not summarized, as cleanup was completed, and the Husky and WUT berth areas were dredged numerous times since the 1990s.

Table A-1 in Appendix A provides a summary of the available suitability determinations and references the project locations presented in Figure 2. Table A-2 provides an overview of adjacent upland and in-water cleanup sites, including site status, contaminants, and affected matrices. Of those adjacent sites, the only sites with historical sediment contamination are the CB N/T Superfund site and Pier 4. Excerpts of tables and figures from the original reports related to potential sediment contamination in the Blair Waterway, when available, are provided in Appendix A. Sections 2.1 to 2.5 discuss the relevant existing data for Husky and WUT and identify any known contamination or potential sources of contamination to the study areas.

2.1 Channel-Wide Dredge Material Evaluations

Since approximately 1995, dredge material sampling has occurred in the Blair Waterway to implement Port infrastructure improvements, including widening the waterway in select areas,

expanding the turning basin, and performing maintenance dredging in active wharves and terminals. Most studies have generated sample results to evaluate the suitability of proposed dredged material for unconfined aquatic disposal in Commencement Bay that have been deemed material suitable. Of the eight projects near Husky and WUT (including the 1999 and 2000 USACE and Port Waterway Deepening project), two projects had material with chemical concentrations above DMMP screening levels (SLs).

Based on available suitability determinations, previous dredged project locations in or adjacent to Husky and WUT berth areas are presented in Figure 2 and discussed in Sections 2.2.1 and 2.3.1, respectively. Dredge material evaluations from 1999 and 2019 that assessed material from the entire channel are applicable to both terminals and summarized in Sections 2.1.1 and 2.1.2.

2.1.1 1999-2000 USACE Port of Tacoma Blair Waterway Deepening

Sediment characterization occurred in 1998 for deepening the Blair Waterway in 2000 to -51 feet MLLW. The characterization separated the waterway into 10 DMMUs, each representing a section of the waterway. A few DMMUs included a portion of Husky berth area and WUT berth area. None of the chemical concentrations exceeded the SL values, and the material was deemed suitable for open-water disposal (DMMO 1999).

2.1.2 2019 USACE Blair Waterway Deepening Feasibility Study

The USACE and Port conducted a feasibility study to investigate potential deepening and widening alternatives for the Blair Waterway. The DMMP prepared an advisory determination of potential suitability of 2.5 million cubic yards (cy) of dredged material in 2019 (DMMO 2019). For an advisory-level characterization, a low-moderate ranking was specified and 20% of the typical number of samples required for full characterization was determined to be sufficient. Based on the proposed volume, 63 samples were required for an advisory-level characterization. Sampling occurred in February 2019 to collect 20 cores in the navigation channel and 5 in the side slopes and analyzed for DMMP chemicals. Field observations indicate native material was encountered between -52 and -53 feet MLLW near the Husky and WUT berth areas. Results indicated DMMP SL exceedances at seven locations in non-native sediments, none of which overlap with the Husky or WUT berth areas (Appendix A). The middle portion of the waterway had the lowest suitability probabilities due to dioxins/furans (D/F), TBT, and possibly total chlordane (based on non-detect total chlordane results exceeding the DMMP SL). For native material, the suitability probability was high as only one sample exceeded for hexachlorobutadiene on the east side of the channel across from WUT. The advisory determination concluded that the average probability of suitability for open-water disposal of native sediment was 95% and non-native sediment was 90% in the mouth, 60% in the middle, and 100% in the head of the waterway (Appendix A). The DMMP agencies suggested that material outside of the channel and closer to the shoreline (i.e., FNC side slopes) may have higher chemical concentrations

and should therefore conservatively be ranked higher than material in the channel that was characterized as part of this study.

2.2 Husky Terminal: Existing Data and Potential Sources of Contamination

Existing data within or adjacent to the proposed Husky dredge prism includes dredge material evaluations and the Pier 4 sediment cleanup investigation. Potential sources of contamination, including the Slip 1 CDF, outfalls, and spills to water are also discussed in Sections 2.2.1 to 2.2.4.

2.2.1 Husky Terminal: Dredge Material Evaluations

2.2.1.1 2004-2005 Port of Tacoma Blair Bridge Reach Widening

In 2004, Blair Waterway was widened along the southern shoreline in the vicinity where the Blair Bridge and the East 11th Street right-of-way previously existed. This area is adjacent to and south of Terminal 4. Sediment characterization to evaluate disposal options occurred in November 2003. Four soil borings were collected from the upland bank cutback area to a maximum depth of 32 feet below mudline (-12 feet MLLW). Samples were collected in 4-foot intervals and composited in the top two and bottom six 4-foot intervals. None of the chemical concentrations exceeded the SL values, and the material was deemed suitable for open-water disposal (DMMO 2004).

2.2.1.2 2011-2012 Port of Tacoma Husky Terminal Maintenance Dredging

Surface sediment samples were collected in 2011 prior to maintenance dredging within the berthing area at Husky. Of approximately 42,000 cy total, 16,000 cy from DMMU 1 and a portion of DMMU 3 were found unsuitable for open-water disposal due to elevated levels of D/F (ranging from 2.78 to 10.99 parts per trillion [pptr] toxic equivalency quotient [TEQ]; DMMO 2011).

The volume-weighted average of D/F concentrations for all material was 4.91 pptr TEQ, slightly above the 4.0 pptr TEQ Non-Dispersive Disposal Site Management Objective. The Port opted to dispose of the lowest concentration material meeting the 4.0 pptr TEQ Non-Dispersive Disposal Site Management Objective at the Commencement Bay open-water disposal site and use upland disposal at Parcel 14 for the higher concentration material. The higher concentration material was approved by the Tacoma-Pierce County Health Department for placement on Port property at the Parcel 14 dredge disposal area, which occurred during 2011-2012 maintenance dredging activities.

2.2.1.3 2015 Port of Tacoma Pier 4 Reconfiguration Project, Phase 1 and 2

The Port of Tacoma dredged approximately 550,000 cy of material to cut back and reconfigure Pier 4 to be in alignment with Pier 3 within Husky Container Terminal on the Blair Waterway in 2015. During upland soil sampling in April 2013 for characterization of proposed excavated material, levels of porewater TBT exceeded the DMMP SL for porewater TBT in one dredge unit representing the

upland cutback material. Subsequent sampling events in August and November 2013 to determine the extent of TBT contamination revealed very high levels of TBT in bulk sediments underlying the armored riprap beneath the former pier (DMMO 2015, 2016). A fourth sampling event in July 2014 determined vertical and horizontal extent of TBT contamination and resulted in the reconfiguration project being divided into two phases; a Phase 1 removal action and a Phase 2 reconfiguration project. Under the Phase 1 removal action in 2015 and 2016, approximately 70,000 cy of TBT-contaminated material was removed, an additional 9,000 cy of dredged material was deemed suitable for open-water disposal, and approximately 2,300 cy of riprap from the top 2 feet of the dredge prism was deemed unsuitable for open-water disposal (DMMO 2015, 2016). The Phase 1 removal action is further discussed in Section 2.2.2.2. Following completion of the Phase 1 removal action, the reconfiguration project under Phase 2 dredged 500,000 cy of material, all of which was deemed suitable for open-water disposal (DMMO 2016).

2.2.1.4 2022 Husky Terminal and Washington United Terminals Maintenance Dredging

Surface sediment samples were collected in 2020 prior to maintenance dredging within the berthing areas of Husky and WUT terminals. Composite samples were below the SLs and bioaccumulation triggers (BTs) for Husky DMMUs. One WUT DMMU exceeded the 10 pptr TEQ BT for D/F TEQ as further discussed in Section 2.3.1.4. However, the volume-weighted average concentration of D/F in Husky and WUT sediments met the non-dispersive disposal site guidance of less than 4 nanograms per kilogram (ng/kg) TEQ. Therefore, all material characterized from both terminal berth areas was deemed suitable for open-water disposal as long as they were dredged together during the same event (DMMO 2021). Approximately 27,000 cy total was deemed suitable for open-water disposal (8,080 cy for Husky and 18,810 cy for WUT; DMMO 2021).

2.2.2 Husky Terminal: Other Environmental Investigations

Excerpts of tables and figures from the original reports related to potential sediment contamination in the Blair Waterway, when available, are provided in Appendix A.

2.2.2.1 2000 Port of Tacoma and Occidental Chemical, Hylebos Waterway/Blair Waterway Slip 1 CDF

Hylebos Waterway and Middle Waterway sediment dredged for cleanup was placed in the former Slip 1 location as part of a CDF located in the footprint of the current Husky Terminal along the Blair Waterway. In support of other CB N/T Superfund cleanup efforts, between 2003 and 2005, approximately 600,000 cy of contaminated sediments dredged from the Hylebos and Middle Waterways were placed in the former Blair Waterway Slip 1 Nearshore Confined Disposal (NCD) facility, located on the northern portion of Husky (Figure 2). This material was characterized in accordance with the DMMP in 2000 and was determined to be chemically unsuitable for open-water disposal. The

hazardous substances that exceeded SLs included hexachlorobutadiene (HCBD), PCBs , high-molecular-weight polynuclear aromatic hydrocarbons (HPAHs), zinc, and TBT. Materials were filled and isolated with 9 feet of clean material before being paved and converted to a terminal facility. Similar to other NCD facilities constructed in the CB N/T Site, the Slip 1 NCD project provided an expanded Port container terminal as well as off-site intertidal habitat mitigation. Groundwater monitoring of the Slip 1 NCD facility is ongoing by the Port and Occidental Chemical Corporation to ensure the protectiveness of the remedial action.

2.2.2.2 2015-2016 Pier 4 Sediments Cleanup

After dredging of the Husky berth in 2013, high levels of TBT were discovered in the sediments under Pier 4 within Husky (Floyd Snider 2014) during DMMP characterization for realignment/reconfiguration of Pier 4 (see Section 2.2.1.3). TBT was historically used in antifouling ship paint, but no specific source of TBT was determined. The Port and EPA signed an Administrative Order on Consent on June 13, 2014, to conduct a removal site evaluation to determine if a removal action was necessary. Sampling was conducted in June and July of 2014. Data are included in Appendix A.

EPA determined that a removal action was necessary to mitigate the threat to the environment from very high levels of TBT in sediments. Removal of approximately 70,000 cy of TBT contaminated sediment was conducted as part of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Time Critical Removal Action and Phase 1 of the Port of Tacoma Pier 4 Reconfiguration Project as discussed in Section 2.2.1.3. Dredging contaminated sediments as part of the removal action was conducted during the 2015-2016 in-water work window. 74,069 cy of sediment were disposed of at the Pierce County LRI landfill. Confirmation sediment and porewater sampling indicated elevated levels of TBT were still present and that an additional round of dredging was required. After the second round of dredging was conducted, EPA determined that the TBT-contaminated sediment under Pier 4 was completely removed (Parker 2016).

2.2.3 Husky Terminal: Existing Outfalls

As shown in Figure 2, six outfalls are mapped in the vicinity of the Husky berths that discharge or have discharged to Blair Waterway from the shoreline or under the terminal. Based on EPA National Pollution Discharge Elimination System (NPDES) mapping data and Ecology's Water Quality Permitting and Reporting Information System (PARIS), one outfall is related to the Industrial Stormwater General Permit (ISGP) issued to the Port of Tacoma Maintenance Shop (WAR003627) under standard industrial classification (SIC) for marine cargo handling, two outfalls are related to the ISGP issued to Husky (WAR004486) under SIC for marine cargo handling, and two outfalls are related to terminated NPDES construction stormwater general permits related to excavation work for the Pier 4 Reconfiguration project discussed in Section 2.2.1.3 (Ecology 2024). No documentation was

available regarding the sixth outfall, which was recorded as a 18-inch diameter concrete pipe along the northwestern end of Husky along Blair Waterway.

2.2.4 Husky Terminal: Reported Spills to Water

The Ecology Spills Database was searched to compile information on recent spills to water in the vicinity of the Husky berths. Spill data were available in the time period of July 1, 2015, to June 5, 2024. Table A-3 provides a summary of the two spills identified in the immediate vicinity of the Husky berths along Blair Waterway and at the mouth of Blair Waterway.

2.3 Washington United Terminals: Existing Data and Potential Sources of Contamination

Existing data within or adjacent to the proposed WUT dredge prism includes dredge material evaluations and environmental investigations for U.S. Oil NPDES permits and the Urban Water Initiative (UWI). Potential sources of contamination, including outfalls and spills to water, are also discussed in Sections 2.3.1 to 2.3.4.

2.3.1 Washington United Terminals: Dredge Material Evaluations

2.3.1.1 1995-1996 Port of Tacoma West Blair Terminal Development

The Port of Tacoma performed berth dredging and bank cutback at West Blair Terminal (which is now WUT). Sediment characterization was conducted for a suitability determination for disposal of an estimated 500,000 cy of dredge material. Upland verification sampling of the dredged material surface underlying the Model Toxics Control Act (MTCA) and CERCLA cleanups was conducted for the final suitability determination. Sampling occurred for the side slope in April 1994 and the MTCA upland verification in February 1995. Supplemental verification sampling in the upland soils underlying the MTCA cleanup area from 1993 was also evaluated. Based on the results from the three sampling efforts, all the material was deemed suitable for unconfined open-water disposal (DMMO 1995).

2.3.1.2 2009-2010 Port of Tacoma Washington United Terminals Project High Spot Maintenance Dredging

Sediment characterization was conducted in preparation for maintenance dredging along the WUT wharf. This included a high spot dredge area and included 5,600 cy of dredge material. Sampling was conducted in July 2008 for the high spot's DMMU (WUT-5). No chemical concentrations exceeded the SL values, and no toxicity testing was required. The material was deemed suitable for unconfined open-water disposal (DMMO 2008).

2.3.1.3 2009-2010 Port of Tacoma Washington United Terminals Bank Cutback

Sediment characterization was conducted for WUT in preparation for maintenance dredging and extension of the berthing length along the pier. This included the cutback area and wharf subarea not included in the high spot area discussed in Section 2.3.1.2 and consisted of 228,400 cy of dredge material. Sampling for the cutback and wharf subareas was performed in July and August 2008 at four DMMUs (WUT-01, WUT-02, and WUT-03, and WUT-4, respectively). No chemical concentrations exceeded the SL values. To evaluate suitability for open-water disposal, D/F results were evaluated using an interim framework in which test sediment concentrations were compared to disposal site background. D/F TEQ concentrations for all four DMMUs were quantified below the disposal site maximum of 5.2 pptr, and the volume-weighted average was below the disposal site average of 2.4 pptr. The material was deemed suitable for unconfined open-water disposal at an appropriate non-dispersive disposal site (DMMO 2009).

2.3.1.4 2022 Husky Terminal and Washington United Terminals Maintenance Dredging

As discussed in Section 2.2.1.4, surface sediment samples were collected in 2020 prior to maintenance dredging within the berthing areas of Husky and WUT. Composite samples were below the SLs and BTs, except for D/F TEQ in sample WUT-1, which was 6.8 ng/kg. However, the volume-weighted average concentration of D/F in Husky and WUT sediments met the non-dispersive disposal site guidance of less than 4 ng/kg TEQ. Therefore, the characterized material for both terminals was deemed suitable for open-water disposal as long as they were dredged together during the same event (DMMO 2021). Approximately 27,000 cy total was deemed suitable for open-water disposal (8,080 cy for Husky and 18,810 for WUT; DMMO 2021).

2.3.2 Washington United Terminals: Other Environmental Investigations

2.3.2.1 2007 and 2022 U.S. Oil NPDES Permit Sediment Sampling Environmental Data

The U.S. Oil and Refining Co. (USOR) is a petroleum refinery located north of WUT. In 2007, USOR conducted sampling to determine baseline sediment quality near Outfall 001. Treated wastewater from Outfall 001A, stormwater from Outfalls 001B and 002, and other industrial facilities' wastewater effluents and stormwater runoff combine to discharge to the Lincoln Avenue Ditch and discharge into Blair Waterway from Outfall 001 immediately northwest of WUT (Floyd Snider 2022). Sediment sampling was required according to the 2002 NPDES permit, and samples were analyzed for metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total organic carbon (TOC), grain size, total solids (TS), ammonia, and sulfides. Of the two surface sediment samples collected, neither exceeded Sediment Quality Standards and no bioassay testing was required.

In 2022, USOR conducted surface sediment sampling at six discrete stations in the vicinity of Outfall 001 (Floyd Snider 2023). Data was collected for the NPDES permit to recharacterize sediment quality. Samples were analyzed for metals, VOCs, SVOCs, PCBs, TOC, grain size, TS, ammonia, and sulfides. Review of the data from available reports (Floyd Snider 2023; Appendix A) and EIM indicates no exceedances of Washington State Sediment Management Standards sediment cleanup objectives (SCOs).

2.3.2.2 2008, 2014, and 2022 Urban Waters Initiative Sediment Quality in Commencement Bay

In 2008, Ecology sampled Commencement Bay and adjoining waterways as part of the UWI multi-agency program to assess sediment quality in selected urban bays of Puget Sound (Partridge et al. 2010). To characterize change over time, samples were collected at sites sampled a decade earlier as part of the 1997 to 1999 joint National Oceanic and Atmospheric Administration (NOAA)-Ecology survey of Puget Sound known as Puget Sound Assessment and Monitoring Program (PSAMP)/NOAA. Three locations for this testing program are located within the Blair Waterway. Locations 300 and 301 are offshore of WUT within the FNC, and location 302 is located at the central neck of the turning basin (outside of the WUT vicinity). Surface grab samples were collected and submitted for biological testing, as well as chemical analyses of 132 chemicals and TOC by Ecology's Manchester Environmental Laboratory, Manchester, Washington. D/F and TBT were not tested as part of this program. No contact with native material was recorded. Of the two samples in the WUT vicinity, only sample station 300 exceeded any sediment criteria. Bis(2-ethylhexyl) phthalate exceeded both SCO and cleanup screening level criteria (see Appendix A).

In 2014, locations from the 2008 PSAMP/NOAA and UWI study were reoccupied and surface sediment grab samples were submitted for chemical and biological analysis (Partridge et al. 2014). D/F and TBT were not tested as part of this program. No contact with native material was recorded. No SCO exceedances were identified for samples in the WUT vicinity (see Appendix A).

In 2022, locations 300 and 301 were revisited for surface sediment grab sampling. No report for this sampling was available online; however, data from EIM indicates no SCO exceedances. These locations from 2008, 2014, and 2022 have not been dredged and are still representative of current conditions, although samples depths were limited to the upper 3 centimeters (cm) of sediment.

2.3.3 Washington United Terminals: Existing Outfalls

As shown in Figure 2, nine outfalls are mapped in the vicinity of WUT that discharge to Blair Waterway from the shoreline or under the terminal. Based on EPA NPDES mapping data, one of the nine outfalls is related to the ISGP issued to WUT (WAR003491) under SIC for marine cargo handling. Additional information for the remaining eight outfalls was not available in PARIS.

2.3.4 Washington United Terminals: Reported Spills to Water

The Ecology Spills Database was searched to compile information on recent spills to water in the vicinity of WUT. Spill data were available in the time period of July 1, 2015, to June 5, 2024. Table A-3 provides a summary of the one spill identified in the immediate vicinity of WUT along Blair Waterway.

2.4 Asarco Smelter

In addition to the cleanup sites adjacent to the site, operation of the Asarco Smelter for more than 95 years resulted in contamination, primarily with arsenic and lead, of the smelter site, offshore sediments, and the surrounding residential area (EPA 2014). The Blair Waterway is within the area where concentrations of arsenic are elevated but generally not above 20 milligrams per kilogram (Appendix A).

2.5 Aquatic Invasive Species

A check was performed to determine whether invasive species, including the New Zealand mud snail, has been documented within the project area. The site and surrounding areas are not included in the Washington Department of Fish and Wildlife (WDFW) mapping for New Zealand mud snail (WDFW 2024).

3 Project Management

This section discusses the proposed project team and team member responsibilities for conducting the field investigation, lists training and certification requirements for sampling personnel, and describes documentation and recordkeeping procedures.

3.1 Project/Task Organization

Responsibilities of the team members, as well as of the laboratory project managers, are described in the following paragraphs.

Anchor QEA Project Manager (PM). Christine Simmons will be responsible for directing the project team for the implementation of all activities described in this SQAPP. She will also be responsible for production of work plans, producing all project deliverables, and performing the administrative tasks needed to ensure timely and successful completion of these studies. The PM will provide the overall programmatic guidance to support staff and will ensure that all documents, procedures, and project activities meet the objectives contained within this SQAPP. The PM will also be responsible for resolving project concerns or conflicts related to technical matters.

Field Coordinator (FC). Nik Bacher or his designee will be responsible for coordination of field sampling activities. He will ensure that appropriate protocols for sample collection, preservation, and holding times are observed, and he will oversee submission of environmental samples to the designated laboratory for chemical and physical analyses.

Quality Assurance/Quality Control (QA/QC) Manager. Delaney Peterson will provide QA/QC oversight for both the field sampling and laboratory programs, ensure that samples are collected and documented appropriately, coordinate with the analytical laboratories, ensure data quality, oversee data validation, and supervise project QA coordination and data validation.

3.2 Special Training Requirements/Certifications

For sample preparation tasks, it is important that field crews are trained in standardized data collection requirements so that the data collected are consistent among the field crews. Field crews will comprise individuals who are fully trained in sediment core collection and processing, decontamination protocols, field documentation, and chain-of-custody procedures.

In addition, the 29 *Code of Federal Regulations* 1910.120 Occupational Safety and Health Act (OSHA) regulations require training to provide employees with the knowledge and skills enabling them to perform their jobs safely and with minimum risk to their personal health. All field personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet the OSHA regulations.

3.3 Documentation and Records

This project will require central project files to be maintained at Anchor QEA. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing it to the person responsible for the filing system. Individual team members may maintain files for individual tasks but must file documents in the central project files upon completion of each task. Hard copy documents will be scanned and saved to the central files. Electronic data will be maintained in the database, and database exports will be stored in a designated directory at Anchor QEA.

3.3.1 Field Records

All documents generated during the field effort are controlled documents that become part of the project file. Field team members will keep a daily record of significant events, observations, and measurements on field forms specific to the collection activity. Field documentation will consist of a daily field log and sediment core collection and processing forms (Appendix C). Field forms will be maintained by the FC. The sampling documentation will contain information on each sample collected and will include, at a minimum, the following information:

- Project name
- Field personnel on site
- Site visitors
- Weather conditions
- Field observations
- Sample collection dates and times
- Sample collection methods and description of activities
- Identification (ID) or serial numbers of instruments or equipment used
- Deviations from this SQAPP
- Meetings associated with field sampling activities

Entries for each day will begin on a new form. The person recording information must enter the date and time. In general, sufficient information will be recorded during sample collection and processing activities so that reconstruction of the event can occur without relying on the memory of the field personnel.

The field forms may be electronic or handwritten. If handwritten, they will be on water-resistant, durable paper. Notes will be made in indelible, waterproof blue or black ink. Errors will be corrected by crossing out with a single line and initialing the change. Each form will list the project name, number, and date. The field forms will be scanned or saved into Anchor QEA's project file directory as convenient during the sampling event or upon completion of each sampling event.

3.3.2 Analytical Records

The laboratory will retain analytical data records. Additionally, Anchor QEA will retain copies of PDF analytical data in the central project files. Data reporting requirements will include those items necessary to complete data validation, including copies of raw data. Elements to be reported in the laboratory data packages are listed in Section 6.3.6.

Instrument data will be fully restorable at the laboratory from electronic backup. The laboratory will be required to maintain records relevant to project sample analyses for a minimum of 5 years. Data validation reports will be maintained in the central project files with the analytical data reports.

3.3.3 Data Reduction

Data reduction is the process by which original data (analytical measurements) are converted or reduced to a specified format or unit to facilitate analysis of the data. Data reduction requires that all aspects of sample preparation that could affect test results, such as sample mass or volume analyzed, sample moisture content, or dilutions required, be taken into account in the final result. The laboratory analyst is responsible to reduce the data, which are subject to further review by the laboratory manager, the PM, the QA/QC manager, and independent reviewers. Data reduction may be performed manually or electronically.

3.4 Project Schedule

Sampling is planned for fall 2024. Dredging will occur prior to the channel deepening project to be conducted by USACE, which is anticipated to occur in 2028.

4 Conceptual Sampling Approach for Berth Deepening

This section describes the rationale for establishing the number of DMMUs, the required number of samples to adequately characterize each DMMU, and the sampling and compositing scheme for the Husky and WUT berth deepening. Currently, the depth at all berths is maintained at -51 feet MLLW with some deeper areas and some shallower areas. There are several pre-existing deeper holes caused by prop wash, which go to -60 feet MLLW. The goal is to deepen the berths to -57 feet MLLW depth with a 2-foot overdredge allowance to a maximum depth of -59 feet MLLW, which is the same depth as the proposed FNC deepening. The dredging design is expected to target areas where the current mudline is shallower than -57 feet MLLW. Areas with existing mudline elevations deeper than -57 feet MLLW (i.e., between -57 feet MLLW and -59 feet MLLW) are not significant but were conservatively included in the volume calculations for the berth areas used to establish DMMUs (i.e., the DMMU includes dredge volume to the overdredge depth of -59 feet MLLW).

To adopt a conservative approach, the Port proposes to test the material in accordance with requirements for a moderate ranking. Although there is a potential for contaminant sources in the vicinity of the project, including ship berthing operations, historical data indicate there are no significant sources of contamination and minimal spills have occurred near the berth areas. Past dredge material characterization studies have determined sediments are suitable for in-water disposal, except during two studies for Husky. In both cases, contaminated sediments were dredged and disposed of. The first study, described in Section 2.2.1.2, resulted in upland disposal of approximately 16,000 cy due to D/F TEQ concentrations up to 10.99 pptr. The second study, described in Section 2.2.1.3, resulted in an extensive investigation of TBT contamination (Section 2.2.2.2) and the removal and upland disposal of approximately 70,000 cy of TBT contaminated material and 2,300 cy of riprap. Additionally, there are no indicators that contamination increases with depth. The channel and berth areas have been maintained at -51 feet MLLW with a 2-foot overdredge, so it is anticipated that native material will be encountered at approximately -53 feet MLLW, consistent with observations from the 2019 Blair Waterway Deepening Feasibility Study (Section 2.1.2). During the 2019 study, chemical concentrations in native sediments were far below the DMMP SLs, with one exception at C7, which does not overlap with the berth areas. The advisory determination for that study indicates the probability that native sediments will be suitable for open-water disposal is 98.1% (DMMO 2019).

For this SQAPP, dredge prism material will be characterized as surface and subsurface DMMUs. Characterization requirements for surface and subsurface material of moderate rank are one sediment field sample for each 4,000 cy. One laboratory analysis for each 16,000 cy is required for characterizing surface material and one analysis per 24,000 cy is required for subsurface characterization. The subsurface DMMUs represent a larger volume of dredge material, based on the expectation that subsurface DMMUs will likely be clean native material, as discussed in the previous paragraph.

4.1 Husky Berth

4.1.1 Number of DMMUs

Figure 3a shows the proposed dredge area and DMMU designations in the Husky berth. A rock keyway is present in front of most of Terminal 3 and all of Terminal 4. Appendix B provides additional information on the as-built condition of the underpier and berth areas. A toe wall will be installed along all of Terminal 3, but Terminal 4 was rebuilt more recently to accommodate berth deepening, so no toe wall will be required in that area.

The surface dredge areas have each been divided into five DMMUs (DMMUs 1 through 5), one of which (DMMU-1) is located along Terminal 4 (Figures 3a and 3b). Five subsurface DMMUs have been identified in the berth area (DMMUs 6 through 10). Surface DMMUs and subsurface DMMUs are distinguished based on elevation -55 feet MLLW, which will allow a contractor to segregate surface from subsurface material. The total estimated dredge volumes from the Husky berth area are 60,748 cy from the surface DMMUs and 96,727 cy from the subsurface DMMUs.

4.1.1.1 Pier-Face DMMUs

DMMUs have been developed to consider where rock may be removed as part of berth deepening, from keyway removal, or in areas where a toe wall is not planned (Terminal 4). These are areas where rock may unravel down into the dredge area from the underpier slope (active removal of underpier rock is not planned). The top of the rock keyway at Terminal 4 was designed to be -56 feet MLLW, which would require 1 foot of rock removal to achieve a berthing depth of -57 feet MLLW without installation of a toe wall. Although rock that will be removed has been excluded from DMMU volume estimates, bathymetry measurements at the Terminal 4 pier-face have indicated the presence of sediment that has accumulated on top of the rock. This sediment will be included as part of surface DMMU-1, which is 40 feet wide along the Terminal 4 pier-face and berth end. No subsurface DMMU or Z-layer sampling is proposed for the area beneath DMMU-1 due to the presence of rock.

A rock keyway is also present along the majority of the Terminal 3 pier-face. This rock will be removed after installation of a toe wall. Bathymetry measurements at the Terminal 3 pier-face do not indicate the presence of sediment on top of this rock, so unlike Terminal 4, the characterization volume does not include any material within the keyway area. An additional area of sediment is planned to be removed below the Terminal 3 keyway that is 2 feet deep by 10 feet wide, which will be backfilled with rock to provide toe protection for the new sheet pile wall (Figure 3b). This sediment volume is included in the volume for DMMUs 9 and 10. Based on the installation of a toe wall at Terminal 3 and the existing rock underpier of Terminal 4, no underpier characterization is planned.

No rock keyway is present along the northern portion of Terminal 3, so no rock is included from the DMMUs in this area. Surface DMMU-5 and subsurface DMMU-10 extend up to the pier-face in this area.

The locations of Cross Sections A-A' and B-B' are showed in plan view in Figure 3a and the cross sections are shown in Figure 3b. The cross sections show the existing mudline elevations, target dredge depths, and estimated extent of keyway/rock. Cross Section A-A' displays a section across surface DMMU-5 and subsurface DMMU-10 at Terminal 3. Cross Section B-B' displays a section across surface DMMU-1, surface DMMU-2, and subsurface DMMU-6 at Terminal 4. Estimated maximum dredge volumes, number of surface and subsurface DMMUs, and the minimum number of cores required per DMMU are summarized in Table 1.

4.1.1.2 Main Berth Area DMMUs

Surface DMMUs 2, 3, and 4 are located in the berth area beyond the keyways, extending out to the PED FNC. Side slopes for the berth deepening area are assumed to extend into the FNC, using a 3H:1V slope ratio. DMMUs 2 and 3 are in berth areas for Terminal 4. DMMUs 4 and 5 are located in berth areas for Terminal 3. DMMU-5 extends up to the pier-face on the northern end of Terminal 3 where no keyway exists.

Subsurface DMMUs 6 through 10 are present within the same footprint of surface DMMUs, except for DMMU-1. Subsurface DMMUs extend from -55 feet MLLW to -59 feet MLLW, except where mudlines are already equal to or deeper than -57 feet MLLW.

Some areas within DMMU 3-are scoured deeper than the surface DMMU elevation breakpoint of -55 feet MLLW. These areas are not included as part of the surface DMMU. Areas with mudline elevations between -55 feet MLLW and -57 feet MLLW will not contribute a significant sediment volume but were included, with overdepth allowance to -59 feet, as part of the subsurface DMMU.

4.1.2 Sampling and Compositing Scheme

A total of 29 sediment cores will be collected to a depth of -57 feet MLLW plus 2 feet allowable overdredge (to -59 feet MLLW), plus 2 feet of Z-layer material (to -61 feet MLLW), as shown in Table 2. Figure 4 shows proposed core locations at Husky. Discrete aliquots from each core sample and Z-layer material from each core will be archived individually by freezing for potential future analyses. Surface and subsurface intervals from each core will represent the dredge prism and be composited into a single sample for analyses (Table 3).

The surface DMMUs have been divided into five DMMUs (DMMUs 1 through 5). Five core samples will be collected down to -55 feet MLLW from DMMU-2. Ten core samples will be collected within the footprint of DMMU-3, but only nine cores will be composited into this surface DMMU as one core is in an area where the surface is deeper than -55 feet MLLW. Six core samples will be collected down to -55 feet MLLW from DMMUs 4 and 5. Cores from each DMMU will be composited into one sample per DMMU for laboratory analyses. DMMU-1 represents the area immediately adjacent to Pier 4 that consists of sediment deposits on top of the keyway and immediately adjacent to the

keyway. This DMMU will be characterized by the collection of three box core samples of sediment on the rock collected to a target maximum depth of 50 cm and composited for laboratory analyses.

The subsurface DMMUs have been divided into five DMMUs, with five cores collected from DMMUs 6, 7, and 8 and six cores collected from DMMUs 9 and 10. Subsurface intervals will be from -55 feet MLLW to -59 feet MLLW. Subsurface intervals from cores in each DMMU will be composited into one sample for a total of five samples for laboratory analyses.

Z-layer samples will be collected from target depths of -59 feet MLLW to -61 feet MLLW from each core collected for a subsurface DMMU. Z-layer samples will be collected as discrete samples and will be held in frozen archive pending subsurface DMMU composite analytical results.

4.2 Washington United Terminals Berth

4.2.1 Number of DMMUs

Figure 5a shows the proposed dredge area and DMMU designations in the WUT berth. No rock keyway is present in front of the majority of the WUT fender system, but a rock keyway is present in the southern 900 feet, as shown in Figures 5a, 5b, and 5c and Appendix B, which provides additional information on the as-built condition of the underpier and berth areas. A toe wall will be installed along all of the WUT pier-face.

The surface dredge areas have each been divided into four DMMUs (DMMUs 20 through 23; Figures 5a, 5b, and 5c). Four subsurface DMMUs have been identified in the berth area (DMMUs 24 through 27). Surface DMMUs and subsurface DMMUs are distinguished based on elevation -55 feet MLLW, which will allow a contractor to segregate surface from subsurface material. The total estimated dredge volumes from the WUT berth area are 56,668 cy from the surface DMMUs and 92,703 cy from the subsurface DMMUs.

4.2.1.1 Pier-Face DMMUs

DMMUs have been developed to consider where rock may be removed as part of berth deepening, primarily from keyway removal along the southern portion of WUT. The top of the rock keyway is currently -51 feet MLLW and extends down to -62 feet MLLW. No sediment is present within the keyway area, so this entire area is excluded from adjacent DMMUs, DMMU-20 and DMMU-24. No rock from underpier will unravel into the keyway because of the planned sheet pile wall. Additional sediment is planned to be removed where no keyway is present, in an area that is 2 feet deep by 10 feet wide, which will allow for backfilling with rock to provide toe protection for the new sheet pile wall (Figure 5b). This sediment volume is included in the volumes for DMMUs 24, 25, 26, and 27.

The locations of cross sections are showed on the plan view in Figure 5a. The cross sections show the existing mudline elevations, target dredge depths, and estimated extent of keyway/rock.

Cross Section C-C' displays a section across surface DMMU-23 and subsurface DMMU-27. Cross Section D-D' displays a section across surface DMMU-22 and subsurface DMMU-26. Cross Section E-E' displays a section across surface DMMU-20 and subsurface DMMU-24. Estimated maximum dredge volumes, number of surface and subsurface DMMUs, and the minimum number of cores required per DMMU are summarized in Table 1.

4.2.1.2 Main Berth Area DMMUs

Subsurface DMMUs 24, 25, 26, and 27 are located in the berth area in the same footprint as the surface DMMUs, extending out to the PED FNC. Side slopes for the berth deepening area are assumed to extend into the FNC, using a 3H:1V slope ratio. Subsurface DMMUs extend from -55 feet MLLW to -59 feet MLLW, except where mudlines are already equal to or deeper than -57 feet MLLW.

Some areas within DMMUs 20, 22, and 23 are scoured deeper than the surface DMMU elevation breakpoint of -55 feet MLLW. These areas are not included as part of the surface DMMU. Areas with mudline elevations between -55 feet MLLW and -57 feet MLLW are included as part of the subsurface DMMU.

No rock is included in dredged volume estimated from slough areas outside of the berth to the south or north of the berth ends, where rock may be removed.

4.2.2 Sampling and Compositing Scheme

A total of 24 sediment cores will be collected to a depth of -57 feet MLLW plus 2 feet allowable overdredge (to -59 feet MLLW), plus 2 feet of Z-layer material (to -61 feet MLLW), as shown in Table 2. Figure 6 shows proposed core locations at WUT. Discrete aliquots from each core sample and Z-layer material from each core will be archived individually by freezing for potential future analyses. Surface and subsurface intervals from each core will represent the dredge prism and be composited into a single sample for analyses (Table 3).

The surface DMMUs have been divided into four DMMUs (DMMUs 20 through 23). Surface DMMUs will be collected down to -55 feet MLLW, including six cores from DMMU-20, four cores from DMMU-21, and seven cores each from DMMUs 22 and 23. Cores from each DMMU will be composited into one sample per DMMU for laboratory analyses.

The subsurface DMMUs have been divided into four DMMUs (DMMUs 24 through 27), with six cores collected from each DMMU. Subsurface intervals will be from -55 feet MLLW to -59 feet MLLW. Subsurface intervals from cores in each DMMU will be composited into one sample for a total of four samples for laboratory analyses.

Z-layer samples will be collected from target depths of -59 feet MLLW to -61 feet MLLW from each core collected for a subsurface DMMU. Z-layer samples will be collected as discrete samples and will be held in frozen archive pending subsurface DMMU composite analytical results.

5 Sample Collection

The methods and procedures for the collection of field samples are provided in this section. Sampling will be conducted following standard procedures documented in this SQAPP. In general, all sampling procedures will also comply with previously approved sample collection standards established for the study area.

5.1 Sampling Methods

This section describes sampling methods and includes sample ID, station positioning, and subsurface sediment collection and processing.

5.1.1 Sample Identification

Each DMMU, individual core sample, and composite sediment sample will be assigned a unique alphanumeric identifier according to the following method:

- Each core sample is identified by "HT" (for Husky) or "WUT" to depict the project location followed by an alphanumeric ID used to identify the core, followed by the interval depth in feet in the format of upper depth to lower depth using two digits for each depth designation.
- Composite samples are identified by the same terminal identifier, with the addition of the DMMU number, followed by "CS."
- To avoid ambiguity, the date in the format YYMMDD will be appended to each sample ID.
- A discrete sample collected from 4 to 8 feet at core location Husky Terminal location 4 on August 22, 2024, would have the identifier HT-SC04-04-08-240822.
- A composite collected for DMMU-9 on August 22, 2024, would have the identifier HT-09CS-240822.

5.1.2 Station Positioning

Station locations are listed in Table 2 and shown in Figures 4 and 6. Horizontal positioning will be determined in the field by differential global positioning system (DGPS) based on target coordinates. Target coordinates are provided in Table 2, and cores will be collected as close to target locations as reasonably feasible. The horizontal datum will be the North American Datum of 1983 (NAD83), Washington State Plane, South Zone, U.S. survey feet. Measured geographical coordinates for station positions will be recorded and reported to the nearest 0.01 second. In addition, state plane coordinates will be reported to the nearest foot. The DGPS accuracy is less than 1 meter and generally less than 30 cm, depending on the satellite coverage and the number of data points collected.

The vertical (mudline) elevation of each sediment station will be measured using a fathometer or lead line and converted to MLLW elevation. Tidal elevations will be determined based on published tide predictions from Tides and Currents software and confirmed using measured data from the

NOAA's automated tide gauge station number 9446484, located in Commencement Bay in Tacoma, Washington. Vertical elevations of sampling stations will be converted to elevations in North American Vertical Datum of 1988, and a conversion table will be presented in the data report. Vertical elevations will be used during core processing to identify intervals for surface and subsurface DMMU compositing and the Z-layer as described in Section 5.1.4.

5.1.3 Sediment Core Collection

Subsurface sediment cores will be collected from a sufficiently outfitted marine sampling vessel. Core samples will be collected using a vibracore advanced to 16 feet or refusal depth. If full penetration is not possible, the Port will discuss with DMMP. Samples will be collected from target locations shown in Figures 4 and 6. Vibracore sediment samples will be collected in the following manner:

1. The vessel will maneuver to the proposed sample location.
2. A clean core tube 1 foot longer than the length of the desired penetration depth will be secured to the vibratory assembly and deployed from the vessel.
3. The cable umbilical to the vibrator assembly will be drawn taut and perpendicular while the core rests on the bottom sediment.
4. The location of the umbilical hoist will be measured and recorded by the location control personnel, and depth to sediment will be measured with a survey tape attached to the head assembly.
5. A 4-inch-diameter, thin-walled aluminum or polycarbonate tube will be driven into the sediment using two counter-rotating vibrating heads. The core tubes may be lined with low density polyethylene liners to aid in core extraction from the tube.
6. A continuous core sample will be collected to the designated coring depth or until refusal.
7. The depth of core penetration will be measured and recorded.
8. The vibrator will be turned off, and the core barrel will be extracted from the sediment using the winch.
9. While suspended from the A-frame, the assembly and core barrel will be sprayed off and then placed on the vessel deck.
10. The length of recovered sediment will be recorded.

Cores will be evaluated to determine whether they meet acceptability requirements for the project. Acceptance criteria for sediment core samples are as follows:

- Overlying water is present and the surface is intact.
- The core tube appears intact without obstruction or blocking.
- Recovery is greater than 75% of the drive length.
- Penetration is deep enough to collect all target depth intervals.

If sample acceptance criteria are not achieved, the sample will be rejected unless modified acceptance criteria (i.e., lower percent recovery after multiple attempts) are approved by the DMMP agencies. Up to three attempts will be made before abandoning the sample location and selecting a new location in coordination with the DMMP.

Anchor QEA personnel will record field conditions and drive notes on a standard core collection log (see Appendix C). Logs will include the following information:

- Water depth at each station using lead line or fathometer at point of sampling station
- Coordinates of each station as determined by DGPS
- Date and time of collection of each sediment core sample
- Names of field personnel collecting and handling the samples
- Observations made during sample collection, including weather conditions, complications, ship traffic, and other details associated with the sampling effort
- The sample station ID
- Length and depth intervals of each core section
- Percent recovery for each core sample
- Qualitative notation of apparent resistance of the sediment column to coring (how the core drove)
- Any deviation from the approved SQAPP

Once the core samples are deemed acceptable, the cutterhead will be removed, and a cap will be placed over the end of the tube and secured firmly in place with duct tape. The core tube will then be removed from the sampler, and the other end of the core will be capped and taped. The core tube will be labeled with permanent black pen and scribed with the location ID and an arrow pointing to the top of core. The cores may be cut into appropriate lengths for transport to the processing location and labeled appropriately. The cores will be sealed tightly enough to prevent leakage or disturbance during transport to the processing station. Cores will be transported daily to the processing area.

5.1.4 Sediment Core Processing Methods

The vibracore processing station will be located in a covered, well-ventilated area within the Port property. Transported cores will be handled consistent with ASTM International (ASTM) procedures (ASTM D 4220) and stored upright and cool until processed. The core caps will be removed, and if a liner was used, the core will be extracted by pulling the liner and sediment free from the core tube. If no liner is used, the core will be cut longitudinally using a circular saw, metal shears, or similar. The core will be split into two halves for processing. Alternatively, a section can be cut longitudinally from the core and surface material scraped from the core prior to processing.

Prior to sampling, Anchor QEA field staff will take color photographs and record a sediment description of each core on a standard core processing log (Appendix C). The following parameters will be noted:

- Sample recovery length
- Physical soil description in accordance with ASTM procedures (ASTM D 2488 and ASTM D 2487—Unified Soil Classification System) including soil type, density/consistency of soil, and color
- Odor (e.g., hydrogen sulfide and petroleum)
- Visual stratification (including the horizon with native alluvium, if discernable), structure, and texture
- Vegetation and debris (e.g., wood chips or fibers, concrete and metal debris, paint chips, sand blast grit, slag, and creosote)
- Biological activity (e.g., detritus, shells, tubes, bioturbation, and live or dead organisms)
- Presence of oily sheen or non-aqueous phase liquids
- Contact with native material

No core compaction will be applied to sample intervals. Cores will be processed using the vertical (mudline) elevation to identify intervals for surface and subsurface DMMU compositing and the Z-layer. The surface interval will include sediment from the mudline to -55 feet MLLW. The subsurface interval will include sediment from -55 to -59 feet MLLW. The Z-layer will include sediment from -59 to -61 feet MLLW. Discrete samples will be composited per DMMU for analyses as shown in Tables 3 and 4 and described in the following paragraphs.

Sediment from each core interval, representative of the entire length of the interval, will be collected using a decontaminated spoon and placed into a decontaminated stainless-steel bowl or pot. The sample will be homogenized until uniform in color and texture and an aliquot from each discrete sample will be collected as an archive for potential future analyses. Representative and equal aliquots from each interval will be composited and homogenized into a single sample, either by hand using a spoon, or by using a stainless-steel paddle attached to a variable speed drill motor. Sample composite schemes are shown in Table 3. Samples will be analyzed for the parameters detailed in Table 4. Sample aliquots will be spooned into the appropriate, laboratory-supplied sample containers, as identified in Table 5, and submitted to the laboratory for analyses or archival. The homogenate will be mixed throughout the process of filling sample containers to ensure that each container is representative of the homogenate. The composite samples must be approximately 10 liters of sediment to conduct all required and potential chemical and bioassay analyses.

In addition to sediment for chemical analyses, enough volume will be collected for potential bioassay testing. Approximately 2 liters will be required for chemical analysis, and 8 liters for bioassays. An additional 0.5-liter sample container (approximately 16 ounces) will be collected and archived from each DMMU for additional testing, if required. If sufficient material is available from each core, a

0.5-liter sample container will be collected from each core interval prior to compositing and archived for further testing, if required.

Grain size testing will be conducted on a select number of representative core samples to support geotechnical considerations as identified Table 3. Atterberg limits will be analyzed on up to 25% of select representative core samples based on field observations of grain size and sample plasticity.

Sample handling requirements are presented in Table 5. Samples for chemical analyses will be securely packed and delivered to Analytical Resources, LLC (ARL), or Apex Laboratories, LLC, as an alternative EPA-accredited laboratory if needed. Archived sample aliquots will be held at the laboratory in frozen storage for potential future chemical analyses.

5.1.5 Sediment Grab Sample Collection Procedures

Surface sediment grab samples from 0-cm depth and up to 50-cm depth will be collected at three locations in Husky DMMU-1, targeting sediment that has accumulated on the surface of the rock. Surface grab samples will be collected using a box core sampler. The target locations are HT-SC01, HT-SC02, and HT-SC03 and are shown in Figure 4. Locations and coordinates are listed in Table 2. Samples will be collected in the following manner:

- The sampler will be decontaminated prior to use and between each sampling location.
- The vessel will maneuver to the proposed location.
- Actual coordinates will be recorded.
- The sampler will be deployed over the side of the vessel.
- Safety clips on the swing arm and the release mechanism will not be removed until the sampler is just above the water.
- The sampler will be advanced by gravity to the seabed and into the sediment until full penetration or refusal.
- At the sediment surface the swing arm will be triggered mechanically and the bucket will close as line is taken in and the sampler brought back to the surface.
- Once retrieved, the arms will be removed for access to the top of the corer.
- The sediment sample will be retrieved aboard the vessel and evaluated against the following acceptability criteria:
  - Grab sampler is not overfilled (i.e., sediment surface is not against the top of the sampler).
  - Sediment surface is relatively flat, indicating minimal disturbance or winnowing.
  - Overlying water is present, indicating minimal leakage.
  - Overlying water has low turbidity, indicating minimal sample disturbance.
  - Desired penetration depth of at least 50 cm is achieved.

If an acceptable surface sediment sample cannot be collected after three attempts at a given location, the location may be moved up to 50 feet from the target location. If an acceptable surface

sediment sample still cannot be collected, less than 50 cm depth will be accepted, and additional grabs may be attempted to collect sufficient material for analyses. Deviations from the acceptable criteria will be at the discretion of the FC. All sediment samples will be processed as described in the following section.

5.1.6 Sediment Grab Sample Processing Procedures

Sediment grab processing will be conducted aboard the sampling vessel. All working surfaces and instruments will be thoroughly cleaned, decontaminated, and covered with aluminum foil when not in use to minimize potential contamination between sampling stations. Disposable gloves will be discarded after processing each sample and replaced prior to handling decontaminated instruments or work surfaces. Discrete samples from the three locations in DMMU-1 will be composited for analyses as shown in Tables 3 and 4 and described in the following paragraphs.

Prior to sampling, Anchor QEA field staff will take color photographs and record a sediment description of each grab sample on a grab sample log (Appendix C). The following parameters will be noted:

- Grab sample recovery depth
- Physical soil description in accordance with ASTM procedures (ASTM D 2488 and ASTM D 2487 – Unified Soil Classification System) including soil type, density/consistency of soil, and color
- Odor (e.g., hydrogen sulfide and petroleum)
- Visual stratification, structure, and texture
- Vegetation and debris (e.g., wood chips or fibers, concrete and metal debris, paint chips, sand blast grit, slag, and creosote)
- Biological activity (e.g., detritus, shells, tubes, bioturbation, and live or dead organisms)
- Presence of oily sheen or non-aqueous phase liquids

Sediment representative of the entire depth of each grab will be collected using a decontaminated spoon and placed into a decontaminated stainless-steel bowl or pot. The sample will be homogenized until uniform in color and texture and an aliquot from each discrete sample will be collected as an archive for potential future analyses. Representative and equal aliquots from each of the three grab locations will be composited and homogenized into a single sample, either by hand using a spoon, or by using a stainless-steel paddle attached to a variable speed drill motor. The sample composite scheme is shown in Table 3. Sample aliquots will be spooned into the appropriate, laboratory-supplied sample containers, as identified in Table 5, and submitted to the laboratory for analyses or archival. The homogenate will be mixed throughout the process of filling sample containers to ensure that each container is representative of the homogenate. The composite samples must be approximately 10 liters of sediment to conduct all required and potential chemical and bioassay analyses.

Approximately 2 liters will be required for chemical analysis, and 8 liters for bioassays. An additional 0.5-liter sample container (approximately 16 ounces) will be collected and archived from each DMMU for additional testing, if required. If sufficient material is available from each core, a 0.5-liter sample container will be collected from each core interval prior to compositing and archived for further testing, if required. Sample handling requirements are presented in Table 5. Samples for chemical analyses will be securely packed and delivered to ARL, or Apex Laboratories, LLC, as an alternative EPA-accredited laboratory if needed. Archived sample aliquots will be held at the laboratory in frozen storage for potential future chemical analyses.

5.2 Archaeological Observations

Archaeological monitoring will be conducted during sampling activities. Specific methods and level of effort will be detailed in an Archaeological Monitoring and Inadvertent Discovery Plan (MIDP) developed for the project. The MIDP will summarize past cultural resources work, recorded cultural resources, geologic conditions, and prior construction or disturbance within the project area. A draft MIDP will be provided for review by the Port and submitted to the Puyallup Tribal Historic Preservation Office for additional comment. Monitoring is anticipated to include examination of all available core segments above fine open bay sediments. Notes and photographs will be taken for each sample. Notes will include color of sediment, type of sediment observed, cultural material description (if applicable), date, and monitoring conditions.

5.3 Sample Handling Requirements

This section addresses the sampling program requirements for field decontamination, investigation-derived waste (IDW) management, sample custody, and sample shipping requirements.

5.3.1 Field Decontamination Procedures

Sample containers, instruments, working surfaces, and other items that may come into contact with sediment sample material must meet high standards of cleanliness. All equipment and instruments used that are in direct contact with sediment collected for analyses must be made of glass, stainless steel, high-density polyethylene (HDPE), or polytetrafluoroethylene (PTFE). These items will be cleaned prior to each day's use and between sampling or compositing events. Decontamination of all items will follow Puget Sound Estuary Program (PSEP) protocols (PSEP 1997). The decontamination procedure is as follows:

1. Scrub until free of visible sediment in tap water or site water.
2. Wash with a solution of tap water and phosphate-free soap (e.g., Liquinox or another Alconox brand phosphate-free option) and scrub brush.
3. Rinse with tap water.
4. Rinse three times with distilled water.

5. Cover (no contact) all decontaminated items with aluminum foil.
6. Store in a clean, closed container. Bowls may be stored inverted on a clean, foil-covered surface for next use.

5.3.2 Investigation-Derived Waste Management

Any sediment spilled on the deck of the sampling vessel will be washed into the surface waters at the collection site. Sediment remaining after subsurface core processing (landside) is considered IDW and will be collected in 55-gallon drums. The drums will be stored in a secure area and appropriately labeled. A composite sample of IDW will be collected and analyzed for toxic characteristic leaching procedure metals to obtain representative data for sediment disposal profiling.

All disposable sampling materials and personal protective equipment used in sample processing, such as disposable coveralls, gloves, and paper towels, will be placed in heavy duty garbage bags or other appropriate containers. Disposable supplies will be placed in a normal refuse container on site for disposal as solid waste.

5.3.3 Sample Custody and Shipping Requirements

Samples are considered to be in one's custody if they are in the custodian's possession or view, in a secured location (under lock) with restricted access, or in a container that is secured with official seals such that the sample cannot be reached without breaking the seals.

Chain-of-custody procedures will be followed for all samples throughout the collection, handling, and analytical processes. The principal document used to track possession and transfer of samples is the chain-of-custody form. Each sample ID will be listed on an electronic or handwritten chain-of-custody form the day it is collected. All handwritten data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and initialing the change. Blank lines and spaces on chain-of-custody forms will be lined-out and initialed by the individual maintaining custody.

A chain-of-custody form will accompany each shipment of samples to the analytical laboratory. Each person who has custody of the samples will ensure that the samples are not left unattended unless properly secured. Copies of all chain-of-custody forms will be retained in the project files.

All samples will be shipped or hand-delivered to the analytical laboratory no later than the day after collection. Samples collected on Friday may be held until the following Monday for shipment, provided this does not jeopardize any holding time requirements. Specific sample shipping procedures are as follows:

- Each cooler or container with samples will be hand-delivered, couriered, or shipped via overnight delivery to the appropriate analytical laboratory. If Saturday delivery is required, the

FC or designee will contact the analytical laboratory before 3:00 p.m. on Friday to ensure the laboratory is accepting sample deliveries and is aware of the number of containers shipped. The airbill tracking numbers for those containers will be provided to the laboratory.

- Ice will be sealed in separate plastic bags and placed in shipping containers. Ice may be kept in the bags provided and placed in the cooler if the samples will be couriered or hand-delivered.
- Individual samples will be placed in sealable plastic bags, packed to prevent breakage, and transported in a sealed cooler or other suitable container.
- Glass jars will be separated in the shipping container by shock absorbent material (e.g., bubble wrap) to prevent breakage.
- If samples are transferred using a commercial shipping company, the following procedures will be followed:
  - The shipping containers will be clearly labeled with sufficient information (name of project, laboratory name and shipping address, and consultant's name and return address) to enable positive ID.
  - Chain-of-custody forms will be enclosed in a plastic bag and placed inside the cooler.
  - A minimum of two signed and dated chain-of-custody seals will be placed on adjacent sides of each cooler prior to shipping.
  - Each cooler will be secured with packing tape.

Upon transfer of sample possession to the analytical laboratory, the persons transferring custody of the sample container will sign the chain-of-custody form. Upon receipt of samples at the laboratory, the person receiving the cooler will sign the chain-of-custody forms. The shipping container seals will be broken (if applicable), and the receiver will record the condition of the samples on a sample receipt form. Chain-of-custody forms will be used internally in the laboratory to track sample handling and final disposition.

5.4 Laboratory Methods

This section summarizes the target physical and chemical analyses that will be conducted on the samples collected. All sample analyses will be conducted in accordance with EPA-approved methods or other commonly acceptable methods and this SQAPP. Prior to analyses, all samples will be maintained according to the appropriate holding times and temperatures for each analysis (Table 5). Analytes, analytical methods, and target detection limits for chemical and physical testing are presented in Table 4. The analytical laboratory will prepare a detailed report in accordance with this SQAPP.

Prior to sample analyses, the laboratory will calculate minimum detection limits (MDLs) and establish reporting limits (RLs) for each analyte of interest, where applicable. RLs will be at or below the values specified in Table 4, if technically feasible.

Chemical/physical testing will be conducted at ARL in Tukwila, Washington. ARL is accredited under the National Environmental Laboratories Accreditation Program. All chemical and physical testing will adhere to the most recent EPA QA/QC procedures outlined in the approved analytical methods and in this SQAPP. The laboratory may use more current analytical methods, if available, with DMMP approval.

In completing chemical analyses for this project, the contract laboratories are expected to meet the following minimum requirements:

- Adhere to the methods outlined in this SQAPP, including methods referenced for each analytical procedure (Table 4).
- Deliver electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet agreed-upon turnaround times for deliverables.
- Implement QA/QC procedures discussed in this SQAPP, including following Data Quality Objectives (DQOs), laboratory quality control requirements, and performance evaluation testing requirements.
- Notify the project QA manager of any SQAPP QA/QC problems when they are identified to allow for quick resolution.
- Allow laboratory and data audits to be performed, if deemed necessary.

6 Quality Assurance/Quality Control

Field and laboratory activities will be conducted in such a manner that the results meet specified quality objectives and are fully defensible. Guidance for QA/QC is derived from the protocols developed for EPA SW-846 (1986), the EPA Contract Laboratory Program (EPA 2020b, 2020c, 2020d), and the cited methods.

6.1 Field Quality Control

Anchor QEA personnel will identify and label samples in a consistent manner to ensure that field samples are traceable. Labels should be used in conjunction with the chain-of-custody and this SQAPP to provide all information necessary for the laboratory to conduct required analyses properly. Samples will be placed in appropriate containers and preserved for shipment to the laboratory in accordance with the requirements presented in Table 5.

6.1.1 Sample Containers

Sample containers and preservatives will be provided by the laboratory. The laboratory will maintain documentation certifying the cleanliness of bottles and the purity of preservatives provided. Container requirements are listed in Table 5. During collection of samples, additional sample mass is required to ensure that the laboratory has sufficient sample mass or volume to run the matrix-specified analytical QA/QC (matrix duplicate [MD]/matrix spike [MS]/MS duplicate [MSD]) samples for analyses as specified in Table 6. The samples designated for MD/MS/MSD analyses should be clearly marked on the chain-of-custody forms.

6.1.2 Sample Identification and Labels

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Company name
- Project name
- Sample ID
- Date and time of sample collection
- Preservative type (if applicable)
- Analysis to be performed

6.2 Data Quality Objectives and Criteria

The DQOs for this project will ensure that data collected are of known and acceptable quality so that the project objectives described in this SQAPP are achieved. The quality of the laboratory data is assessed by precision, accuracy, representativeness, comparability, and completeness (the "PARCC"

parameters). Definitions of these parameters and the applicable quality control procedures are given below. Applicable quantitative goals for these data quality parameters are listed or referenced in Table 7.

6.2.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sample collection, sample handling, and laboratory analyses. ASTM recognizes two levels of precision (ASTM 2002):

- Repeatability: the random error associated with measurements made by a single test operator on identical aliquots of test material in a given laboratory with the same apparatus under constant operating conditions
- Reproducibility: the random error associated with measurements made by different test operators in different laboratories using the same method but different equipment to analyze identical samples of test material

In the laboratory, "within-batch" precision is measured using duplicate sample or quality control analyses and is expressed as the relative percent difference (RPD) between the measurements. The "batch-to-batch" precision is determined from the variance observed in the analyses of standard solutions or laboratory control samples (LCS) from multiple analytical batches.

Laboratory precision control limits are listed in Table 7 for each analysis. Equation 1 shows the RPD equation used to express precision:

Equation 1

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

where:

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

6.2.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value. Accuracy is determined by calculating the value of results from analyses of LCSs, standard reference materials (SRM), and standard solutions. In addition, matrix-spiked samples are also measured, which indicate the accuracy or bias in the actual

sample matrix. Accuracy is expressed as percent recovery of the measured value, relative to the true or expected value. If a measurement process produces results that are not the true or expected values, the process is said to be biased. Bias is the systematic error either inherent in a method of analysis (e.g., extraction efficiencies) or caused by an artifact of the measurement system (e.g., contamination). Analytical laboratories use several quality control measures to eliminate analytical bias, including systematic analysis of method blanks, LCSs, and independent calibration verification standards. Because bias can be positive or negative, and because several types of bias can occur simultaneously, only the net, or total, bias can be evaluated in a measurement.

Laboratory accuracy will be evaluated using quantitative LCS, MS, surrogate spike, and calibration standard recoveries compared with criteria listed in Table 7 or the method-specified performance criteria. Accuracy can be expressed as a concentration compared to the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. Equation 2 shows the equation used to express accuracy:

Equation 2

$$\%R = 100\% \; x \; (S - U)/Csa$$

where:

$\%R$	=	percent recovery
S	=	measured concentration in the spiked aliquot
U	=	measured concentration in the unspiked aliquot
Csa	=	actual concentration of spike added

Field accuracy will be controlled by adherence to sample collection procedures outlined in this SQAPP.

6.2.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition.

6.2.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and through common traceable calibration standards and reference materials.

6.2.5 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated using Equation 3:

Equation 3

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

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

6.2.6 Sensitivity

Sensitivity is a measure of analytical detection and RLs. In general, the lowest technologically achievable MDLs and RLs will be targeted for this project, and high-resolution method data will be reported to estimated detection limits (EDLs).

The MDL is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. EDLs are defined as the minimum concentration required to produce a signal with a peak height of area at least 2.5 times the background or noise level. EDLs are sample- and analyte-specific and calculated at the time of analysis, so they cannot be determined ahead of time. Laboratory MDLs, RLs, and EDLs will be used to evaluate the method sensitivity and applicability prior to the acceptance of a method for this program. Laboratory MDLs, RLs, and EDLs must be below applicable SLs to avoid the need for further testing or an unsuitable determination. Method blanks will be analyzed to ensure target analytes are not introduced during sample preparation or analysis that would affect analytical sensitivities.

The sample-specific MDLs, RLs, and EDLs will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase these limits (e.g., dilution factor, percent moisture, and analytical mass). If MDLs, RLs, or EDLs are elevated due to matrix interferences and subsequent dilutions or reductions in sample aliquots, the data will be evaluated by Anchor QEA and the laboratory to determine whether an alternative course of action is required or possible. The sample-specific MDLs, RLs, and EDLs will be the values stored in the project database.

6.3 Laboratory Quality Control

Laboratory QC procedures, where applicable, include instrument performance checks, initial and continuing instrument calibrations, SRMs, LCSs, surrogate spikes (for organic analyses), labeled compound spikes (for high-resolution analyses), and method blanks. Sample-specific matrix laboratory control analyses include matrix replicates and MSs. Laboratory quantitative DQOs are listed in Table 7. QA/QC sample analytical frequencies are provided in Table 6.

The analyst will review the results of the quality control samples from each sample group immediately after a sample group has been analyzed. The quality control sample results will be evaluated to determine whether control limits have been exceeded. Samples will be reprepared and reanalyzed to correct or confirm exceedances. If non-matrix QC control limits are exceeded after they have been confirmed, the QA manager will be contacted, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be discussed and implemented as necessary.

6.3.1 Laboratory Instrument Calibration and Frequency

An initial calibration will be performed on each laboratory instrument to be used prior to the start of the project, after each major interruption to the analytical instrument, and when ongoing calibration does not meet method control criteria. An initial calibration verification will be analyzed following each initial calibration and will meet method criteria prior to sample analyses. Continuing calibration verifications (CCV) will be analyzed at method-required frequencies to track instrument performance. The frequency of CCVs varies with method. For gas chromatography/mass spectrometer methods, one will be analyzed every 12 hours. For gas chromatography, metals, and inorganic methods, one will be analyzed for every 10 field samples analyzed and at the end of each run, or as specified in the method. If a continuing calibration is out of control, the source of the control failure will be investigated and eliminated or reduced to meet control specifications, which may include analyzing a new initial calibration. Any project samples analyzed while the instrument calibration was out of control will be reanalyzed.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to or immediately following CCVs at the instrument as required per method.

6.3.2 Laboratory Duplicates/Replicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates and replicates are subsamples of the original sample that are prepared and analyzed as a separate sample.

6.3.3 Matrix Spikes and Matrix Spike Duplicates

Analyses of MS samples provide information on the extraction efficiency of the method on the sample matrix as well as any interferences introduced by the sample matrix. By analyzing MS samples in duplicate, precision data are also provided.

6.3.4 Method Blanks

Method blanks are prepared and analyzed in the same manner as project samples to assess possible laboratory contamination at all stages of sample preparation and analyses. The method blank for all analyses must be less than the method reporting limit of any single target analyte. If a laboratory method blank exceeds this criterion for any analyte, and the concentration of the analyte in any of the samples is less than five times the concentration found in the blank (10 times for common contaminants), analyses must stop, and the source of contamination must be eliminated or reduced. Affected samples should be reprepared and reanalyzed, if possible.

6.3.5 Laboratory Control Samples

LCSs are analyzed to assess possible laboratory bias at all stages of sample preparation and analysis. The LCS is a matrix-dependent spiked sample prepared at the time of sample preparation along with the preparation of the sample, MD, MS, and method blank. The LCS will provide information on the accuracy of the analytical process and, when analyzed in duplicate, will also provide precision data.

6.3.6 Laboratory Deliverables

Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. The analytical laboratory will be required, where applicable, to report the following:

- **Project Narrative.** This summary will include a discussion of any problems encountered during analyses. This summary should include (but not be limited to) QA/QC, sample receipt, sample storage, and analytical difficulties. Any problems encountered and their resolutions will be documented in as much detail as appropriate.
- **Chain-of-Custody Records.** Legible copies of the chain-of-custody forms will be provided as part of the data packages. This documentation will include the time of receipt and condition of the samples received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include sample shipping container temperatures measured at the time of sample receipt.
- **Sample Results.** Data packages will provide results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample ID code and the corresponding laboratory ID code
  - Sample matrix

  - Date of sample preparation/extraction
  - Date and time of analysis
  - Mass or volume used for preparation and analysis
  - Final dilution or concentration factors
  - ID of the instrument used for analysis
  - MDLs, RLs, and/or EDLs accounting for sample-specific factors (e.g., dilution and TS)
  - Analytical results with reporting units
  - Data qualifiers and their definitions
- **QA/QC Summaries.** This section will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. The required summaries are as follows (additional information may be requested):
  - **Instrument Performance Checks.** Injection times, ion abundances, and mass resolution checks will be reported and compared to method criteria. Associated samples and analysis times will also be reported.
  - **Calibration Data Summary.** These summaries will report the concentrations of the initial calibration and continuing calibration standards and the date and time of analyses. The response factor, percent relative standard deviation, percent drift/difference or correlation coefficient, and retention time for each analyte will be listed, as applicable to the method. Calibration results for standards will be documented to indicate instrument sensitivity.
  - **Internal Standard Area Summary.** Internal standard areas will be reported and evaluated against method criteria.
  - **Method Blank Analysis.** The method blank analysis associated with each sample and the concentration of all target analytes identified in these blanks will be reported.
  - **Surrogate Spike and Labeled Compound Recoveries.** All surrogate spike or labeled compound recoveries for organic analyses will be reported. The name and concentration of all compounds added, percent recoveries, and range of acceptable recoveries will be provided.
  - **MS Recovery.** MS recovery data for all applicable analyses will be reported. The names and concentrations of analytes added, percent recoveries, and range of acceptable recoveries will be listed. The percent recoveries and RPD values for MSD analyses will be reported.
  - **Matrix Duplicates.** The RPD values for MD analyses will be reported.
  - **Laboratory Control Sample.** LCS recovery data will be reported. The names and concentrations of analytes added, percent recoveries, and range of acceptable recoveries will be included. The percent recoveries and RPD values for LCS duplicate analyses will be included.

- **Original Data.** Legible copies of the original data generated by the laboratory will include the following information:
  - Sample extraction, preparation, and cleanup logs, including methods used
  - Instrument analysis logs for all instruments used on days of calibration and sample analyses
  - Calculation worksheets as applicable
  - Ion chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials, as applicable
  - Copies of full scan chromatograms and quantitation reports for gas chromatography /mass spectrometer analyses of samples, standards, blanks, calibrations, spikes, replicates, and reference materials
  - Enhanced spectra of detected compounds with associated best-match spectra for each sample
- **Electronic Data Deliverable.** An electronic data deliverable will be provided in the Anchor QEA custom Environmental Quality Information System (EQuIS) format specified in advance.

6.4 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

6.4.1 Field Instruments/Equipment

In accordance with the QA program, Anchor QEA will maintain an inventory of field instruments and equipment. The frequency and types of maintenance will be based on the manufacturer's recommendations and previous experience with the equipment.

The Anchor QEA FC will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. The equipment maintenance information will be documented in the instrument's calibration log. The frequency of maintenance is dependent on the type and stability of the equipment, the methods used, the intended use of the equipment, and the recommendations of the manufacturer. Detailed information regarding the calibration and frequency of equipment calibration is provided in each specific manufacturer's instruction manuals.

All maintenance records will be verified prior to each sampling event. The FC will be responsible for verifying that required maintenance has been performed prior to using the equipment in the field. For this project, maintenance inspections will include the following activities:

- The subcontractor responsible for navigation will confirm proper operation of the navigation equipment daily. This verification may consist of internal diagnostics or visiting a location with known coordinates to confirm the coordinates indicated by the navigation system.
- The winch line and sampling equipment will be inspected daily for fraying, misalignment, loose connections, and any other applicable mechanical problems.

Any problems will be noted in the field log book and corrected prior to continuing sampling operations.

6.4.2 Laboratory Instruments/Equipment

In accordance with the QA program, the laboratory will maintain an inventory of instruments and equipment, and the frequency of maintenance will be based on the manufacturer's recommendations and previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in the laboratory QA Plan, is organized to maintain proper instrument and equipment performance and to prevent instrument and equipment failure during use. The program considers instrumentation, equipment, and parts that are subject to wear, deterioration, or other changes in operational characteristics, the availability of spare parts, and the frequency at which maintenance is required. Any equipment that has been overloaded, mishandled, gives suspect results, or has been determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to ensure that it is in proper operational condition. The client will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data. The client will also be notified immediately regarding any delays due to instrument malfunctions that could impact holding times or turnaround times.

Laboratories will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. Maintenance records will be checked according to the schedule on an annual basis and recorded by laboratory personnel. The laboratory QA/QC manager or designee will be responsible for verifying compliance.

6.4.2.1 Laboratory Instrument/Equipment Calibration

As part of their quality control program, laboratories perform two types of calibrations. A periodic calibration is performed at prescribed intervals (e.g., balances, drying ovens, refrigerators, and thermometers), and operational calibrations are performed daily or at a specified frequency or prior to analysis (i.e., initial calibrations) according to method requirements. Calibration procedures and

frequency are discussed in the laboratory QA Plan. Calibrations are discussed in the laboratory standard operating procedures (SOPs) for analyses.

The laboratory QA/QC manager will be responsible for ensuring that the laboratory instrumentation is calibrated in accordance with specifications. Implementation of the calibration program will be the responsibility of the respective laboratory Group Supervisors. Recognized procedures (EPA, ASTM, or manufacturer's instructions) will be used when available.

Physical standards (i.e., weights or certified thermometers) will be traceable to nationally recognized standards such as the National Institute of Standards and Technology (NIST). Chemical reference standards will be NIST SRMs or vendor-certified materials traceable to these standards.

The calibration requirements for each method and respective corrective actions will be accessible either in the laboratory SOPs or in the laboratory's QA Plan for each instrument or analytical method in use. All calibrations will be preserved on electronic media.

6.5 Inspection/Acceptance of Supplies and Consumables

Inspection and acceptance of field supplies, including laboratory-supplied sampling bottles, will be performed by the FC. All primary chemical standards and standard solutions used for this project, either in the field or laboratory, will be traceable to documented, reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

6.6 Data Management

Field data sheets will be checked for completeness and accuracy by the FC prior to delivery to the data manager. Data generated in the field will be documented on electronic or hard copy and provided to the data manager, who is responsible for the data entry into the database. All manually entered data will be verified by a second party. Field documentation will be filed in the main project folder after data entry and verification are complete.

Laboratory data will be provided to the data manager in the EQuIS electronic format. Laboratory data that is electronically provided and loaded into the database will undergo a check against laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

7 Biological Testing

Bioaccumulation testing is not planned. If bioaccumulation testing is triggered (by a BT exceedance) and pursued by the Port, Anchor QEA will prepare a Bioaccumulation Sampling and Analysis Plan Addendum and remobilize to collect additional sediments. If required, this SAP Addendum will be prepared following receipt of chemical and bioassay testing results from berth material and will describe additional sampling that will be conducted to demonstrate suitability for open-water disposal or in-water or upland beneficial use placement.

Bioassay testing may be required if sediment concentrations exceed DMMP SLs. Bioassay testing will be performed by EcoAnalysts, Inc., in Port Gamble, Washington, following the standard suite of DMMP bioassays: the 10-day amphipod mortality test, 20-day juvenile polychaete growth test, and the sediment larval development test.

Bioassay testing will be performed in accordance with *Recommended Protocols for Conducting Laboratory Bioassays on Puget Sound Sediments* (PSEP 1995) and the *Dredged Material Evaluation and Disposal Procedures User Manual* (DMMP 2021). Modifications from the DMMP Program Updates web page will be incorporated as appropriate. All bioassay analyses, including retests, are required to commence within 56 days after collection to meet holding times.

Eight liters of sediment for each DMMU will be collected for bioassays testing and stored in a laboratory-approved plastic bag at approximately 4°C±2°C until analysis, if required. Temperatures will be monitored and chain-of-custody procedures will be followed throughout sample handling by the laboratory.

Bioassay testing requires that test sediments be matched and conducted simultaneously with appropriate DMMP-approved reference sediment to factor out sediment grain size effects on bioassay organisms. The selection of the reference sediment will be based on the percent fines determined from wet sieve analyses conducted during sample processing procedures. The fines content of reference sediments should ideally fall within 10% of the fines content in the test sediments. Multiple reference sediments will be used to match sample fines if needed.

This section describes bioassay testing procedures, QA/QC, test result interpretative criteria, and reporting.

7.1 Bioassay Testing Procedures

Specific procedures for each sediment bioassay are summarized in the following sections. As indicated above, the bioassay methodologies will follow those described in PSEP 1995, as modified by DMMP.

7.1.1 Amphipod Bioassay

The acute amphipod survival bioassay will be performed using the amphipod *Eohaustorius estuarius*, *Rhepoxynius abronius*, or *Ampelisca abdita*. Species selection will be determined in coordination with DMMP and based upon grain size, salinity, and collection season prior to test initiation. Amphipods will be exposed to test, control, and reference sediments for a 10-day period. After 10 days, organisms will be sieved from the sediment and survivorship will be recorded. Test acceptability will be evaluated by mortality in the control, which should be less than or equal to 10%. Additionally, mean mortality for the reference sediment should be within 20% of the mean negative control sediment mortality. If the test does not meet control and reference acceptability criteria, it should be repeated. Ammonia and sulfide concentrations in the exposure medium will be measured on project sediments prior to testing and at test termination. If pre-test ammonia and sulfide concentrations exceed purging triggers identified in the DMMP User Manual (DMMP 2021), EcoAnalysts will contact the Anchor QEA PM prior to setting up the tests to discuss the need for purging.

7.1.2 Larval Bioassay

The acute larval survival and development bioassay will be conducted with the echinoderm species *Mytilus galloprovincialis*, bivalve species *Dendraster excentricus*, or an alternative species such as the bivalve *Crassostrea gigas* based on availability. Use of an alternative species will be coordinated with DMMP. For the bioassay, adult test organisms will be allowed to spawn and the resulting embryos will be exposed to a seawater control, along with test and reference sediments, until formation into the larval stage occurs in 90% of the control organisms (typically 48 to 60 hours). At the end of the test, larvae from each test sediment exposure are examined to quantify abnormality and mortality. Test acceptability will be evaluated by normal development in the control, which should be at least 70%. Additionally, the reference sediment should have at least 65% of normal individuals as compared to the control. If the test does not meet control and reference acceptability criteria, it should be repeated. Ammonia and sulfide concentrations in the exposure medium will be measured in the overlying water prior to testing and at test termination. If pre-test ammonia and sulfide concentrations exceed purging triggers identified in the DMMP User Manual (DMMP 2021), EcoAnalysts will contact the Anchor QEA PM prior to setting up the tests to discuss the need for purging. The recommended pH range for the bioassay test is 7.5 to 9. Low pH may be a confounding factor to interpret larval bioassay test results. If pH drops below 7.5 at any point during the test, results may be rejected.

The resuspension protocol (DMMP 2013) may be used in place of the standard PSEP protocol if dredged material encountered has high concentrations of fines, wood waste, or other flocculent material. The standard protocol may result in false positives from normally developing larvae being entrained in the flocculent material. The decision to use the resuspension protocol will be made in coordination with the DMMP agencies for approval before use.

7.1.3 Juvenile Polychaete Bioassay

The chronic juvenile polychaete growth bioassay will be conducted with the worm species *Neanthes arenaceodentata*. Polychaetes will be exposed to test, control, and reference sediments for a 20-day period. After 20 days, organisms will be sieved and survivorship will be recorded. The ash-free dry weight of the test organisms, along with the ash-free dry weight of time zero organisms, will be used to calculate the growth rate. Test acceptability will be evaluated by mortality in the control, which should be less than 10%, as well as a growth rate greater than 0.38 milligrams per individual per day (dry weight). Additionally, mean mortality for the reference sediment should be less than 20% and the mean reference growth rate should be greater than or equal to 80% of the mean negative control growth rate. If the test does not meet control and reference acceptability criteria, it should be repeated. Ammonia and sulfide concentrations in the exposure medium will be measured on project sediments prior to testing and at test termination. If pre-test ammonia and sulfide concentrations exceed purging triggers identified in the DMMP User Manual (DMMP 2021), EcoAnalysts will contact the Anchor QEA PM prior to setting up the tests to discuss the need for purging.

7.2 Test Quality Assurance/Quality Control

Sediment toxicity tests will incorporate standard QA/QC procedures to ensure that the test results are valid. Standard QA/QC procedures include the use of negative controls, positive controls, reference sediment samples, replicates, and measurements of water quality during testing.

7.2.1 Negative Controls

A negative control will be run for each bioassay to estimate the general health of test organisms during the test exposure period. For the amphipod and juvenile polychaete bioassays, the negative control will be sediment from the amphipod collection site and seawater. The negative control for the larval bioassay will be a seawater control.

7.2.2 Positive Controls

A positive control will be run for each bioassay to establish the relative sensitivity of the test organisms by exposing the organisms to a reference toxicant. The positive control for sediment tests is typically conducted with diluent freshwater and without sediment. The LC_{50} or the EC_{50} must be within the 95% confidence interval of responses (calculated using a minimum of the most recent 12 monthly positive control tests) expected for the toxicant used.[2] Reference toxicants are typically metals, such as cadmium chloride. If elevated ammonia in the test sediments exceeds the purging trigger, unionized ammonia must be used as a reference toxicant.

[2] LC_{50} is the lethal concentration of toxicant killing 50% of exposed organisms. EC_{50} is the concentration of test substance in dilution water that is calculated to affect 50% of a test population during continuous exposure over a specified time period.

7.2.3 Reference Sediment

Reference sediment will also be included with each bioassay, tested concurrently with test sediments to provide data that can be used to separate toxicant effects from unrelated effects, such as those of sediment grain size. Reference sediment samples should be collected from an area documented to be free from chemical contamination and should represent the range of important natural, physical, and chemical characteristics of the test sediments (e.g., sediment grain size and total organic carbon). For this study, reference sediment samples will be collected from Carr Inlet in Puget Sound, Washington. All bioassays have performance standards for reference sediments as mentioned above. Failure to meet these standards may result in the requirement to retest.

7.2.4 Replicates

Five replicate chambers for each test sediment, reference sediment, and negative controls treatment will be run for each bioassay. A water quality replicate will also be run for each treatment.

7.2.5 Water Quality Monitoring

Water quality monitoring will be conducted for the amphipod, larval, and juvenile polychaete bioassays and reference toxicant tests. This monitoring consists of daily measurements in the water quality replicate of salinity, temperature, pH, and dissolved oxygen for the amphipod and larval tests. These measurements will be made at a minimum of every 3 days for the juvenile polychaete bioassay, with the exception of dissolved oxygen, which will be measured daily. Ammonia and sulfides in the overlying water and sediment porewater from a separate beaker will be determined at test initiation and termination for all three tests. Monitoring will be conducted for all test and reference sediments and negative controls (including seawater controls).

7.3 Interpretation

Test interpretation consists of endpoint comparisons of test sediments to the measurements observed in the controls and in reference sediments on an absolute percentage basis, as well as statistical comparison between the test and reference endpoints, where appropriate. Test interpretation will follow the guidelines established in DMMP (2021) and through the DMMP review process. Table 8 provides the most current DMMP interpretative criteria.

7.4 Bioassay Retest

Any bioassay retests must be fully coordinated with, and approved by, the DMMP agencies. The Dredged Material Management Office (DMMO) will be contacted to handle this coordination.

7.5 Data Deliverables

The laboratory conducting the bioassay tests will be responsible for internal checks on data reporting and will correct errors identified during the QA review. The bioassay laboratory for this study will be required to provide a biological testing report that includes all information recommended by PSEP protocols for QA review, as follows:

- A description of any deviations from the methodology or problems with the process and procedures of analyses
- Test methods used for bioassay testing and statistical analyses
- Results for survival, growth, abnormalities, water quality parameters, reference toxicant, and statistical analyses
- Original data sheets for water quality, survival, growth, abnormalities, reference toxicant, and statistical analyses
- Chain-of-custody records

Close contact with the laboratory will be maintained to resolve any QA/QC problems in a timely manner.

8 Assessments and Response Actions

Once data are received from the laboratory, several quality control procedures will be followed to provide an accurate evaluation of data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

8.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted as part of this study. However, all laboratory audit reports will be made available to the project QA/QC manager upon request. The laboratory is required to have written procedures addressing internal QA/QC. These procedures have been submitted, and the project QA/QC manager will review them to ensure compliance with this SQAPP. The laboratory must ensure that personnel engaged in analytical tasks have appropriate and sufficient training. The laboratory will provide written details of any method modifications planned prior to project commencement.

8.2 Response and Corrective Actions

The following paragraphs identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or non-conformance of protocols identified in this document.

8.2.1 Field Activities

The FC will be responsible for correcting equipment malfunctions during the field sampling effort. The project QA/QC manager will be responsible for resolving situations identified by the FC that may result in noncompliance with this SQAPP. All corrective measures will be immediately documented in the field log book.

8.2.2 Laboratory

The laboratory is required to comply with its SOPs. The laboratory PM will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this SQAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The laboratory PM will be notified if any quality control sample exceeds the project-specified control limits and corrective action does not improve results. The analyst will identify and correct the anomaly before continuing with sample analyses. If the laboratory internal corrective action does not resolve the non-conformance, the laboratory PM will notify the QA/QC manager. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of

the relevant sample batch (i.e., recalculation, reanalysis, and repreparation) will be submitted with the data package in the form of a cover letter.

8.3 Reports to Management

QA reports to management include verbal status reports, data validation reports, and final project reports. These reports will be the responsibility of the QA/QC manager.

9 Data Validation, Usability, and Reporting

This section describes the processes that will be used to review project data quality.

9.1 Data Review, Validation, and Verification

During the EPA Stage 2B validation process to be performed by Anchor QEA, analytical data will be evaluated for project, method, and laboratory quality control compliance, and their validity and applicability for program purposes will be determined. Based on the findings of the EPA Stage 2B validation process, data validation qualifiers may be assigned. The validated project data, including qualifiers, will be entered into the project database, and all exports generated will include validation qualifiers.

9.2 Validation and Verification Methods

Data validation includes signed entries by the field and laboratory technicians on field data sheets and laboratory datasheets, respectively; review for completeness and accuracy by the FC and laboratory manager; review by the QA manager for outliers and omissions; and the use of quality control criteria to accept or reject specific data. All data will be entered into the EQuIS database and verified manually and electronically. A second data manager or designee will perform a cursory verification of the database raw data file. If errors are found, further verification will be performed to ensure that all data are accurate. Any errors found will be corrected in the database, and the laboratory will be notified of the errors.

All laboratory data will be reviewed and verified to determine whether DQOs have been met and that appropriate corrective actions have been taken when necessary. The project QA/QC manager or designee will be responsible for the final review of data generated from analyses of samples.

The first level of review will take place in the laboratory as the data are generated. The laboratory department manager or designee will be responsible for ensuring that the data generated meet minimum QA/QC requirements and that the instruments were operating under acceptable conditions during generation of data. DQOs will also be assessed at this point by comparing the results of quality control measurements with pre-established criteria as a measure of data acceptability.

The analysts or laboratory department manager will prepare a preliminary quality control checklist for each parameter and for each sample delivery group as soon as analysis of a sample batch has been completed. Any deviations from the DQOs listed on the checklist will be brought to the attention of the laboratory PM to determine whether corrective action is needed and to determine the impact on the reporting schedule.

Data packages will be checked for completeness upon receipt from the laboratory to ensure that data and QA/QC information requested are present. Stage 2B validations (EPA 2009) will be

conducted on all data packages. Data validation will be conducted by a reviewer using current National Functional Guidelines for Data Review (EPA 2020b, 2020c, 2020d), the analytical methods, this SQAPP, and best professional judgment by considering the following information, as applicable:

- Chain-of-custody documentation and sample receipt condition
- Holding times
- Instrument performance checks
- Initial calibrations
- Continuing calibrations
- Method blanks
- Surrogate recoveries
- Internal standard area counts
- Labeled compound recoveries
- Detection limits
- RLs
- LCSs
- MS/MSD samples
- Laboratory duplicates
- Rinsate blanks
- SRM results

The data will be validated in accordance with the project specific DQOs described previously and listed in Table 7, analytical method criteria, and the laboratory's internal performance standards based on their SOPs.

9.3 Reconciliation with User Requirements

The QA/QC manager will review data after each event to determine whether DQOs have been met. If data do not meet the project's specifications, the QA/QC manager will review the errors and determine whether the problem is due to calibration, maintenance, sampling techniques, or other factors and will suggest corrective action. Retraining, revision of techniques, or replacement of supplies/equipment should correct the problem; if not, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA/QC manager will recommend appropriate modifications.

9.4 Data Summary Report

Anchor QEA will prepare a sediment characterization report. The report will include the following:

- A summary of field activities
- Deviations from this SQAPP
- A summary of analytical results as compared to DMMP criteria (DMMP 2021)

- A summary of field and laboratory QA/QC findings, including a brief summary of data validation findings
- A figure showing actual sampling locations and DMMU composite areas
- A table showing the compositing scheme, coordinates, core penetration, recovery, and sampling depths associated with composites and Z-samples
  - Coordinates for all sampling locations in Washington State Plane South NAD83, U.S. survey feet
- Data results tables, which will include the following:
  - Chemical, physical, and conventional results compared to applicable regulatory criteria; if applicable, biological results will also be provided and compared to applicable regulatory criteria. Exceedances will be formatted (e.g., highlighted) for ease of review.
  - Data qualifiers applied by the laboratory and as a result of data validation and their definitions
- Copies of laboratory data packages included as appendices or attachments, including chain-of-custody forms. A comprehensive laboratory data package will also be provided for Ecology.
- Copies of field logs and core photographs included as appendices or attachments
- Copies of validation reports and findings

All analytical data and biological data, if applicable, will also be provided as an EIM database deliverable.

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Tables

Table 1
Dredge Material Management Unit Rationale

Terminal	Rank	*Surface*				*Subsurface*			
		DMMU	Area (ft^2)	Volume (cy)	Minimum Required Number of Cores	DMMU	Area (ft^2)	Volume (cy)	Minimum Required Number of Cores[a]
Husky	Moderate	1[b]	52,365	3,454	1	6	131,200	19,205	5
		2	121,146	14,074	4	7	96,963	15,647	4
		3	174,838	15,071	4	8	125,064	18,093	5
		4	135,365	14,776	4	9[c]	143,195	21,247	6
		5	135,795	13,373	4	10[c]	152,769	22,535	6
Husky Totals[d]			**619,509**	**60,748**	**17**		**649,191**	**96,727**	**26**
WUT	Moderate	20	124,620	13,016	4	24	157,375	23,156	6
		21	104,311	14,132	4	25	152,777	22,998	6
		22	143,968	14,787	4	26	155,417	23,106	6
		23	141,400	14,733	4	27	149,095	23,443	6
WUT Totals[d,e]			**514,299**	**56,668**	**16**		**614,664**	**92,703**	**24**

Notes:

a. Cores will be collected for overlapping surface and subsurface DMMUs as single cores targeting the deepest subsurface DMMU depths.

b. Husky DMMU 1 includes approximately 5,700 cy of rock within the DMMU footprint not slated for open water disposal. The rock volume is not included in the dredge volume presented in the table.

c. Husky DMMUs 9 and 10 include 374 and 504 cy, respectively, of additional sediment volume to be removed to support toe wall rock placement.

d. Total volume includes dredge area and side slopes in surface DMMUs and assumes a 3:1 daylight side slope angle, except as noted on figures.

e. There is an estimated additional 3,175 cy of riprap slope keyway rock that will be removed as part of WUT dredging, primarily from the area adjacent to DMMUs 20 and 24 that is entirely rock to the surface. The rock volume is not included in the dredge volume presented in the table. Minor rock volumes from DMMUs 21, 22, and 23 have also been excluded.

cy: cubic yards

DMMU: Dredged Material Management Unit

ft^2: square feet

WUT: Washington United Terminals

Table 2
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Expected Surface Layer Thickness (feet)[1,2]	Discrete Sample ID
			Easting (feet)	Northing (feet)			
Husky Terminal							
1	N/A	HT-SC01	1167163.4	712885.3	-54.1	0.9	HT-SC01-A-YYMMDD
		HT-SC02	1166793.6	713243.2	-54.5	0.5	HT-SC02-A-YYMMDD
		HT-SC03	1166484.0	713545.0	-54.5	0.5	HT-SC03-A-YYMMDD
2	6	HT-SC04	1167632.5	712651.0	-51.2	3.8	HT-SC04-A-YYMMDD
							HT-SC04-B-YYMMDD
							HT-SC04-Z-YYMMDD
		HT-SC05	1167496.4	712649.2	-51.2	3.8	HT-SC05-A-YYMMDD
							HT-SC05-B-YYMMDD
							HT-SC05-Z-YYMMDD
		HT-SC06	1167417.0	712781.9	-52.2	2.8	HT-SC06-A-YYMMDD
							HT-SC06-B-YYMMDD
							HT-SC06-Z-YYMMDD
		HT-SC07	1167281.0	712857.9	-52.2	2.8	HT-SC07-A-YYMMDD
							HT-SC07-B-YYMMDD
							HT-SC07-Z-YYMMDD
		HT-SC08	1167347.8	712926.9	-51.8	3.2	HT-SC08-A-YYMMDD
							HT-SC08-B-YYMMDD
							HT-SC08-Z-YYMMDD
3	7	HT-SC09	1167127.7	713005.9	-52.2	2.8	HT-SC09-A-YYMMDD
							HT-SC09-B-YYMMDD
							HT-SC09-Z-YYMMDD
		HT-SC10	1167194.8	713074.6	-52.6	2.4	HT-SC10-A-YYMMDD
							HT-SC10-B-YYMMDD
							HT-SC10-Z-YYMMDD
		HT-SC11	1167042.1	713143.8	-52.2	2.8	HT-SC11-A-YYMMDD
							HT-SC11-B-YYMMDD
							HT-SC11-Z-YYMMDD
		HT-SC12	1166892.0	713234.9	-50.9	4.1	HT-SC12-A-YYMMDD
							HT-SC12-B-YYMMDD
							HT-SC12-Z-YYMMDD
		HT-SC13	1166959.1	713303.6	-52.2	2.8	HT-SC13-A-YYMMDD
							HT-SC13-B-YYMMDD
							HT-SC13-Z-YYMMDD
	8	HT-SC14	1166779.2	713478.0	-53.7	1.3	HT-SC14-A-YYMMDD
							HT-SC14-B-YYMMDD
							HT-SC14-Z-YYMMDD
		HT-SC15	1166629.8	713481.1	-51.5	3.5	HT-SC15-A-YYMMDD
							HT-SC15-B-YYMMDD
							HT-SC15-Z-YYMMDD
		HT-SC16	1166631.2	713621.4	-54.8	0.2	HT-SC16-A-YYMMDD
							HT-SC16-B-YYMMDD
							HT-SC16-Z-YYMMDD
		HT-SC17	1166478.8	713631.4	-53.3	1.7	HT-SC17-A-YYMMDD
							HT-SC17-B-YYMMDD
							HT-SC17-Z-YYMMDD
		HT-SC18	1166433.7	713812.8	-56.9	N/A[3]	N/A[3]
							HT-SC18-B-YYMMDD
							HT-SC18-Z-YYMMDD
4	9	HT-SC19	1166227.1	713865.1	-51.7	3.3	HT-SC19-A-YYMMDD
							HT-SC19-B-YYMMDD
							HT-SC19-Z-YYMMDD
		HT-SC20	1166292.3	713950.7	-53.6	1.4	HT-SC20-A-YYMMDD
							HT-SC20-B-YYMMDD
							HT-SC20-Z-YYMMDD
		HT-SC21	1166069.4	714024.6	-52.1	2.9	HT-SC21-A-YYMMDD
							HT-SC21-B-YYMMDD
							HT-SC21-Z-YYMMDD
		HT-SC22	1166138.1	714093.3	-51.9	3.1	HT-SC22-A-YYMMDD
							HT-SC22-B-YYMMDD
							HT-SC22-Z-YYMMDD
		HT-SC23	1165957.6	714275.9	-51.8	3.2	HT-SC23-A-YYMMDD
							HT-SC23-B-YYMMDD
							HT-SC23-Z-YYMMDD
		HT-SC24	1165884.0	714206.4	-51.6	3.4	HT-SC24-A-YYMMDD
							HT-SC24-B-YYMMDD
							HT-SC24-Z-YYMMDD

Table 2
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Expected Surface Layer Thickness (feet)[1,2]	Discrete Sample ID
			Easting (feet)	Northing (feet)			
5	10	HT-SC25	1165751.1	714340.7	-51.8	3.2	HT-SC25-A-YYMMDD
							HT-SC25-B-YYMMDD
							HT-SC25-Z-YYMMDD
		HT-SC26	1165817.9	714409.6	-51.3	3.7	HT-SC26-A-YYMMDD
							HT-SC26-B-YYMMDD
							HT-SC26-Z-YYMMDD
		HT-SC27	1165626.3	714427.0	-51.7	3.3	HT-SC27-A-YYMMDD
							HT-SC27-B-YYMMDD
							HT-SC27-Z-YYMMDD
		HT-SC28	1165638.8	714574.0	-52.7	2.3	HT-SC28-A-YYMMDD
							HT-SC28-B-YYMMDD
							HT-SC28-Z-YYMMDD
		HT-SC29	1165474.8	714608.4	-51.8	3.2	HT-SC29-A-YYMMDD
							HT-SC29-B-YYMMDD
							HT-SC29-Z-YYMMDD
		HT-SC30	1165467.7	714749.1	-53.0	2.0	HT-SC30-A-YYMMDD
							HT-SC30-B-YYMMDD
							HT-SC30-Z-YYMMDD
Washington United Terminals							
20	24	WUT-SC01	1172429.4	708202.3	-51.3	3.7	WUT-SC01-A-YYMMDD
							WUT-SC01-B-YYMMDD
							WUT-SC01-Z-YYMMDD
		WUT-SC02	1172325.9	708182.2	-50.9	4.1	WUT-SC02-A-YYMMDD
							WUT-SC02-B-YYMMDD
							WUT-SC02-Z-YYMMDD
		WUT-SC03	1172238.7	708276.6	-55.4	N/A[3]	N/A[3]
							WUT-SC03-B-YYMMDD
							WUT-SC03-Z-YYMMDD
		WUT-SC04	1172234.0	708381.2	-53.1	1.9	WUT-SC04-A-YYMMDD
							WUT-SC04-B-YYMMDD
							WUT-SC04-Z-YYMMDD
		WUT-SC05	1172058.0	708458.5	-51.8	3.2	WUT-SC05-A-YYMMDD
							WUT-SC05-B-YYMMDD
							WUT-SC05-Z-YYMMDD
		WUT-SC06	1172058.5	708540.7	-52.1	2.9	WUT-SC06-A-YYMMDD
							WUT-SC06-B-YYMMDD
							WUT-SC06-Z-YYMMDD

Table 2
Sample Locations, IDs, Coordinates, Elevations, and Intervals Summary

Surface DMMU	Subsurface DMMU	Location ID	Station Coordinates (Washington SP NAD83 South Zone)		Mudline Elevation (feet MLLW)	Expected Surface Layer Thickness (feet)[1,2]	Discrete Sample ID
			Easting (feet)	Northing (feet)			
21	25	WUT-SC07	1171845.2	708640.5	-51.3	3.7	WUT-SC07-A-YYMMDD
							WUT-SC07-B-YYMMDD
							WUT-SC07-Z-YYMMDD
		WUT-SC08	1171902.3	708700.8	-51.7	3.3	WUT-SC08-A-YYMMDD
							WUT-SC08-B-YYMMDD
							WUT-SC08-Z-YYMMDD
		WUT-SC09	1171748.2	708853.6	-51.8	3.2	WUT-SC09-A-YYMMDD
							WUT-SC09-B-YYMMDD
							WUT-SC09-Z-YYMMDD
		WUT-SC10	1171683.3	708797.1	-51.1	3.9	WUT-SC10-A-YYMMDD
							WUT-SC10-B-YYMMDD
							WUT-SC10-Z-YYMMDD
22		WUT-SC11[4]	1171467.0	708944.9	-51.4	3.6	WUT-SC11-A-YYMMDD
							WUT-SC11-B-YYMMDD
							WUT-SC11-Z1-YYMMDD
							WUT-SC11-Z2-YYMMDD
		WUT-SC12	1171527.7	709083.7	-52.6	2.4	WUT-SC12-A-YYMMDD
							WUT-SC12-B-YYMMDD
							WUT-SC12-Z-YYMMDD
	26	WUT-SC13	1171352.9	709130.2	-53.7	1.3	WUT-SC13-A-YYMMDD
							WUT-SC13-B-YYMMDD
							WUT-SC13-Z-YYMMDD
		WUT-SC14	1171367.8	709250.1	-52.0	3.0	WUT-SC14-A-YYMMDD
							WUT-SC14-B-YYMMDD
							WUT-SC14-Z-YYMMDD
		WUT-SC15	1171153.4	709315.1	-52.2	2.8	WUT-SC15-A-YYMMDD
							WUT-SC15-B-YYMMDD
							WUT-SC15-Z-YYMMDD
		WUT-SC16	1171222.5	709387.2	-51.7	3.3	WUT-SC16-A-YYMMDD
							WUT-SC16-B-YYMMDD
							WUT-SC16-Z-YYMMDD
		WUT-SC17	1171136.8	709469.0	-52.6	2.4	WUT-SC17-A-YYMMDD
							WUT-SC17-B-YYMMDD
							WUT-SC17-Z-YYMMDD
23		WUT-SC18[4]	1170985.1	709411.5	-51.2	3.8	WUT-SC18-A-YYMMDD
							WUT-SC18-B-YYMMDD
							WUT-SC18-Z1-YYMMDD
							WUT-SC18-Z2-YYMMDD
	27	WUT-SC19	1170832.9	709604.3	-52.7	2.3	WUT-SC19-A-YYMMDD
							WUT-SC19-B-YYMMDD
							WUT-SC19-Z-YYMMDD
		WUT-SC20	1170890.7	709695.1	-54.4	0.6	WUT-SC20-A-YYMMDD
							WUT-SC20-B-YYMMDD
							WUT-SC20-Z-YYMMDD
		WUT-SC21[4]	1170683.9	709703.2	-52.1	2.9	WUT-SC21-A-YYMMDD
							WUT-SC21-B-YYMMDD
							WUT-SC21-Z1-YYMMDD
							WUT-SC21-Z2-YYMMDD
		WUT-SC22	1170811.0	709790.4	-53.7	1.3	WUT-SC22-A-YYMMDD
							WUT-SC22-B-YYMMDD
							WUT-SC22-Z-YYMMDD
		WUT-SC23	1170571.1	709885.9	-52.9	2.1	WUT-SC23-A-YYMMDD
							WUT-SC23-B-YYMMDD
							WUT-SC23-Z-YYMMDD
		WUT-SC24	1170554.8	710013.3	-51.8	3.2	WUT-SC24-A-YYMMDD
							WUT-SC24-B-YYMMDD
							WUT-SC24-Z-YYMMDD

Notes:

--: not applicable

1. Expected surface layer thickness is the difference between the mudline elevation and -55 feet MLLW (bottom of elevation-based surface DMMU).

2. Subsurface layer (B Interval) thickness will be 4 feet, starting at -55 feet MLLW to -59 feet MLLW (elevation-based subsurface DMMU). Z-layer thickness will be 2 feet, starting at -59 feet MLLW to -61 feet MLLW. Intervals to be processed will be determined in the field based on leadline and tidal data.

3. Mudline elevation at this station is at or below the bottom of the surface DMMU elevation (-55 feet MLLW), therefore, a surface interval is not planned for this core.

4. Cores WUT-SC11, -SC18, and SC21 are intended to be collected within 10 feet of the pier face or as close as practically feasible. These cores are located in an area extending 10 feet off the face of the pier, where sediments are planned to be dredged 2 feet deeper in order to support placement of rock for future toe wall support. Therefore, a second Z-layer (Z2) is planned, from -61 feet MLLW to -63 feet MLLW.

ID: identification

MLLW: mean lower low water

Washington SP NAD83: Washington State Plane North American Datum of 1983

Table 3
Sample IDs, Composite Schemes, and Analyses Summary

DMMU/Z-Layer	Location ID	Discrete Sample ID[1]	Composite Sample ID[1]	Analyses[2]										
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain size[3]	Chemistry Archive	Bioassay Archive
Husky Terminal														
1	HT-SC01	HT-SC01-A-YYMMDD	HT-01CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC02	HT-SC02-A-YYMMDD										--	X	
	HT-SC03	HT-SC03-A-YYMMDD										--	X	
2	HT-SC04	HT-SC04-A-YYMMDD	HT-02CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	HT-SC05	HT-SC05-A-YYMMDD										X	X	
	HT-SC06	HT-SC06-A-YYMMDD										--	X	
	HT-SC07	HT-SC07-A-YYMMDD										--	X	
	HT-SC08	HT-SC08-A-YYMMDD										X	X	
3	HT-SC09	HT-SC09-A-YYMMDD	HT-03CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	HT-SC10	HT-SC10-A-YYMMDD										--	X	
	HT-SC11	HT-SC11-A-YYMMDD										X	X	
	HT-SC12	HT-SC12-A-YYMMDD										--	X	
	HT-SC13	HT-SC13-A-YYMMDD										X	X	
	HT-SC14	HT-SC14-A-YYMMDD										--	X	
	HT-SC15	HT-SC15-A-YYMMDD										X	X	
	HT-SC16	HT-SC16-A-YYMMDD										--	X	
	HT-SC17	HT-SC17-A-YYMMDD										X	X	
	HT-SC18	--[4]										--	X	
4	HT-SC19	HT-SC19-A-YYMMDD	HT-04CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC20	HT-SC20-A-YYMMDD										X	X	
	HT-SC21	HT-SC21-A-YYMMDD										--	X	
	HT-SC22	HT-SC22-A-YYMMDD										--	X	
	HT-SC23	HT-SC23-A-YYMMDD										--	X	
	HT-SC24	HT-SC24-A-YYMMDD										X	X	
5	HT-SC25	HT-SC25-A-YYMMDD	HT-05CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC26	HT-SC26-A-YYMMDD										X	X	
	HT-SC27	HT-SC27-A-YYMMDD										X	X	
	HT-SC28	HT-SC28-A-YYMMDD										--	X	
	HT-SC29	HT-SC29-A-YYMMDD										--	X	
	HT-SC30	HT-SC30-A-YYMMDD										X	X	
6	HT-SC04	HT-SC04-B-YYMMDD	HT-06CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	HT-SC05	HT-SC05-B-YYMMDD										X	X	
	HT-SC06	HT-SC06-B-YYMMDD										--	X	
	HT-SC07	HT-SC07-B-YYMMDD										--	X	
	HT-SC08	HT-SC08-B-YYMMDD										X	X	

Table 3
Sample IDs, Composite Schemes, and Analyses Summary

DMMU/Z-Layer	Location ID	Discrete Sample ID[1]	Composite Sample ID[1]	Analyses[2]										
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain size[3]	Chemistry Archive	Bioassay Archive
7	HT-SC09	HT-SC09-B-YYMMDD	HT-07CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	HT-SC10	HT-SC10-B-YYMMDD										--	X	
	HT-SC11	HT-SC11-B-YYMMDD										X	X	
	HT-SC12	HT-SC12-B-YYMMDD										--	X	
	HT-SC13	HT-SC13-B-YYMMDD										X	X	
8	HT-SC14	HT-SC14-B-YYMMDD	HT-08CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC15	HT-SC15-B-YYMMDD										X	X	
	HT-SC16	HT-SC16-B-YYMMDD										--	X	
	HT-SC17	HT-SC17-B-YYMMDD										X	X	
	HT-SC18	HT-SC18-B-YYMMDD										--	X	
9	HT-SC19	HT-SC19-B-YYMMDD	HT-09CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC20	HT-SC20-B-YYMMDD										X	X	
	HT-SC21	HT-SC21-B-YYMMDD										--	X	
	HT-SC22	HT-SC22-B-YYMMDD										--	X	
	HT-SC23	HT-SC23-B-YYMMDD										--	X	
	HT-SC24	HT-SC24-B-YYMMDD										X	X	
10	HT-SC25	HT-SC25-B-YYMMDD	HT-10CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	HT-SC26	HT-SC26-B-YYMMDD										X	X	
	HT-SC27	HT-SC27-B-YYMMDD										X	X	
	HT-SC28	HT-SC28-B-YYMMDD										--	X	
	HT-SC29	HT-SC29-B-YYMMDD										--	X	
	HT-SC30	HT-SC30-B-YYMMDD										X	X	

Table 3
Sample IDs, Composite Schemes, and Analyses Summary

DMMU/Z-Layer	Location ID	Discrete Sample ID[1]	Composite Sample ID[1]	Analyses[2]										
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain size[3]	Chemistry Archive	Bioassay Archive
Z-Layer Samples (All DMMUs)	HT-SC04	HT-SC04-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC05	HT-SC05-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC06	HT-SC06-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC07	HT-SC07-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC08	HT-SC08-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC09	HT-SC09-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC10	HT-SC10-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC11	HT-SC11-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC12	HT-SC12-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC13	HT-SC13-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC14	HT-SC14-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC15	HT-SC15-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC16	HT-SC16-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC17	HT-SC17-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC18	HT-SC18-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC19	HT-SC19-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC20	HT-SC20-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC21	HT-SC21-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC22	HT-SC22-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC23	HT-SC23-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC24	HT-SC24-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC25	HT-SC25-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC26	HT-SC26-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC27	HT-SC27-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	HT-SC28	HT-SC28-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC29	HT-SC29-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	HT-SC30	HT-SC30-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
Washington United Terminals														
20	WUT-SC01	WUT-SC01-A-YYMMDD	WUT-20CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	WUT-SC02	WUT-SC02-A-YYMMDD										--	X	
	WUT-SC03	--[4]										--	X	
	WUT-SC04	WUT-SC04-A-YYMMDD										X	X	
	WUT-SC05	WUT-SC05-A-YYMMDD										X	X	
	WUT-SC06	WUT-SC06-A-YYMMDD										--	X	
21	WUT-SC07	WUT-SC07-A-YYMMDD	WUT-21CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	WUT-SC08	WUT-SC08-A-YYMMDD										X	X	
	WUT-SC09	WUT-SC09-A-YYMMDD										--	X	
	WUT-SC10	WUT-SC10-A-YYMMDD										X	X	

Table 3
Sample IDs, Composite Schemes, and Analyses Summary

DMMU/Z-Layer	Location ID	Discrete Sample ID[1]	Composite Sample ID[1]	Analyses[2]										
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain size[3]	Chemistry Archive	Bioassay Archive
22	WUT-SC11	WUT-SC11-A-YYMMDD	WUT-22CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	WUT-SC12	WUT-SC12-A-YYMMDD										--	X	
	WUT-SC13	WUT-SC13-A-YYMMDD										--	X	
	WUT-SC14	WUT-SC14-A-YYMMDD										X	X	
	WUT-SC15	WUT-SC15-A-YYMMDD										--	X	
	WUT-SC16	WUT-SC16-A-YYMMDD										--	X	
	WUT-SC17	WUT-SC17-A-YYMMDD										--	X	
23	WUT-SC18	WUT-SC18-A-YYMMDD	WUT-23CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	WUT-SC19	WUT-SC19-A-YYMMDD										--	X	
	WUT-SC20	WUT-SC20-A-YYMMDD										X	X	
	WUT-SC21	WUT-SC21-A-YYMMDD										X	X	
	WUT-SC22	WUT-SC22-A-YYMMDD										--	X	
	WUT-SC23	WUT-SC23-A-YYMMDD										--	X	
	WUT-SC24	WUT-SC24-A-YYMMDD										X	X	
24	WUT-SC01	WUT-SC01-B-YYMMDD	WUT-24CS-YYMMDD	X	X	X	X	X	X	X	X	X	X	X
	WUT-SC02	WUT-SC02-B-YYMMDD										--	X	
	WUT-SC03	WUT-SC03-B-YYMMDD										--	X	
	WUT-SC04	WUT-SC04-B-YYMMDD										X	X	
	WUT-SC05	WUT-SC05-B-YYMMDD										X	X	
	WUT-SC06	WUT-SC06-B-YYMMDD										--	X	
25	WUT-SC07	WUT-SC07-B-YYMMDD	WUT-25CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	WUT-SC08	WUT-SC08-B-YYMMDD										X	X	
	WUT-SC09	WUT-SC09-B-YYMMDD										--	X	
	WUT-SC10	WUT-SC10-B-YYMMDD										X	X	
	WUT-SC11	WUT-SC11-B-YYMMDD										X	X	
	WUT-SC12	WUT-SC12-B-YYMMDD										--	X	
26	WUT-SC13	WUT-SC13-B-YYMMDD	WUT-26CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	WUT-SC14	WUT-SC14-B-YYMMDD										X	X	
	WUT-SC15	WUT-SC15-B-YYMMDD										--	X	
	WUT-SC16	WUT-SC16-B-YYMMDD										--	X	
	WUT-SC17	WUT-SC17-B-YYMMDD										--	X	
	WUT-SC18	WUT-SC18-B-YYMMDD										X	X	
27	WUT-SC19	WUT-SC19-B-YYMMDD	WUT-27CS-YYMMDD	X	X	X	X	X	X	X	X	--	X	X
	WUT-SC20	WUT-SC20-B-YYMMDD										X	X	
	WUT-SC21	WUT-SC21-B-YYMMDD										X	X	
	WUT-SC22	WUT-SC22-B-YYMMDD										--	X	
	WUT-SC23	WUT-SC23-B-YYMMDD										--	X	
	WUT-SC24	WUT-SC24-B-YYMMDD										X	X	

Table 3
Sample IDs, Composite Schemes, and Analyses Summary

DMMU/Z-Layer	Location ID	Discrete Sample ID[1]	Composite Sample ID[1]	Analyses[2]										
				TS/TVS/TOC	NH_3/ S^{2-}	Metals	Butyltins	SVOCs	Pesticides	PCBs	D/F	Grain size[3]	Chemistry Archive	Bioassay Archive
Z-Layer Samples	WUT-SC01	WUT-SC01-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC02	WUT-SC02-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC03	WUT-SC03-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC04	WUT-SC04-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC05	WUT-SC05-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC06	WUT-SC06-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC07	WUT-SC07-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC08	WUT-SC08-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC09	WUT-SC09-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC10	WUT-SC10-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC11	WUT-SC11-Z1-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC11	WUT-SC11-Z2-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC12	WUT-SC12-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC13	WUT-SC13-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC14	WUT-SC14-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC15	WUT-SC15-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC16	WUT-SC16-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC17	WUT-SC17-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC18	WUT-SC18-Z1-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC18	WUT-SC18-Z2-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC19	WUT-SC19-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC20	WUT-SC20-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC21	WUT-SC21-Z1-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC21	WUT-SC21-Z2-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--
	WUT-SC22	WUT-SC22-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC23	WUT-SC23-Z-YYMMDD	--	--	--	--	--	--	--	--	--	--	X	--
	WUT-SC24	WUT-SC24-Z-YYMMDD	--	--	--	--	--	--	--	--	--	X	X	--

Notes:

1. Archive aliquots will be collected for all discrete sample intervals and all composite samples.
2. Atterberg testing will be conducted on up to 25% of representative discrete samples. Samples will be selected based on field observations of grain size and plasticity.
3. Grain size testing will be conducted on discrete samples.
4. Mudline elevation at this station is at or below the bottom of the surface DMMU elevation (-55 feet MLLW), therefore, a surface interval is not planned for this core.
5. Note two Z-layers will be collected at these stations. Each Z-layer will be 2 feet thick.

--: not applicable
D/F: dioxins/furans
DMMU: Dredged Material Management Unit
ID: identification
MLLW: mean lower low water
NH_3: Ammonia
PCB: polychlorinated biphenyl
S^{2-}: sulfide
SVOCs: semivolatile organic compounds
TOC: total organic carbon
TS: total solids
TVS: total volatile solids
Washington SP NAD83: Washington State Plane North American Datum of 1983

Table 4
Parameters for Analysis, Methods, Screening Levels, and Target Reporting Limits

Parameter	Analytical Method	Method Detection Limit	Reporting Limit	Marine DMMP Guidelines			SMS Marine Sediment		Marine SMS AET	
				Screening Level	Bioaccumulation Trigger	Maximum Level	Sediment Cleanup Objective	Cleanup Screening Level	Sediment Cleanup Objective	Cleanup Screening Level
Conventional Parameters (%)										
Total solids	SM2540G/PSEP	--	0.1	--	--	--	--	--	--	--
Total volatile solids	SM2540G/PSEP	--	0.1	--	--	--	--	--	--	--
Total organic carbon	EPA 9060A Mod	--	0.1	--	--	--	--	--	--	--
Grain size	PSEP/ASTM D422 Modified[1]	--	0.1	--	--	--	--	--	--	--
Atterberg Limits	ASTM D4318	--	--	--	--	--	--	--	--	--
Conventional Parameters (mg/kg)										
Ammonia	SM 4500-NH3	0.400	0.400	--	--	--	--	--	--	--
Sulfide	SM 4500-S2	1.00	1.00	--	--	--	--	--	--	--
Metals (mg/kg dry weight)										
Antimony	EPA 6020B	0.10	0.20	150	--	200	--	--	--	--
Arsenic	EPA 6020B	0.038	0.20	57	507.1	700	57	93	57	93
Cadmium	EPA 6020B	0.040	0.10	5.1	--	14	5.1	6.7	5.1	6.7
Chromium	EPA 6020B	0.26	0.50	260	--	--	260	270	260	270
Copper	EPA 6020B	0.35	0.50	390	--	1,300	390	390	390	390
Lead	EPA 6020B	0.052	0.10	450	975	1,200	450	530	450	530
Mercury	EPA 7471B	0.0053	0.025	0.41	1.5	2.3	0.41	0.59	0.41	0.59
Selenium[2]	EPA 6020B	0.18	0.50	--	3	--	--	--	--	--
Silver	EPA 6020B	0.022	0.20	6.1	--	8.4	6.1	6.1	6.1	6.1
Zinc	EPA 6020B	2.9	6.0	410	--	3,800	410	960	410	960
Butyltins (µg/kg dry weight)										
Tributyltin ion	Krone/8270E-SIM	0.5	3.9	--	73	--	--	--	--	--
Semivolatile Organic Compounds (µg/kg dry weight)										
Polycyclic Aromatic Hydrocarbons							**mg/kg OC**		**µg/kg dry weight**	
2-Methylnaphthalene	EPA 8270E	4.5	20	670	---	1,900	38	64	670	670
Acenaphthene	EPA 8270E	5.2	20	500	---	2,000	16	57	500	500
Acenaphthylene	EPA 8270E	6.2	20	560	---	1,300	66	66	1,300	1,300
Anthracene	EPA 8270E	7.2	20	960	---	13,000	220	1,200	960	960
Benzo(a)anthracene	EPA 8270E	6.0	20	1,300	---	5,100	110	270	1,300	1,600
Benzo(a)pyrene	EPA 8270E	4.2	20	1,600	---	3,600	99	210	1,600	1,600
Benzo(b,j,k)fluoranthenes	EPA 8270E	10	40	670	---	3,200	230	450	3,200	3,600
Benzo(g,h,i)perylene	EPA 8270E	14	20	1,400	---	21,000	31	78	670	720
Chrysene	EPA 8270E	6.1	20	230	---	1,900	110	460	1,400	2,800
Dibenz(a,h)anthracene	EPA 8270E-SIM	0.91	5.0	1,700	4,600	30,000	12	33	230	230
Fluoranthene	EPA 8270E	6.1	20	540	---	3,600	160	1,200	1,700	2,500
Fluorene	EPA 8270E	15	20	600	---	4,400	23	79	540	540
Indeno(1,2,3-cd)pyrene	EPA 8270E	15	20	2,100	---	2,400	34	88	600	690
Naphthalene	EPA 8270E	4.2	20	1,500	---	21,000	99	170	2,100	2,100
Phenanthrene	EPA 8270E	8.7	20	2,600	11,980	16,000	100	480	1,500	1,500
Pyrene	EPA 8270E	5.7	20	3,200	---	9,900	1,000	1,400	2,600	3,300
Total LPAH (U = 0)[3]	EPA 8270E	--	--	5,200	---	29,000	370	780	5,200	5,200

Table 4
Parameters for Analysis, Methods, Screening Levels, and Target Reporting Limits

Parameter	Analytical Method	Method Detection Limit	Reporting Limit	Marine DMMP Guidelines			SMS Marine Sediment		Marine SMS AET	
				Screening Level	Bioaccumulation Trigger	Maximum Level	Sediment Cleanup Objective	Cleanup Screening Level	Sediment Cleanup Objective	Cleanup Screening Level
Total HPAHs (U = 0)[4]	EPA 8270E	--	--	12,000	---	69,000	960	5,300	12,000	17,000
Total PAHs (U = 0)[5]	Calculated	--	--	--	--	--	--	--	--	--
Chlorinated Hydrocarbons							**mg/kg OC**		**µg/kg dry weight**	
1,4-Dichlorobenzene	EPA 8270E-SIM	0.6	5.0	110	--	120	3.1	9	110	110
1,2-Dichlorobenzene	EPA 8270E-SIM	0.7	5.0	35	--	110	2.3	2.3	35	50
1,2,4-Trichlorobenzene	EPA 8270E-SIM	2.7	5.0	31	--	64	0.81	1.8	31	51
Hexachlorobenzene	EPA 8270E-SIM	0.7	5.0	22	168	230	0.38	2.3	22	70
Phthalates							**mg/kg OC**		**µg/kg dry weight**	
Dimethyl phthalate	EPA 8270E-SIM	1.0	5.0	71	--	1,400	53	53	71	160
Diethyl phthalate	EPA 8270E-SIM	4.8	20	200	--	1,200	61	110	200	>1,200
Di-n-butyl phthalate	EPA 8270E	5.6	20	1,400	--	5,100	220	1,700	1,400	1,400
Butyl benzyl phthalate	EPA 8270E-SIM	0.68	5.0	63	--	970	4.9	64	63	900
Bis(2-ethylhexyl) phthalate	EPA 8270E	5.5	50	1,300	--	8,300	47	78	1300	1900
Di-n-octyl phthalate	EPA 8270E	4.4	20	6,200	--	6,200	58	4,500	6,200	6,200
Phenols (µg/kg dry weight)							**µg/kg dry weight**		**µg/kg dry weight**	
Phenol	EPA 8270E-SIM	2.2	5.0	420	--	1,200	420	1,200	420	1,200
2-Methylphenol	EPA 8270E-SIM	1.1	5.0	63	--	77	63	63	63	63
4-Methylphenol	EPA 8270E-SIM	0.9	5.0	670	--	3,600	670	670	670	670
2,4-Dimethylphenol	EPA 8270E-SIM	2.2	20	29	--	210	29	29	29	29
Pentachlorophenol	EPA 8270E-SIM	2.1	20	400	504	690	360	690	360	690
Miscellaneous Extractables (µg/kg dry weight)							**mg/kg OC (unless noted)**		**µg/kg dry weight**	
Benzyl Alcohol	EPA 8270E-SIM	2.5	20	57	--	870	57 dry weight	73 dry weight	57	73
Benzoic Acid	EPA 8270E-SIM	13	100	650	--	760	650 dry weight	650 dry weight	650	650
Dibenzofuran	EPA 8270E	14	20	540	--	1,700	15	58	540	540
Hexachlorobutadiene	EPA 8270E-SIM	0.72	5.0	11	--	270	3.9	6.2	11	120
N-Nitrosodiphenylamine	EPA 8270E-SIM	1.3	5.0	28	--	--	11	11	28	40
Carbazole	EPA 8270E	4.3	20	--	--	--	3.9	6.2	11	120
Pesticides (µg/kg dry weight)										
2,4'-DDD	EPA 8081B	0.20	1.0	--	--	--	--	--	--	--
2,4'-DDE	EPA 8081B	0.25	1.0	--	--	--	--	--	--	--
2,4'-DDT	EPA 8081B	0.19	1.0	--	--	--	--	--	--	--
4,4'-DDD	EPA 8081B	0.32	1.0	16	--	--	--	--	--	--
4,4'-DDE	EPA 8081B	0.14	1.0	9	--	--	--	--	--	--
4,4'-DDT	EPA 8081B	0.32	1.0	12	--	--	--	--	--	--
2,4'-DDD and 4,4'-DDD	Calculated	--	--	--	--	--	--	--	--	--
2,4'-DDE and 4,4'-DDE	Calculated	--	--	--	--	--	--	--	--	--
2,4'-DDT and 4,4'-DDT	Calculated	--	--	--	--	--	--	--	--	--
Total DDT (U = 0)[6]	Calculated	--	--	--	50	69	--	--	--	--
Aldrin	EPA 8081B	--	--	9.5	--	--	--	--	--	--
beta-HCH	EPA 8081B	0.09	0.50	--	--	--	--	--	--	--
Dieldrin	EPA 8081B	0.12	1.0	1.9	--	1,700	--	--	--	--
Endrin ketone	EPA 8081B	0.28	1.0	--	--	--	--	--	--	--

Table 4
Parameters for Analysis, Methods, Screening Levels, and Target Reporting Limits

Parameter	Analytical Method	Method Detection Limit	Reporting Limit	Marine DMMP Guidelines			SMS Marine Sediment		Marine SMS AET	
				Screening Level	Bioaccumulation Trigger	Maximum Level	Sediment Cleanup Objective	Cleanup Screening Level	Sediment Cleanup Objective	Cleanup Screening Level
Heptachlor	EPA 8081B	0.05	0.50	1.5	--	270	--	--	--	--
cis-chlordane	EPA 8081B	0.1	0.5	--	--	--	--	--	--	--
trans-chlordane	EPA 8081B	0.3	0.5	--	--	--	--	--	--	--
cis-nonchlor	EPA 8081B	0.2	0.5	--	--	--	--	--	--	--
trans-nonachlor	EPA 8081B	0.2	0.5	--	--	--	--	--	--	--
oxychlordane	EPA 8081B	0.1	0.5	--	--	--	--	--	--	--
Total Chlordane (U = 0)[7]	EPA 8081B	--	--	2.8	37	--	--	--	--	--
PCBs (µg/kg dry weight)										
Aroclor 1016	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1221	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1232	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1242	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1248	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1254	EPA 8082A	8.0	20	--	--	--	--	--	--	--
Aroclor 1260	EPA 8082A	9.3	20	--	--	--	**mg/kg OC**		**µg/kg dry weight**	
Total Aroclor PCBs (U = 0)[8]	EPA 8082A	9.3	20	130	38 mg/kg OC	3,100	12	65	130	1,000
Dioxin/Furans (ng/kg dry weight)[9]										
Dioxins										
2,3,7,8-TCDD	EPA 1613B	0.15	1.0	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	EPA 1613B	0.17	1.0	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	EPA 1613B	0.17	1.0	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	EPA 1613B	0.18	1.0	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	EPA 1613B	0.22	1.0	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	EPA 1613B	0.56	2.5	--	--	--	--	--	--	--
OCDD	EPA 1613B	4.60	10	--	--	--	--	--	--	--
Furans										
2,3,7,8-TCDF	EPA 1613B	0.06	1.0	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	EPA 1613B	0.24	1.0	--	--	--	--	--	--	--
2,3,4,7,8,-PeCDF	EPA 1613B	0.22	1.0	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	EPA 1613B	0.28	1.0	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	EPA 1613B	0.20	1.0	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	EPA 1613B	0.19	1.0	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	EPA 1613B	0.17	1.0	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	EPA 1613B	0.21	1.0	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	EPA 1613B	0.24	1.0	--	--	--	--	--	--	--
OCDF	EPA 1613B	1.10	2.5	--	--	--	--	--	--	--
Total TEQ (U = 0)	--	--	--	4.0	10	--	--	--	--	--
Total TEQ (U = 1/2 EDL)	--	--	--	4.0	10	--	--	--	--	--
Bioassay										
10 day Amphipod Mortality	PSEP	--	--	--	--	--	--	--	--	--
Larval Development	PSEP	--	--	--	--	--	--	--	--	--
20 day *Neanthes* Growth	PSEP	--	--	--	--	--	--	--	--	--

Table 4
Parameters for Analysis, Methods, Screening Levels, and Target Reporting Limits

Notes:

1. One of the following sieve series must be used: (1) sieve numbers 5, 10, 18, 35, 60, 120, and 230 (PSEP) or (2) sieve numbers 4, 10, 20, 40, 60, 140, 200, and 230 (ASTM D-422 modified). In both protocols, fine-grained material is defined as the material passing the No. 230 sieve.
2. Because no screening level value exists for toxicity testing, selenium will only be evaluated for its bioaccumulation potential.
3. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
4. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
5. Total PAHs consists of the sum of all PAHs listed.
6. Total DDT consists of the sum of 4,4'-DDD; 4,4'-DDE; and 4,4'-DDT.
7. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.
8. Total PCBs include the sum of the following Aroclors: 1016, 1221, 1232, 1242, 1248, 1254, and 1260. If present, Aroclor-1262 and 1268 should be reported but not included in the total PCB summation.
9. Dioxin/furan results will be reported to sample and analysis-specific estimated detection limits.

Greater than (>) values indicate that the upper bound of toxicity level is unknown, but is known to be above the concentration shown.
µg/kg: micrograms per kilogram
AET: Apparent Effects Threshold
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethylene
DDT: dichlorodiphenyltrichloroethane
EPA: U.S. Environmental Protection Agency
HPAH: high-molecular-weight PAHs
LPAH: low-molecular-weight PAHs
mg/kg: milligram per kilogram
mg/L: milligram per liter
ng/kg: nanograms per kilogram
OC: organic carbon-normalized
PAHs: polycyclic aromatic hydrocarbons
PCBs: polychlorinated bipheynls
PSEP: Puget Sound Estuary Program
SMS: Sediment Management Standards
TEQ: toxic equivalency

Table 5
Sample Handling and Storage Guidelines

Parameter	Sample Size	Container Size and Type[1]	Holding Time	Preservative
Grain size	250 g	16 oz glass or HDPE or ziptop bag	6 months	4°C ± 2°C
Atterberg Limits	200 g		None	
Total solids/total volatile solids/total organic carbon	250 g	8-oz glass	6 months; 28 days for mercury	4°C ± 2°C
			2 years; 1 year for mercury	-18°C ± 2°C
Ammonia	25 g		14 days	4°C ± 2°C
Total metals	50 g		6 months	-18°C ± 10°C
			7 days	4°C ± 2°C
Sulfide	50 g	2-oz glass; no headspace	7 days	ZnAc/NaOH to pH>9; 4°C ± 2°C
SVOCs, PCBs, pesticides, butyltins	200 g	16-oz glass	14 days until extraction	4°C ± 2°C
			1 year until extraction	-18°C ± 2°C
			40 days after extraction	4°C ± 2°C
Dioxins/furans	10 g	4-oz amber glass	1 year until extraction	-18°C ± 2°C
			1 year after extraction	
Chemistry archive	500 g	16-oz glass	varies	-18°C ± 2°C
Bioassay archive	8 L	Plastic bag, no headspace	8 weeks	4°C ± 2°C

Notes:

1. Sample containers may vary based on availability at the time of sample collection.

g: grams

L: liters

HDPE: high-density polyethylene

NaOH: sodium hydroxide

oz: ounce

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound

ZnAc: zinc acetate

Table 6
Laboratory Quality Assurance/Quality Control Requirements

Parameter	Laboratory Quality Control Elements								
	Initial Calibration	Continuing Calibration	Duplicates	Triplicates	Laboratory Control Sample	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogates/Labeled Compounds
Atterberg Limits	Each batch[1]	NA	NA	NA	NA	NA	NA	NA	NA
Grain size	Each batch[1]	NA	NA	Per batch	NA	NA	NA	NA	NA
Total solids/total volatile solids	Each batch[1]	NA	NA	Per batch	NA	NA	NA	NA	NA
Total organic carbon	Daily or each batch	1 per 10 samples	NA	Per batch	1 per 20 samples	NA	NA	1 per 20 samples	NA
Metals	Daily	1 per 10 samples	Per batch	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA
Ammonia	Daily or each batch	1 per 10 samples	NA	Per batch	1 per 20 samples	NA	NA	1 per 20 samples	NA
Sulfide	Daily or each batch	1 per 10 samples	NA	Per batch	1 per 20 samples	NA	NA	1 per 20 samples	NA
Butyltins	As needed[2]	Every 12 hours[3]	NA	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
SVOCs	As needed[2]	Every 12 hours[3]	NA	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Pesticides	As needed[2]	1 per 10 samples[3]	NA	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
PCBs	As needed[2]	1 per 10 samples[3]	NA	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Dioxins/furans	As needed[2]	Every 12 hours[3]	Per batch	NA	1 per 20 samples	NA[3]	NA[3]	1 per 20 samples	Every sample[4]

Notes:
1. Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
2. Initial calibrations are considered valid until the continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
3. Continuing calibrations at the beginning and end of each batch and every 10 samples.
4. Isotope dilution with labeled compounds required in every sample and used in place of MS/MSDs.

MS: matrix spike
MSD: matrix spike duplicate
NA: not applicable
PCB: polychlorinated biphenyl
SVOC: semivolatile organic compound

Table 7
Laboratory Data Quality Objectives

Parameter	Laboratory Replicate Precision[1,2]	Accuracy	Surrogates/Labeled Compounds	Completeness
Grain size	NA	NA	NA	95%
Total solids/total volatile solids	± 20% RSD	NA	NA	95%
Total organic carbon	± 20% RSD	75%–125% R	NA	95%
Ammonia	± 20% RSD	75%–125% R	NA	95%
Sulfide	± 20% RSD	75%–125% R	NA	95%
Total metals	± 20% RPD	75%–125% R	NA	95%
Butyltins	± 35% RPD	50%–150% R	Laboratory limits	95%
SVOCs	± 35% RPD	50%–150% R	Laboratory limits	95%
Pesticides	± 35% RPD	50%–150% R	Laboratory limits	95%
PCBs	± 35% RPD	50%–150% R	Laboratory limits	95%
Dioxins/furans	± 30% RPD	50%–150% R	Laboratory limits	95%

Notes:

1. Parent and/or replicate results that are less than five times reporting limits will be evaluated by using the difference between results using a control limit of ±2x RL.

2. Laboratory replicate precision control limits apply to laboratory replicates, LCS/LCSD, and MS/MSD precision results.

LCS: laboratory control sample

LCSD: laboratory control sample duplicate

MS: matrix spike

MSD: matrix spike duplicate

NA: not applicable

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

R: recovery

RL: reporting limit

RPD: relative percent difference

RSD: relative standard deviation

SVOC: semivolatile organic compound

Table 8

Bioassay Performance Standards and Evaluation Guidelines

Bioassay	Negative Control Performance Standard	Reference Sediment Performance Standard	Dispersive Disposal Site Interpretation Guidelines		Nondispersive Disposal Site Interpretation Guidelines	
			1-hit rule	2-hit rule	1-hit rule	2-hit rule
Amphipod Mortality	$M_C \leq 10\%$	$M_R - M_C \leq 20\%$	$\lvert M_T - M_C \rvert > 20\%$ and M_T vs. M_R SD (p=.05) **AND**			
			$M_T - M_R > 10\%$	NOCN	$M_T - M_R > 30\%$	NOCN
Larval Development	$N_C / I \geq 0.70$	$N_R / N_C \geq 0.65$	$N_T / N_C < 0.80$ and N_T/N_C vs. N_R/N_C SD (p=.10) **AND**			
			$N_R/N_C - N_T/N_C > 0.15$	NOCN	$N_R/N_C - N_T/N_C > 0.30$	NOCN
Neanthes Growth	$M_C \leq 10\%$ and $MIG_C \geq 0.38$	$M_R \leq 20\%$ and $MIG_R / MIG_C \geq 0.80$	$MIG_T / MIG_C < 0.80$ and MIG_T vs. MIG_R SD (p=.05) **AND**			
			$MIG_T/MIG_R < 0.70$	NOCN	$MIG_T/MIG_R < 0.50$	$MIG_T/MIG_R < 0.70$

Notes:

C: negative control

I: initial count

M: Mortality

MIG: mean individual growth rate (milligrams/individual/day)

N: normal larvae

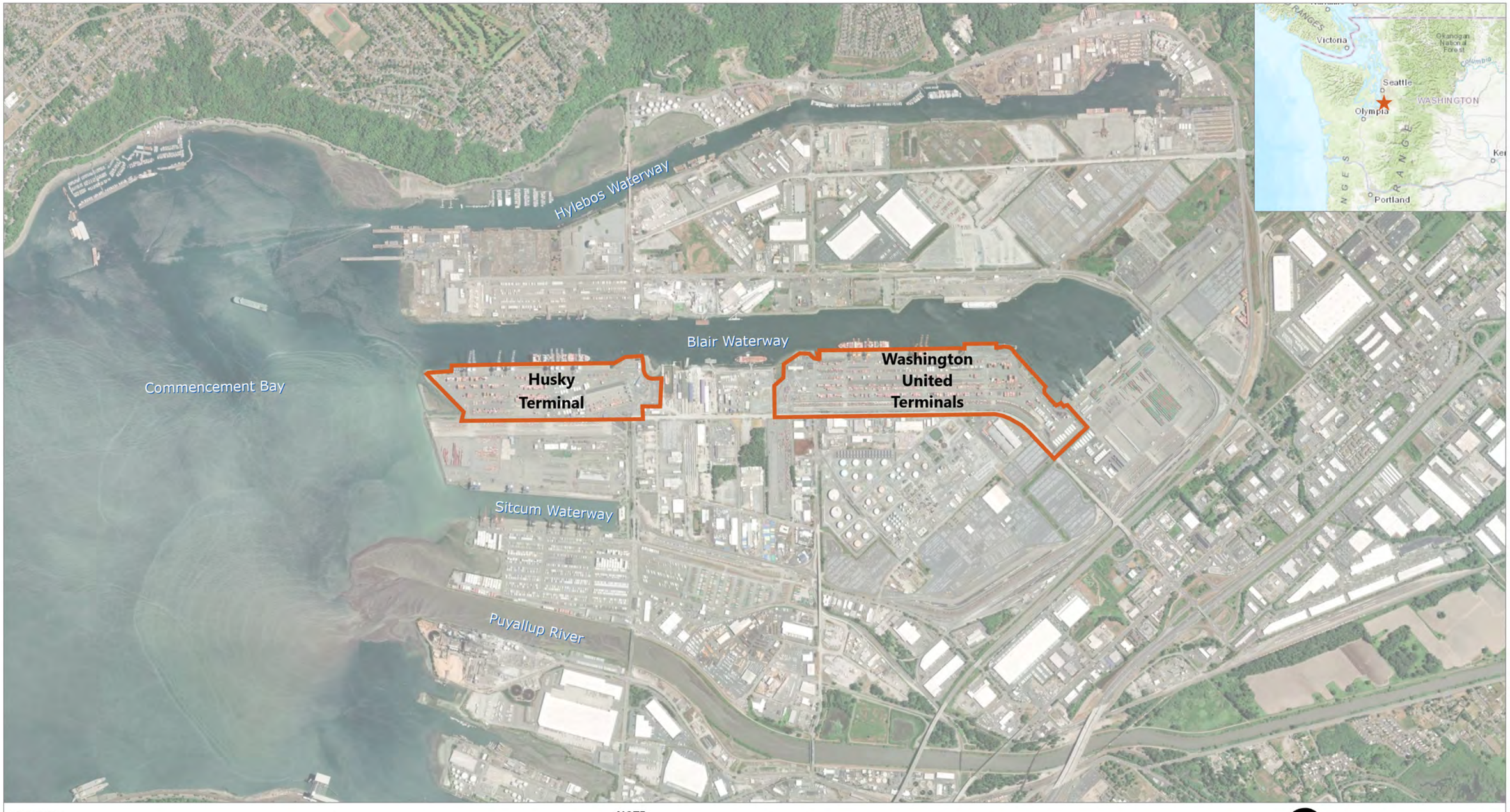
NOCN: no other conditions necessary

R : reference sediment

SD: statistically significant difference

T: test sediment

Figures



LEGEND:

Property Boundary

NOTE:

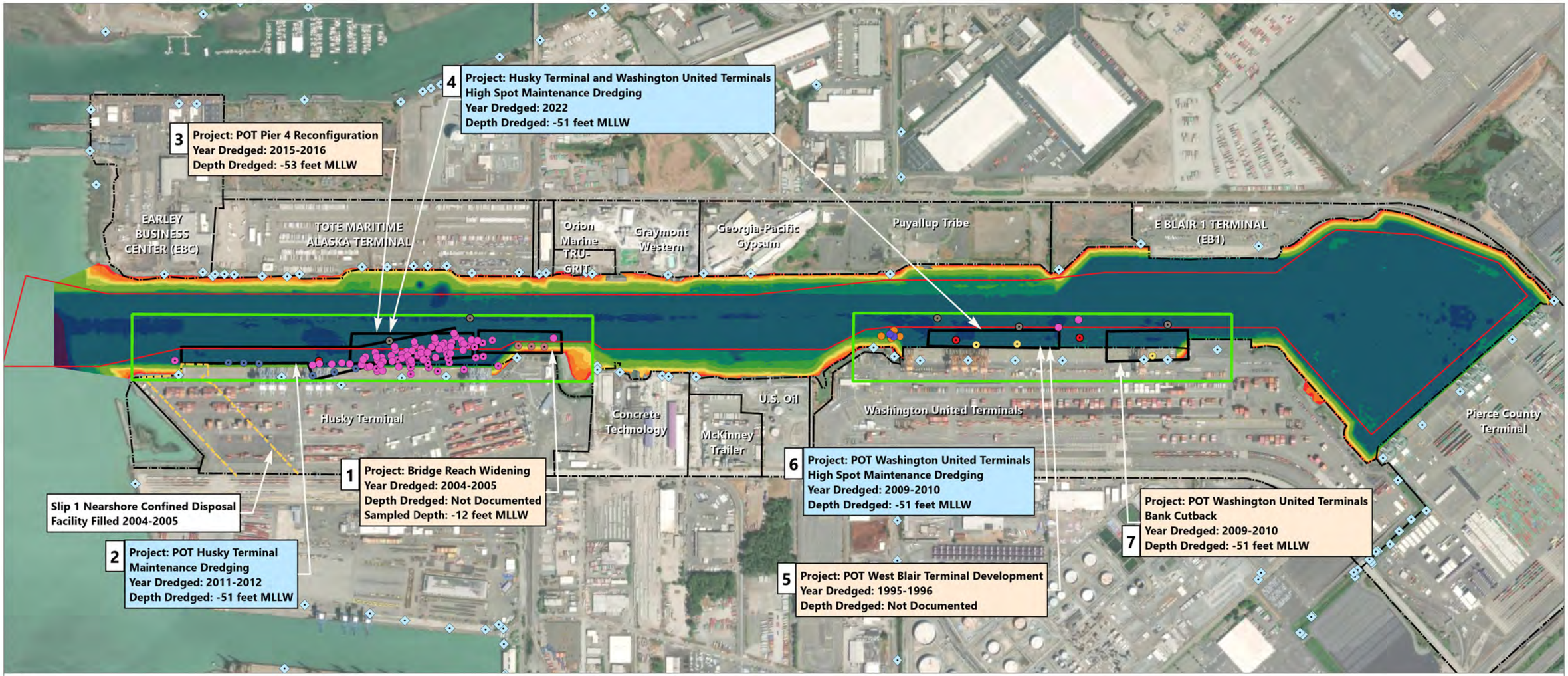
1. Imagery sources: World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, and NPS; World Imagery: Maxar

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Figure 1
Project Sites and Vicinity
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization



LEGEND:

- Outfall
- Project Berths and Vicinity
- Pre-Engineering Design Boundary
- Former Slip 1 High Water Line (Approx.)
- Property Boundary
- Historical Dredged Material Characterization Area

Historical Surface Sample Location

- 2007
- 2008
- 2014
- 2022

Historical Subsurface Sample Location

- 2004
- 2009
- 2011
- 2014
- 2019
- 2020

MLLW Elevation (Feet)

- -74 to -61
- -61 to -55
- -55 to -50
- -50 to -45
- -45 to -40
- -40 to -25
- -25 to -20
- -20 to -15
- -15 to -10
- -10 to -5
- -5 to 0
- 0 to 20

Note Boxes

- Maintenance Dredging to Remove High Spots
- Dredging Resulted in Deepening or Widening that Exposed Native Material

NOTES:

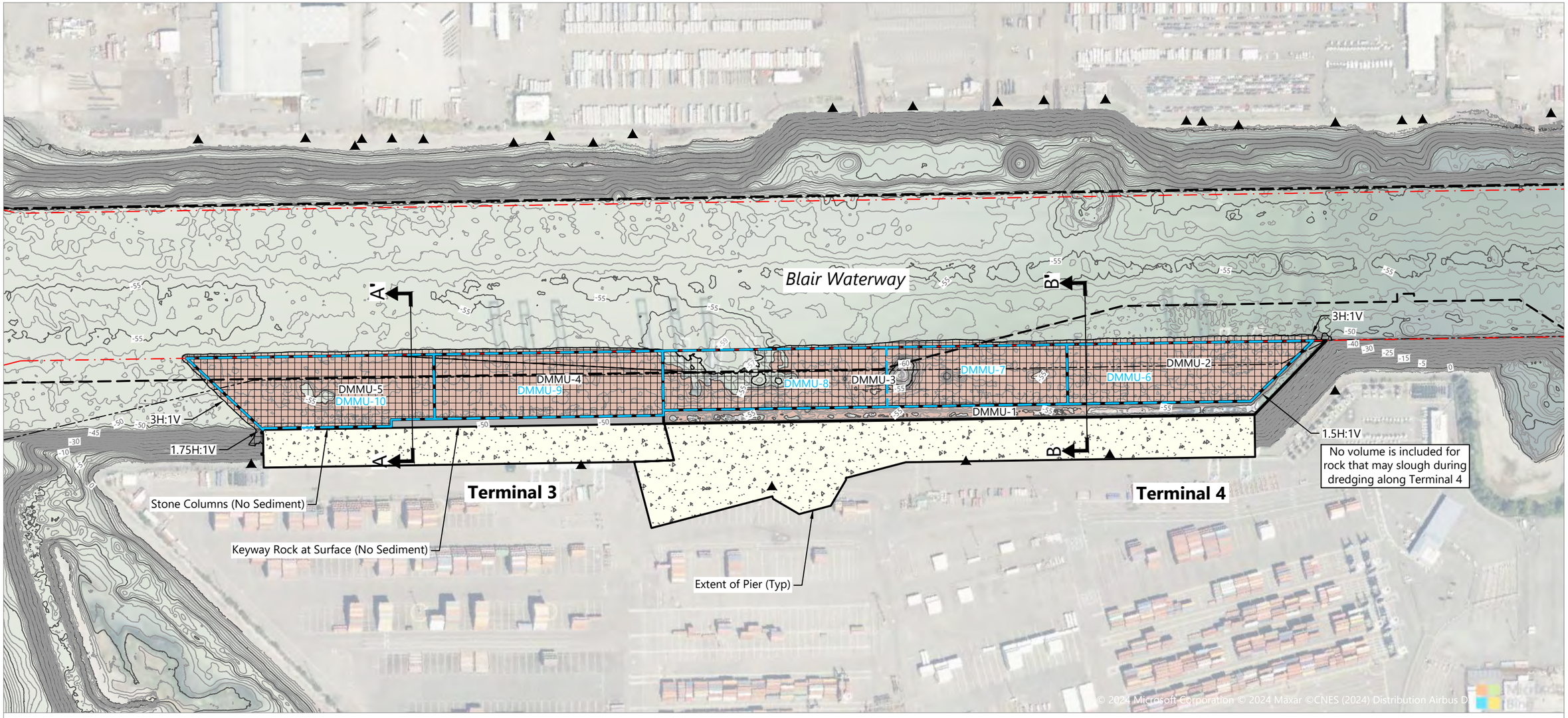
1. Historical sampling locations include data from EIM collected between 2018 and 2022.
2. Numbers correspond to project descriptions in Table A-1.
3. Bathymetry Source: Survey by USACE, dated October 27, 2021, and David Evans Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022.
4. Imagery source: Maxar
5. Abbreviations:
   EIM: Environment Information Management
   MLLW: mean lower low water
   POT: Port of Tacoma
   USACE: U.S. Army Corps of Engineers

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Feet

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Figure 2
Project Overview
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

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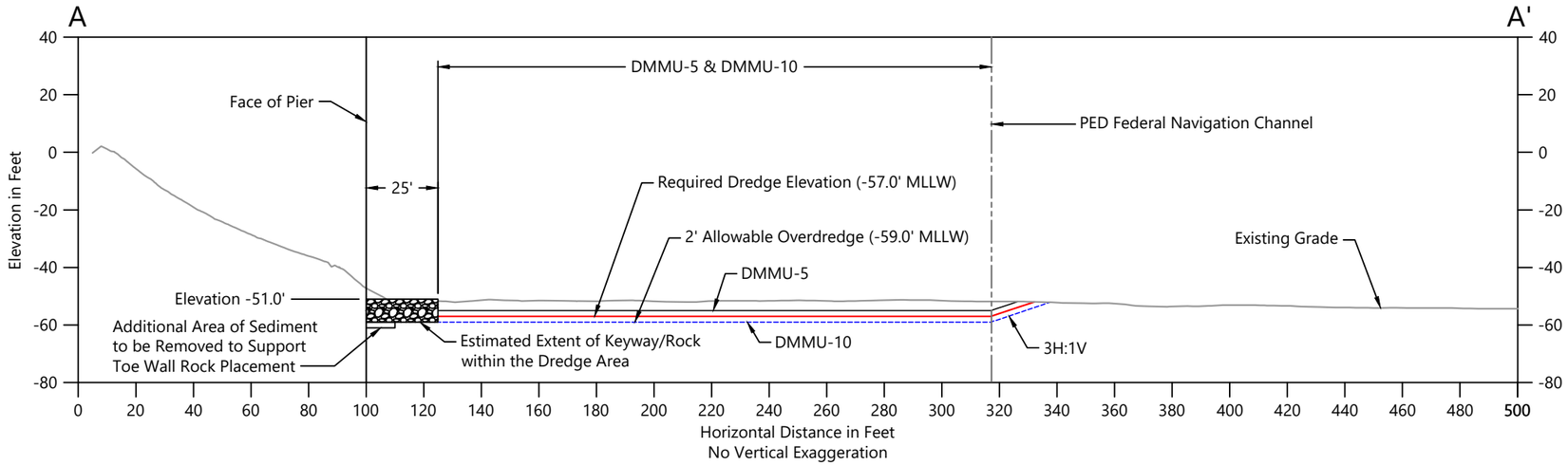
- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- -55 Existing Contours (1' & 5' Intervals)
- Outfall
- DMMU-1 Proposed Surface DMMU
- DMMU-6 Proposed Subsurface DMMU

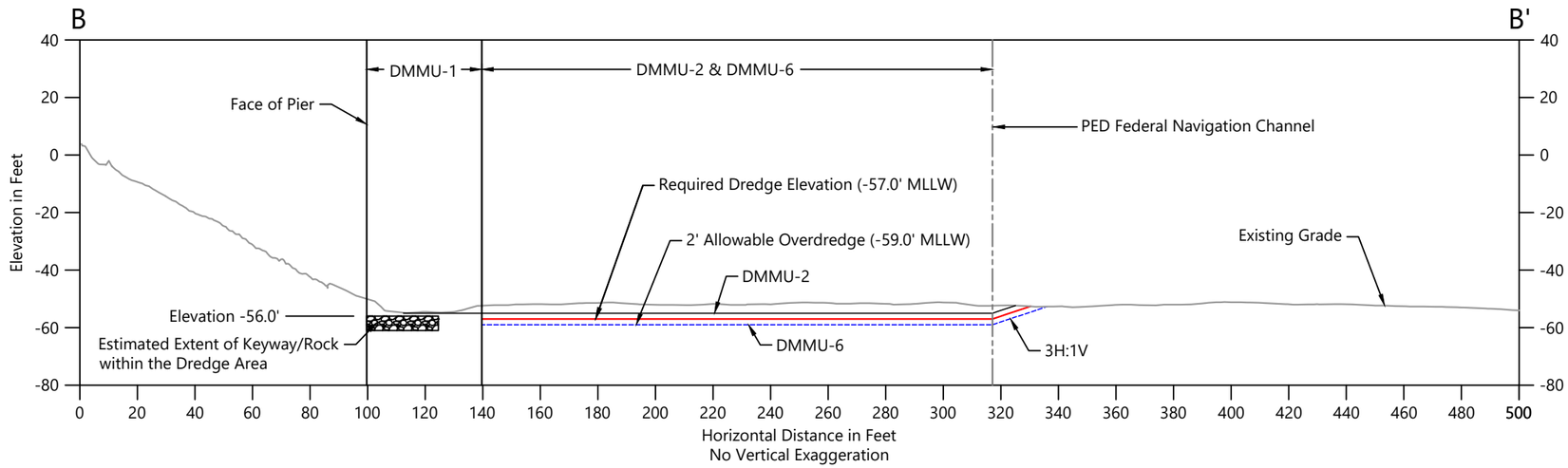
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Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 3a

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Figure 3a
Existing Conditions and Dredge Plan for Husky Terminal
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization





SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022.
VERTICAL DATUM: MLLW

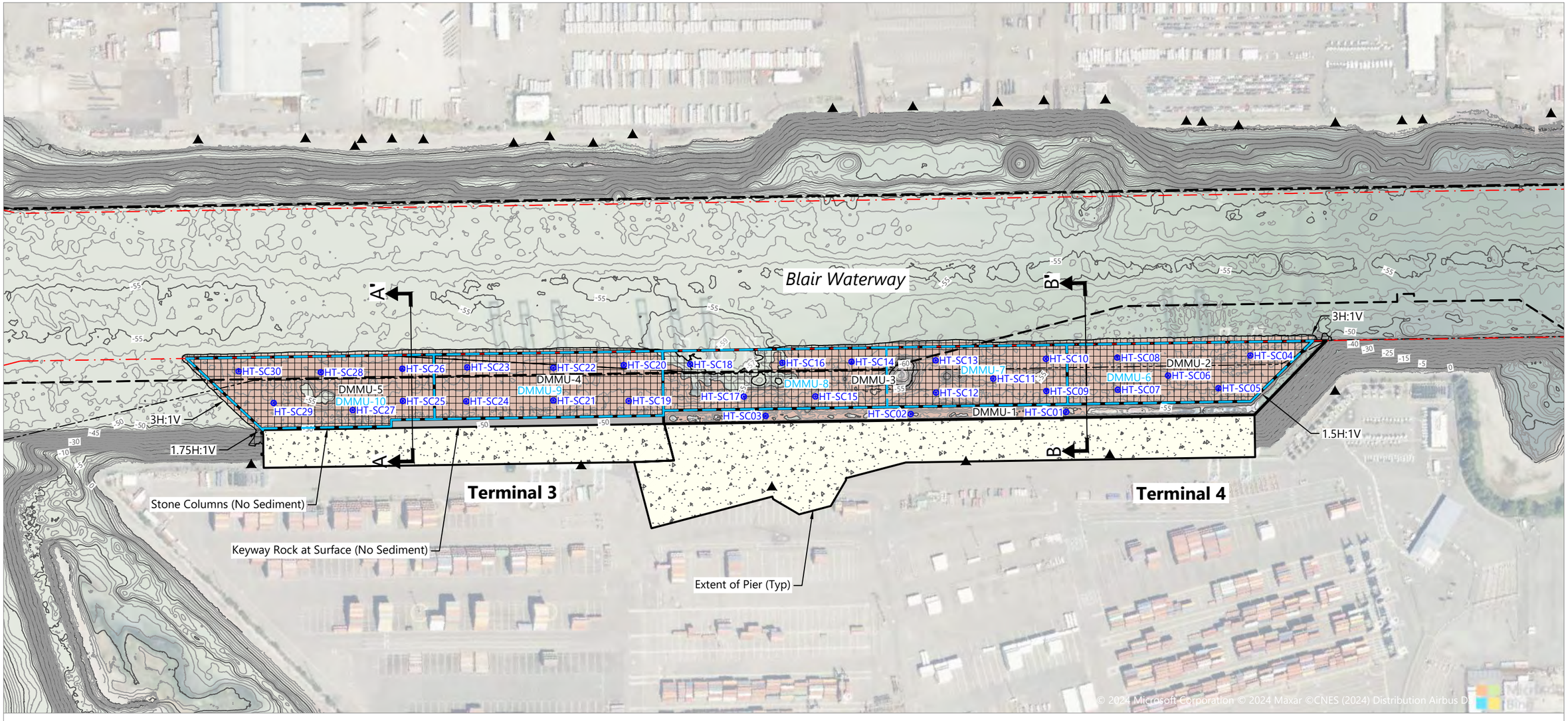
ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

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Publish Date: 2024/09/09 3:57 PM | User: tgriga
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 3b

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Figure 3b
Existing Conditions and Dredge Plan Cross Sections A-A' and B-B' for Husky Terminal



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

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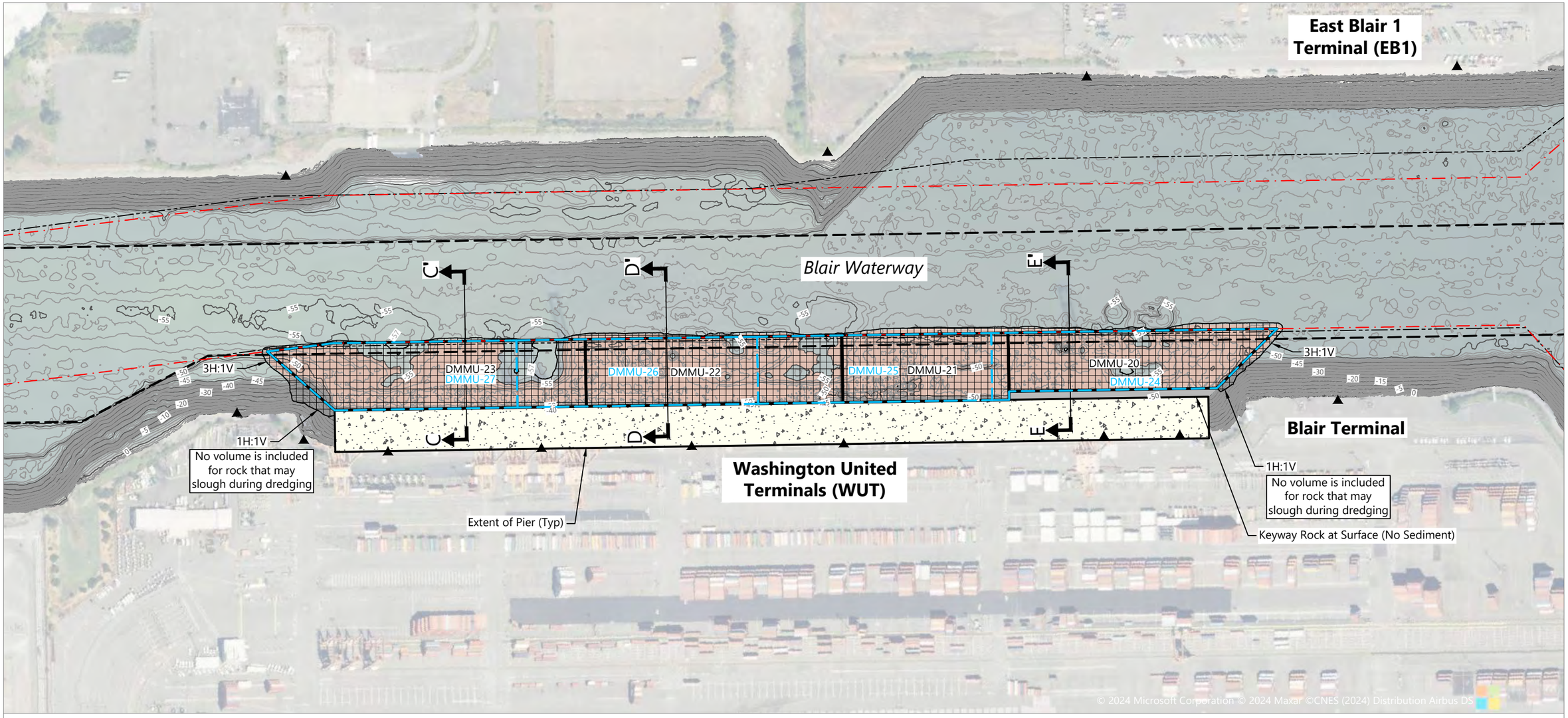
- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- Existing Contours (1' & 5' Intervals)
- Outfall
- Proposed Surface DMMU (DMMU-1)
- Proposed Subsurface DMMU (DMMU-6)
- Proposed Core Location

0 300
Feet

Publish Date: 2024/09/09 3:58 PM | User: tgriga
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 4

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Figure 4
Proposed Sampling Locations for Husky Terminal
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

LEGEND:

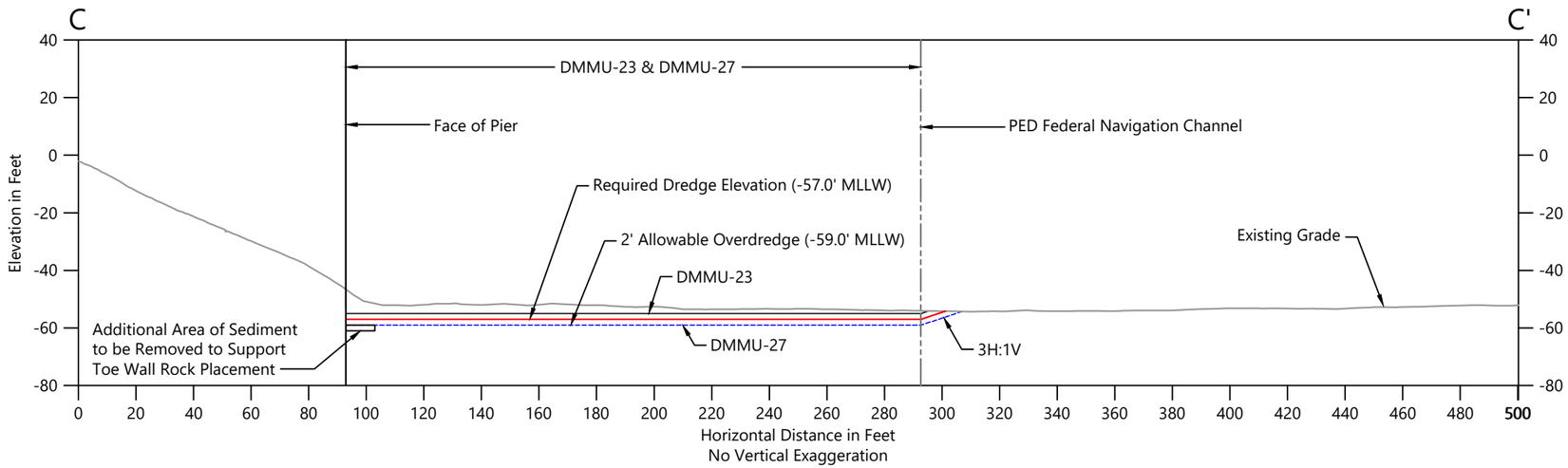
- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- -55 Existing Contours (2' & 10' Intervals)
- Outfall
- DMMU-1 Proposed Surface DMMU
- DMMU-6 Proposed Subsurface DMMU

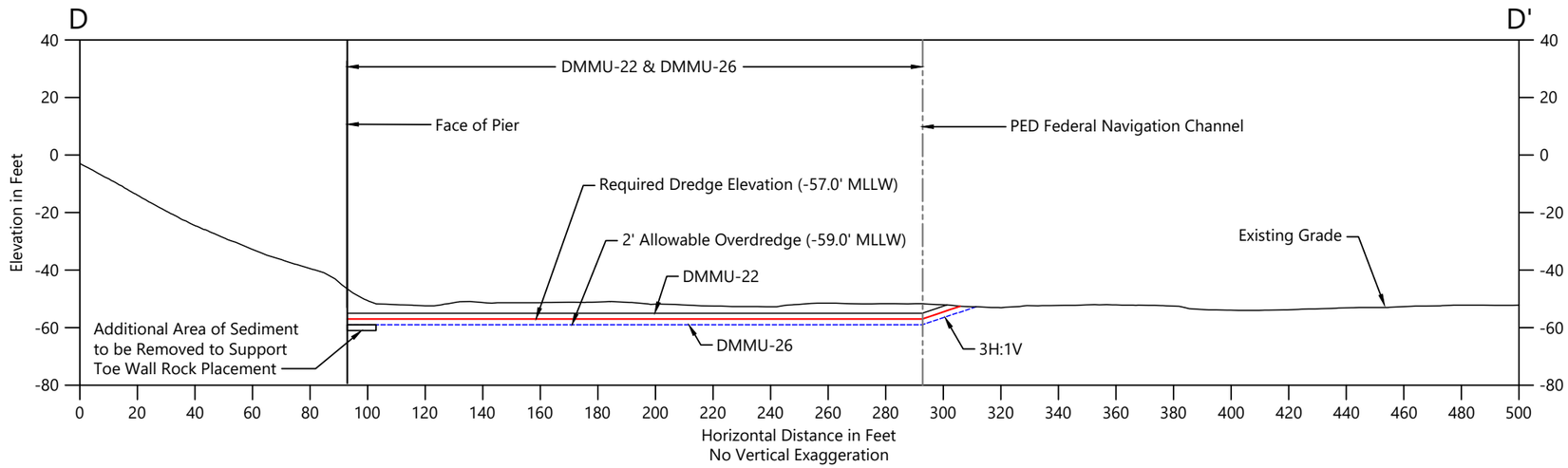
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Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 5a

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Figure 5a
Existing Conditions and Dredge Plan for Washington United Terminals
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization





SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022.
VERTICAL DATUM: MLLW

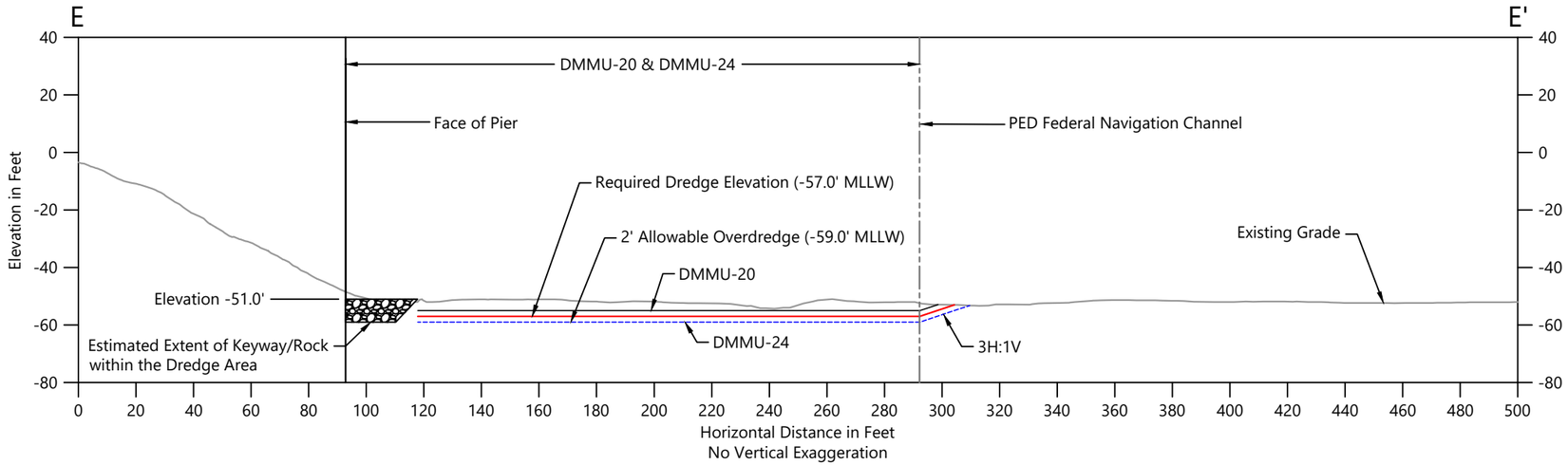
ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

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Feet

Publish Date: 2024/09/09 3:58 PM | User: tgriga
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 5b

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Figure 5b
Existing Conditions and Dredge Plan Cross Sections C-C' and D-D' for Washington United Terminals
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022.
VERTICAL DATUM: MLLW

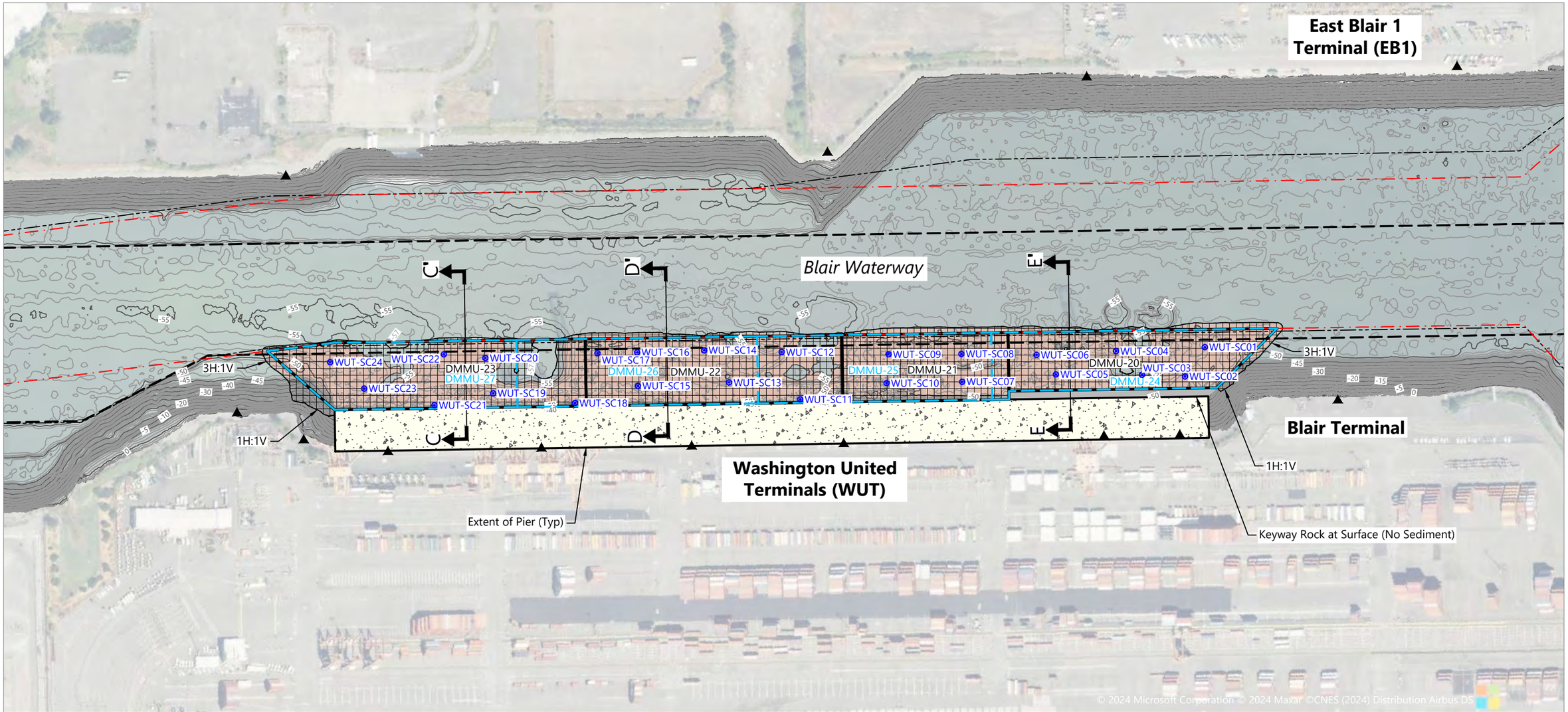
ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

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Publish Date: 2024/09/09 3:58 PM | User: tgriga
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 5c

ANCHOR QEA

Figure 5c
Existing Conditions and Dredge Plan Cross Section E-E' for Washington United Terminals



SOURCE: Survey by USACE, dated October 27, 2021, and David Evans and Associates, Inc., dated May 27, 2022, with data gaps filled from survey by USACE dated November 14, 2022. Aerial from Bing Maps. Current Federal Navigation Channel linework provided by Port of Tacoma and USACE dated 2023.
HORIZONTAL DATUM: Washington State Plane South Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

ABBREVIATIONS:
DMMU: Dredged Material Management Unit
H:V: Horizontal to Vertical
MLLW: Mean Lower Low Water
PED: Pre-Engineering Design
USACE: U.S. Army Corps of Engineers

LEGEND:

- PED Federal Navigation Channel
- Current Federal Navigation Channel
- Feasibility Study Federal Navigation Channel
- Extent of Pier
- -55 Existing Contours (1' & 5' Intervals)
- Outfall
- DMMU-1 Proposed Surface DMMU
- DMMU-6 Proposed Subsurface DMMU
- Proposed Core Location

0 300 Feet

Publish Date: 2024/09/09 3:58 PM | User: tgriga
Filepath: K:\Projects\0092-Port of Tacoma\Berth Deepening and Habitat Restoration\0092-RP-001 (Dredge Plan_Sections-SQAPP).dwg Figure 6

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Figure 6
Proposed Sampling Locations for Washington United Terminals
Sampling and Quality Assurance Project Plan
Husky and Washington United Terminals Berth Deepening Sediment Characterization

Appendix A
Historical Sediment Chemistry

Table A-1
Summary of DMMP Determinations

Terminal	Project Name	Figure 2 Reference	SDM Date	Dredge Year(s)	Dredge Elevation (feet MLLW)	Total Dredge Volume (cubic yards)	Volume Suitable for Open-Water Disposal (cubic yards)	Volume Unsuitable for Open-Water Disposal (cubic yards)	Notes
Channel-wide	USACE Port of Tacoma Blair Waterway Deepening	--	8/15/1998 11/29/1999 5/16/2000	1999–2000	-51+2	1,286,000	1,286,000	0	Deepening and extending the federal navigation channel. All material suitable for open-water disposal.
	USACE Blair Waterway Deepening Feasibility Study	--	6/25/2019	N/A	-58+2 Evaluated	2,500,000	Probability Averages: Head of waterway 100% Middle 63.6% Mouth 92.9% Native sediment 98.1%	N/A	Advisory-level characterization for potential deepening and widening alternatives evaluated Blair Waterway for probability of suitability.
Husky	Port of Tacoma Blair Bridge Reach Widening	1	12/2/1994 2/11/2004 8/4/2004	2004–2005	Not documented	265,000	265,000	0	Bank cut-back to widen the Blair near the 11th Street Bridge. All material suitable for open-water disposal.
	Port of Tacoma Husky Terminal Maintenance Dredging	2	7/14/2011	2011–2012	-51	42,100	26,150	15,950	Maintenance dredging of high spots in front of Husky Terminal. Dioxin/furans were slightly above screening levels in some surface sediment, resulting in partial upland disposal at Parcel 14.
	Port of Tacoma Pier 4 Reconfiguration Project, Phase 1 and 2	3	1/8/2015 2/25/2016	2015-2016	-2 -53	11,300 500,000	9,000 500,000	2,300 0	Terminal re-alignment, composed mostly of bank-cut back removals. Riprap greater than 18 inches was determined too large for open-water disposal.
Husky and WUT	Husky Terminal and Washington United Terminals Maintenance Dredging	4	4/16/2021	2022	-51	26,890 (Husky 8,080 and WUT 18,810)	26,890	0	Maintenance dredging of high spots above berth elevation. All sediment suitable for open-water disposal.
WUT	Port of Tacoma West Blair Terminal Development	5	5/15/1995	1995–1996	Not documented	500,000	500,000	0	Berth dredging of West Blair Terminal and bank cut-back. All material suitable for open-water disposal.
	Port of Tacoma Washington United Terminals Project High Spot Maintenance Dredging	6	10/3/2008	2009–2010	-51	5,600	5,600	0	Maintenance dredging of high spots above berth elevation. All sediment suitable for open-water disposal.
	Port of Tacoma Washington United Terminal Bank Cutback	7	2/13/2009	2009–2010	-51	228,400	228,400	0	Maintenance dredging of sediments above berth elevation and bank cut-back to expand the terminal to the south. All material suitable for open-water disposal.

Notes:
MLLW: mean lower low water
N/A: not applicable
SDM: suitability determination memorandum
USACE: U.S. Army Corps of Engineers
WUT: Washington United Terminals

Table A-2
Summary of Adjacent Washington State Department of Ecology Toxic Cleanup Program Confirmed and Suspected Contaminated Sites

Site Name	Facility Site ID	Cleanup Site ID	Unit Type	Process Type	Statute	Status	Date of No Further Action	No Further Action Reason	Contaminants	Affected Materials[1]			
										Groundwater	Surface Water	Soil	Sediment
Commencement Bay Nearshore Tideflats	42	3032	Sediment	Federal – Supervised or conducted	Federal – CERCLA	Cleanup Started	N/A	N/A	Arsenic	C	C	C	C
									SVOCs	C	C	C	
									D/Fs				S
									Halogenated Organics	C	C	C	
									Halogenated Solvents				C
			Upland			Cleanup Started			Lead			RB	C
									Mercury				C
									Metals-Other			RB	C
									Metals-Priority Pollutants	C	C	C	
									Non-Halogenated Solvents	C	C	C	
									Other Non-Halogenated Solvents				C
			Upland			Tracked by EPA			Petroleum- Unspecified	C	C	C	
									Phenolic Compounds		C	C	
									PCB	C	C	C	C
									PAH	C	C	C	C
									TBT				C
Fairliner Marina	543167637	9634	Upland	Independent Action	MTCA	No Further Action	8/31/2012	Initial Investigation	Benzene			B	
									Other Non-Halogenated Organics			B	
									Petroleum-Gasoline			RB	
									Petroleum-other			RB	
Port of Tacoma Slip 5	79844675	4220	Upland	No Process	MTCA	Awaiting Cleanup	N/A	N/A	Petroleum Products - Unspecified		C	C	
									Non-halogenated Organics - Benzene	C			
									Non-halogenated Organics - Petroleum Diesel	C			
									Non-halogenated Organics - Petroleum Gasoline	C			
									Non-halogenated Organics - Petroleum Other	C			
Pier 4 Sediments	6505	12597	Sediment	Federal-Supervised or conducted	Federal – CERCLA	Completed	N/A	N/A	TBT				C
Cascade Timber 3 US Oil	1258	4593	Upland	Ecology-supervised or conducted	MTCA	No Further Action	2/4/2002	NFA-Ecology Supervised/ Conducted Cleanup	Petroleum Products-Unspecified	R	R	R	
1920 Port of Tacoma Road	30005	3801	Upland	Ecology-supervised or conducted	MTCA	Cleanup Started	N/A	N/A	Non-Halogenated Solvents, Petroleum-Unspecified	C		C	
Rhone Poulenc Basic Chemical	1221	3760	Upland	No Process	MTCA	Cleanup Started	N/A	N/A	Metals Priority Pollutants	S	S	C	
									Petroleum-other	S	S	S	
Franciscan Health Port Clinic	6898	13144	Upland	No Process	MTCA	Awaiting Cleanup	N/A	N/A	Arsenic	C			
									Petroleum-Diesel	C			
JM Eagle Tacoma	48281987	2623	Upland	Voluntary Cleanup Program	MTCA	No Further Action	9/21/2005	Voluntary Cleanup Program Review	Petroleum Products - Unspecified	R		R	

Table A-2
Summary of Adjacent Washington State Department of Ecology Toxic Cleanup Program Confirmed and Suspected Contaminated Sites

Site Name	Facility Site ID	Cleanup Site ID	Unit Type	Process Type	Statute	Status	Date of No Further Action	No Further Action Reason	Contaminants	Affected Materials[1]			
										Groundwater	Surface Water	Soil	Sediment
JL Darling Corporation	47969128	9393	Upland	Independent Action	MTCA	Cleanup Started	N/A	N/A	Benzene			C	
									Non-Halogenated Solvents			C	
									Petroleum-Diesel			B	
Pacific Functional Fluids, LLC	1239	4329	Upland	Ecology-supervised or conducted	MTCA (RCRA Corrective Action)	Cleanup Started	N/A	N/A	SVOCs	C		C	
									Halogenated Organics	C		C	
									Metals Priority Pollutants			C	
Murray Pacific	1211	3075	Upland	Independent Action	MTCA	No Further Action	N/A	N/A	Arsenic	C			
									Lead	RB			
			Upland	Ecology-supervised or conducted		Construction Complete: Performance Monitoring			Metals Priority Pollutants	RB	RB	RA	
									Petroleum-Diesel	RB		RB	

Notes:
1. Current status of contaminants impacting each material type were determined using Ecology Cleanup Site data. The key for each affected materials status type is listed below.
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
D/F: dioxin/furan
EPA: U.S. Environmental Protection Agency
MTCA: Model Toxics Control Act
N/A: not applicable
NFA: no further action
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
RCRA: Resource Conservation and Recovery Act
SVOC: semivolatile organic compound
TBT: tributyltin

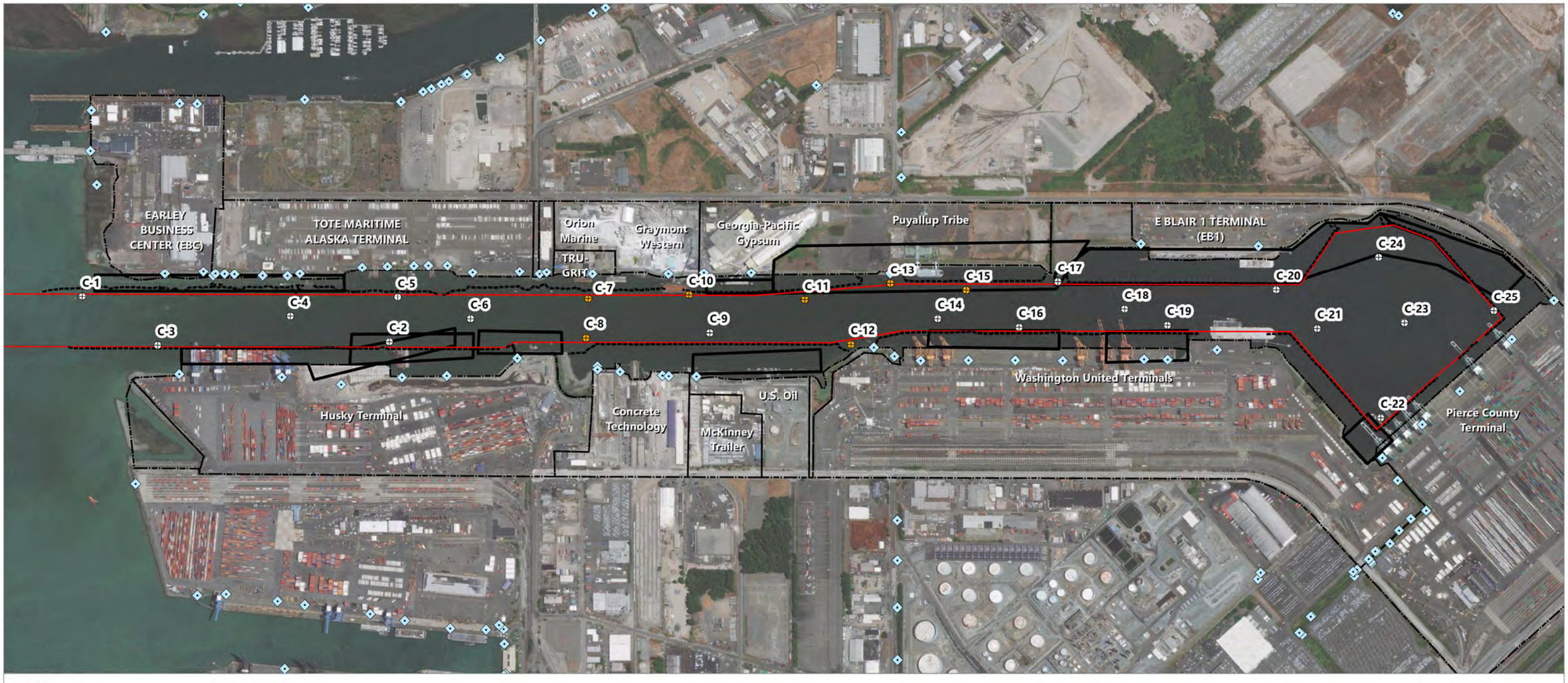
Affected Materials Key:
B: below cleanup level
C: confirmed above cleanup level
R: remediated
RA: remediated above cleanup levels
RB: remediated below cleanup levels
S: suspected

Table A-3
Summary of Spills to Water in Site Areas 2015 to 2024

Date of Incident	Report ID	Case Name	Location	Address	Latitude	Longitude	Medium	Incident Category	Source Type	Oil Type	Total Quantity (gallons)	Quantity to Water (gallons)	Quantity Impacted	Quantity Recovered (gallons)
2/17/2016	166644	Passenger Truck in Blair Waterway	Tacoma Blair Terminal (Washington United Terminals)	2421 Port of Tacoma Road	47.2597	-122.3864	Marine	Oil spill	Vehicle	Gasoline	1	1	None	1
1/23/2018	187432	CalPortland Cement Truck Hydraulic Oil Spill to Blair Waterway	Husky Terminal	1101 Port of Tacoma Road	47.2698	-122.4036	Catch Basin – Wet	Oil spill	Vehicle	Hydraulic oil	2	2	None	2
1/29/2021	218272	Mystery Sheen in Blair Waterway	Mouth of Blair Waterway	--	47.2776	-122.4124	Puget Sound	Oil spill	Unknown	Oily Water Mixture	1	1	None	0

Channel-Wide Existing Data

2019 USACE Blair Waterway Deepening Feasibility Study



LEGEND:

- Outfall
- Actual Sampling Location
- Actual Sampling Location with One or More Exceedance
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

0 2,000
Feet

Publish Date: 2019/04/25, 1:57 PM | User: ckiblinger
Filepath: \\orcas\gis\Jobs\Port_of_Tacoma_0092\Blair_WW_Deepening_Widening\Maps\Dredged_Material_Characterization\AQ_BlairWaterwayDeepening_ActualSamplingLocations_w_Exceed.mxd

ANCHOR QEA

Figure 3
Samples with Chemical Exceedances
Sediment Characterization Data Report
Tacoma Harbor Deepening Study

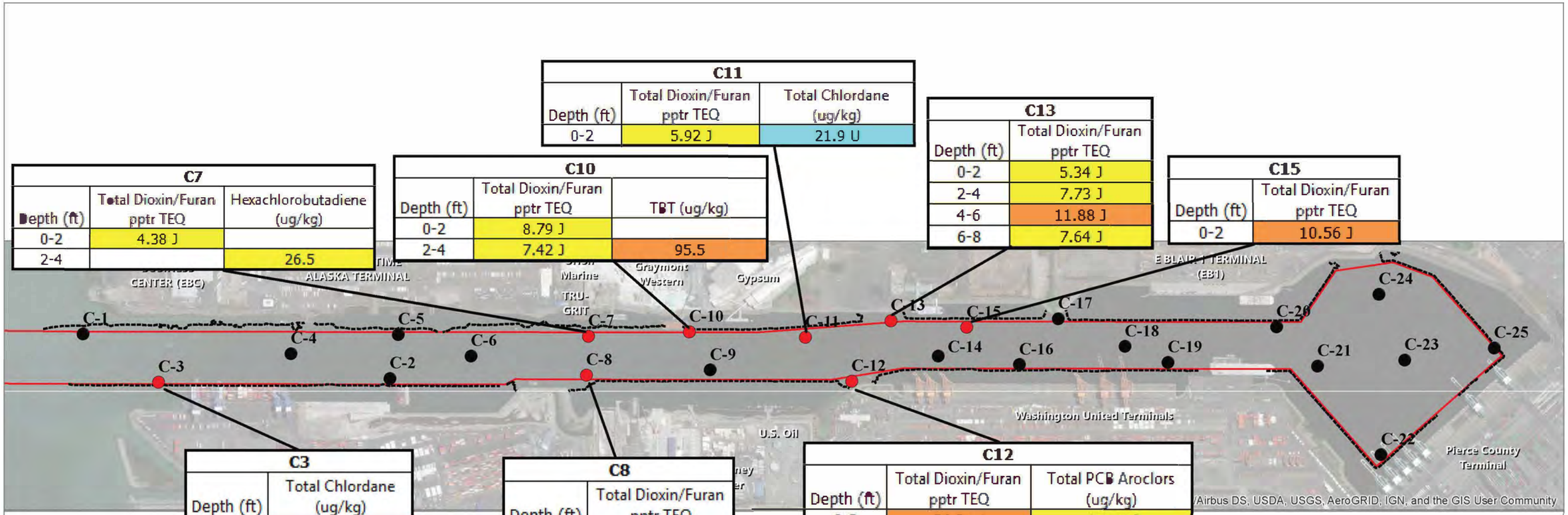
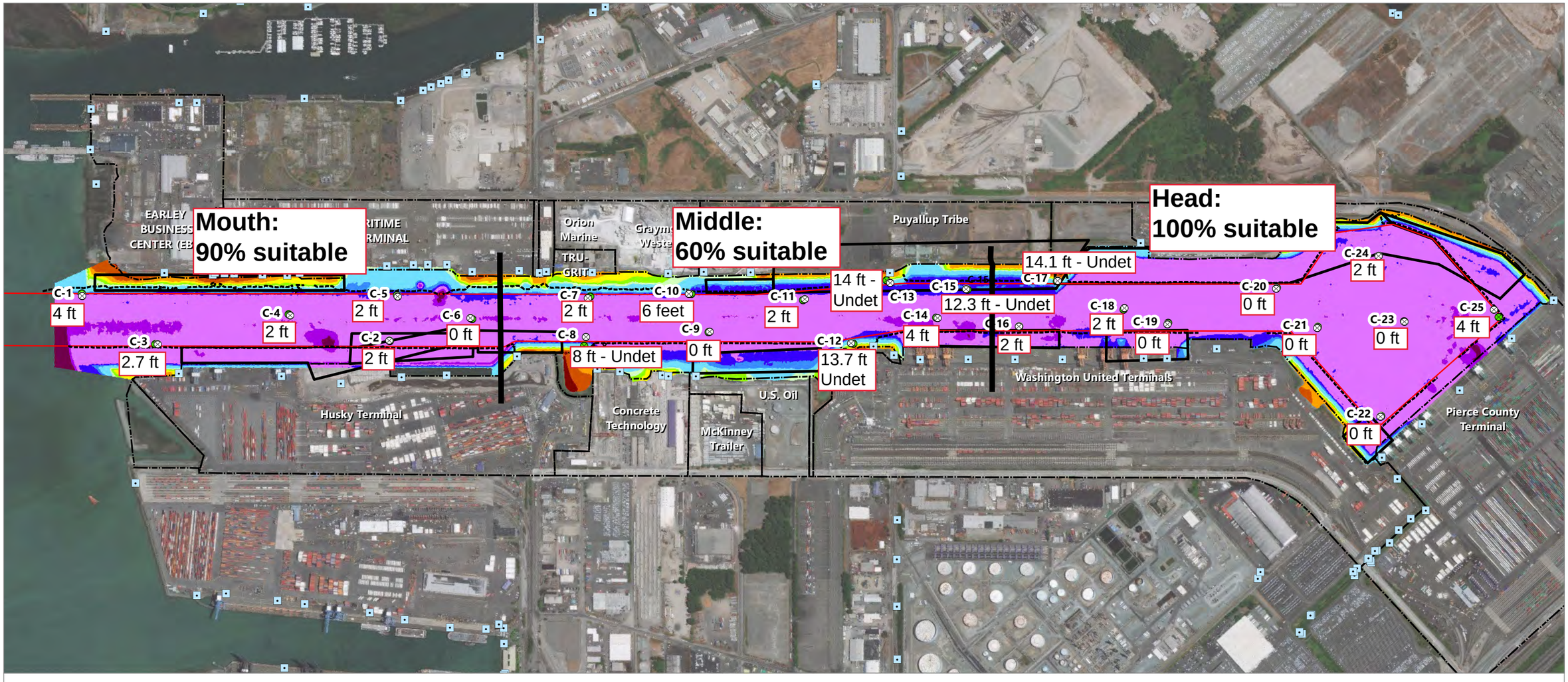


Figure 5
Summary of SL/BT Exceedances
Tacoma Harbor Deepening



LEGEND:

- Outfall
- Actual Sampling Location
- Proposed Sampling Location
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

MLLW Elevation (Feet)

< -58	-25 - -20
-58 - -55	-20 - -15
-55 - -50	-15 - -10
-50 - -45	-10 - -5
-45 - -40	-5 - 0
-40 - -25	0 - 20

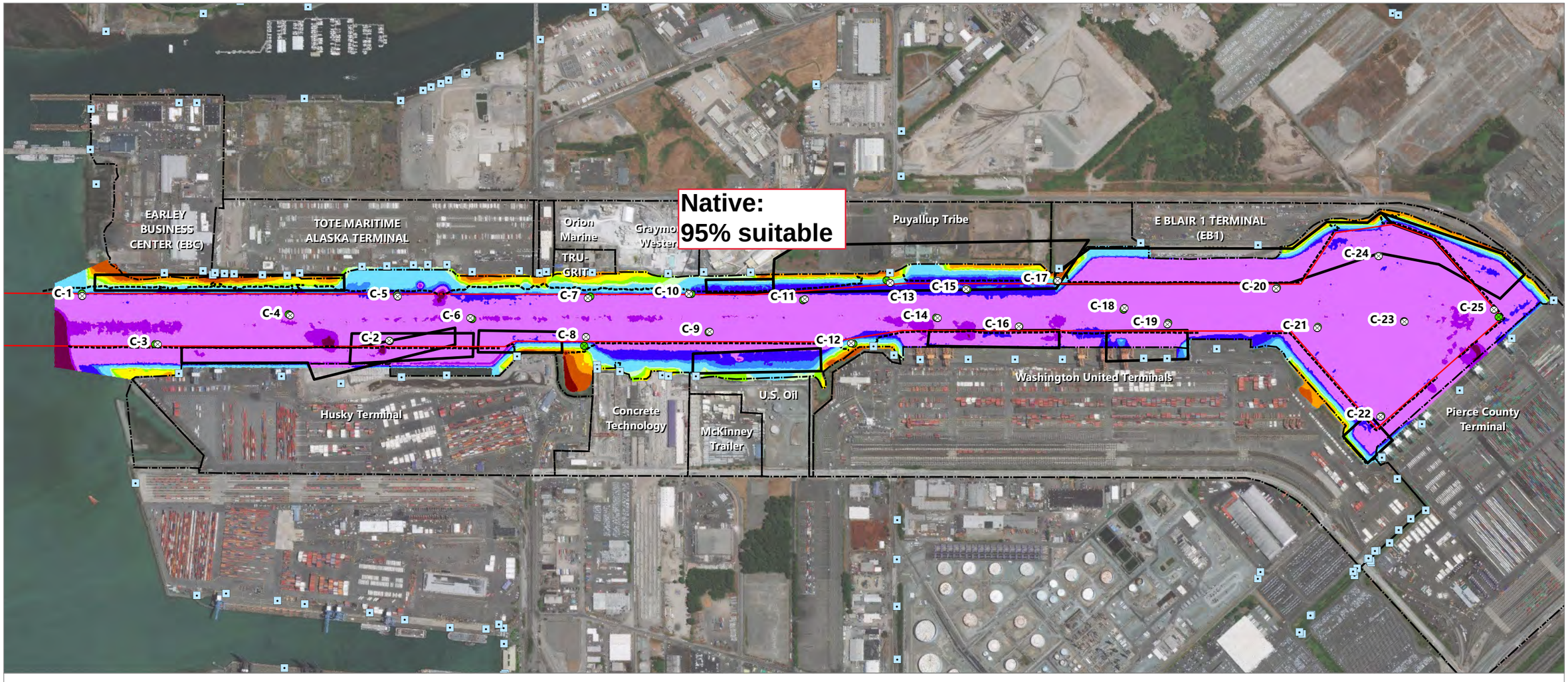
ft indicates the depth of the non-native layer based on core samples.

NOTES:
1. Bathymetry from November 2018.

0 2,000
Feet

Figure 6
Probability of Suitability for Open-Water Disposal of Non-Native Material

Tacoma Harbor Deepening Study



LEGEND:

- Outfall
- Actual Sampling Location
- Proposed Sampling Location
- Proposed Navigation Channel Boundary
- Property Boundary
- Historical Dredged Material Characterization Area
- Approximate 2H:1V Daylight Limits

MLLW Elevation (Feet)

- < -58
- -58 - -55
- -55 - -50
- -50 - -45
- -45 - -40
- -40 - -25
- -25 - -20
- -20 - -15
- -15 - -10
- -10 - -5
- -5 - 0
- 0 - 20

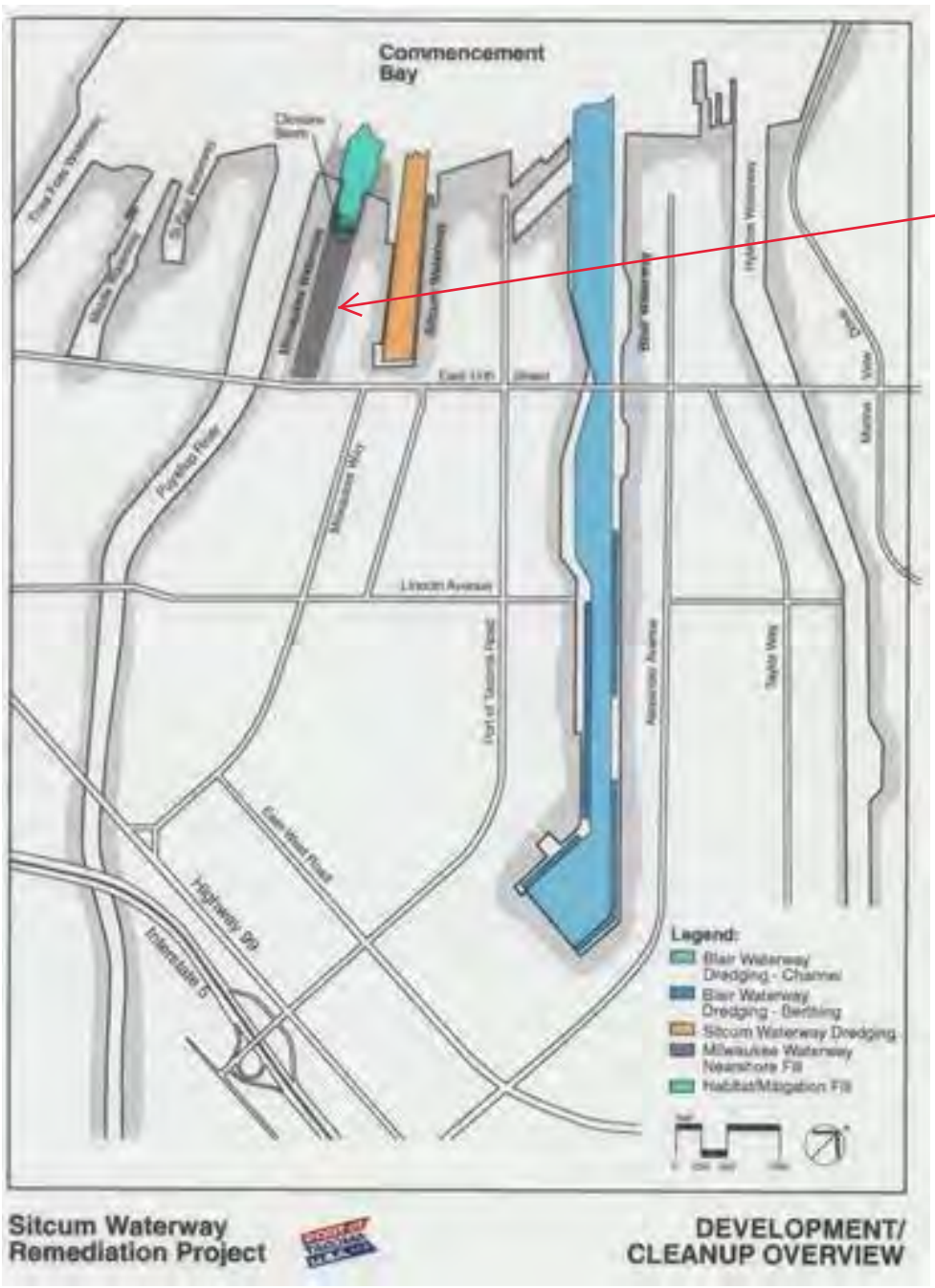
NOTES:
1. Bathymetry from November 2018.
2. Native interval identified based on core lithology

0 2,000
Feet

Figure 7
Probability of Suitability for Open-Water Disposal for Native Material

Tacoma Harbor Deepening Study

2000 Port of Tacoma and Occidental Chemical, Hylebos Waterway/Blair Waterway Slip 1 CDF



Milwaukee Waterway Confined Disposal Facility

2015-2016 Pier 4 Sediments Cleanup

U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Blair WaterwayTBT - Removal Polrep
Final Removal Polrep

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region X

Subject: **POLREP #6**
Final Polrep
Blair WaterwayTBT
10MY
Tacoma, WA
Latitude: 47.2734526 Longitude: -122.4079141

To:
From: Kathy Parker, OSC
Date: 3/30/2016
Reporting Period: 2/19/2016 to 3/30/3016

1. Introduction

1.1 Background

Site Number:	10MY	**Contract Number:**	
D.O. Number:		**Action Memo Date:**	1/27/2015
Response Authority:	CERCLA	**Response Type:**	Time-Critical
Response Lead:	PRP	**Incident Category:**	Removal Action
NPL Status:	Non NPL	**Operable Unit:**	
Mobilization Date:	4/13/2015	**Start Date:**	4/13/2015
Demob Date:	3/30/2016	**Completion Date:**	3/30/2016
CERCLIS ID:	WAD980726368	**RCRIS ID:**	
ERNS No.:		**State Notification:**	
FPN#:		**Reimbursable Account #:**	

1.1.1 Incident Category
Time Critical Removal Action

1.1.2 Site Description

Tributyl tin-contaminated sediments under Pier 4 in Tacoma, Washington.

1.1.2.1 Location

1 Sitkum Way, Tacoma, WA

1.1.2.2 Description of Threat

Tributyltin at levels exceeding 50,000 ug/kg were found in the sediments under Pier 4 during a predredge sampling performd by the Port of Tacoma in 2013. Tributyltin is an environmental toxin affecting mollusks and was banned in the 1990s.

1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results

The Port of Tacoma collected and analyzed samples of sediment under Pier 4 in July 2014 to determine the extent and depth of contamination. Results indicated a removal action was necessary to dredge and remove approximately 50,000 cubic yards of sediment.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative

2.1.2 Response Actions to Date
Between 2/19/2016 and 3/30/2016, OMI cleaned and demobilized the equipment - barges, transload site, water treatment system, trailers, fencing - cleaned the surfaces and returned the property to the Port of Tacoma for re-use. On 3/30/2016, the OSC inspected the properties at Pier 4 and the APM terminal and found that equipment had been completely demobilized, the surfaces cleaned, stripes repainted, and the area in the process of being returned to APM for re-use. The OSC met with the Port of Tacoma to discuss preparing the final report, records transfer, press release and the elimination of the need for financial assurance. The Removal Action completion date was set at 3/30/2016. The Port agreed to be responsible for any future Port Removal Site Controls such as slope protection above the dredged area at Pier 4.

2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)

The Port of Tacoma is the PRP performing the removal action. Research is being conducted to identify

additional PRPs.

2.1.4 Progress Metrics

Waste Stream	*Medium*	*Quantity*	*Manifest #*	*Treatment*	*Disposal*
TBT contaminated	sediment	59,835 ton	many	landfill	LRI, Tacoma

2.2 Planning Section

No information available at this time.

2.3 Logistics Section

No information available at this time.

2.4 Finance Section

No information available at this time.

2.5 Other Command Staff

No information available at this time.

3. Participating Entities

No information available at this time.

4. Personnel On Site

EPA

The Port of Tacoma

Orion Marine Contractors (OMI)

Subcontractors to the Port of Tacoma- Floyd Snider, KPFF, Aspect Environmental

Subcontractors to OMI

5. Definition of Terms

No information available at this time.

6. Additional sources of information

No information available at this time.

7. Situational Reference Materials

No information available at this time.

Notes:
- Results from April 2013 Geoprobe sampling did not exceed the DMMP TBT screening level and are not shown on this figure.
- Existing and proposed Pier 4 locations provided by KPFF.
- Bathymetric contour data provided by Port of Tacoma.
- Background aerial imagery provided by Esri, 2011.

1. Based on Anchor QEA data.
2. Provided by Hart Crowser, Inc.
3. Result shown is TBT in porewater and is less than DMMP porewater screening level of 0.15 µg/L.
4. Result shown is dissolved TBT from DRET test and concentration is greater than USEPA chronic marine aquatic life water quality criterion of 0.0074 µg/L but less than USEPA acute marine aquatic life water quality criterion of 0.42 µg/L.
5. Result shown is TBT in water and is less than USEPA chronic marine aquatic life water quality criterion of 0.0074 µg/L.

Abbreviations:
bml = Below mudline
DMMP = Dredged Material Management Program
DMMU = Dredged Material Management Unit
DRET = Dredging elutriate test
ft = Foot
MHW = Mean high water
MLLW = Mean lower low water
µg/kg = Micrograms per kilograms
µg/L = Micrograms per liter
TBT = Tributyltin
USEPA = U.S. Environmental Protection Agency

Blair Waterway

Ambient Site Water Result
6-ft above mudline 0.005 U µg/L[5]

DRET Result at A16
0–4 ft: **0.23** µg/L[4]

DRET Result at A17
0–8 ft (dup): **0.16** µg/L[4]
0–8 ft: **0.39** µg/L[4]

30+00 35+00 40+00 45+00

A10: 0–0.33 ft: 32
A5: 0–0.33 ft: 35,000; 0.33–1 ft: 3,500; 1–2 ft: 3,200; 2–3 ft: 3,000; 12 ft
A11: 0–0.33 ft: 53
A8: 0–2 ft: 33,000; 2–4 ft: 5,800; 4–6 ft: 2,500; 6–8 ft: 50,000; 8–8.5 ft: 7,900; 8.5–10.5 ft: 2,200; 10.5 ft
A16: 0–4 ft: 42,000; 4–6 ft: 16,000; 6–8 ft: 110; 8–10 ft: 6.6; 9.5 ft
B5B: 0–0.33 ft: 6,900; 0.33–1 ft: 10,00; 1–2 ft: 4,200; 2–3 ft: 81; 10 ft
A17: 0–8 ft: 1,800 J; 7 ft; 8–10 ft: 3.5 U; 10–11 ft: 3.4 U; 11–12 ft: 3.4 U
B5: 0 - 0.33 ft: 1,800
B4: 0–0.33 ft: 570
B9: 0–0.33 ft: 33
B6: 0–2 ft: 660; 2–4 ft: 280; 4–6 ft: 91; 6–8 ft: 55; 7 ft
B7: 0–2 ft: 9,300; 2–4 ft: 2,000; 4–6 ft: 2,200; 6–8 ft: 32; 7 ft; 8–11.5 ft: 31
B8: 0–2 ft: 130; 2–4 ft: 81; 4–6 ft: 26; 13.3 ft
B16: 0–3 ft: Rock armor; 3–3.5 ft: No recovery; 3.5–5.5 ft: 11; 5.5–7.5 ft: 3.5 U; 7.5–9.5 ft: 3.5 U; 9 ft
B18A: 0–3 ft: Rock armor; 3–8 ft: No recovery; 8–10 ft: 3.6 U; 10–13.5 ft: No recovery; 13.5–14.5 ft: 3.8 U; 14.5–16.5 ft: 3.4 U; 14.5 ft
B17: 0–2 ft: 3.6 U
B1, B2, B3 Composite: 0–4 ft: 0.084 µg/L[3]
A6: 0–2 ft: 110; 2–4 ft: 7.2; 4–6 ft: 120; 6–7 ft: 910 J; 7–9 ft: 14 J; 7.5 ft
A4: 0–0.33 ft: 90; 0.33–0.66 ft: 150; 2–6 ft: 3.4 U; 6–8 ft: 3.4 U; 10 ft
A7: 0–2 ft: 2,700; 2–4 ft: 1,400; 4–6 ft: 1,300; 6–8 ft: 9,600; 8–11 ft: No recovery; 11–12 ft: 40; 13 ft
A2: 0–0.33 ft: 3.8 U
A3: 0–0.33 ft: 25
A9: 0–0.33 ft: 13
A1: 0–0.33 ft: 5.5
C4: 0–2 ft: 2.2 JQ; 2–4 ft: 3.4 U; 4–6 ft: 3.4 U; 19.5 ft
B13: 0–3 ft: Rock armor; 3–3.7 ft: No recovery; 3.7–5 ft: 710; 5–11 ft: No recovery; 11–13 ft: 10
B14: 0–2 ft: 4.7; 2–3 ft: 4.8; 3–8 ft: No recovery; 8–10 ft: 3.7 U
B11: 20 ft; 0–2.7 ft: Rock armor; 2.7–4 ft: 85; 4–6 ft: 52; 6–10 ft: 3.7; 7 ft
B15: 0–3 ft: Rock armor; 3–9 ft: No recovery; 9–10 ft: 18; 11.5–13.5 ft: 3.5 U; 13.5–15.5 ft: 3.6 U; 18 ft
D3: 0–2 ft: 3.4 U; 2–4 ft: 3.6 U; 4–6 ft: 3.6 U; 12.5 ft
D4: 0–2 ft: 3.3 U; 2–4 ft: 3.5 U; 4–6 ft: 3.3 U; 12 ft
C5: 0–2 ft: 3.3 UJ; 2–4 ft: 3.4 U; 4–6 ft: 3.4 U; 16 ft
A13: 0–1 ft: Rock armor; 1–3 ft: 360; 3–5 ft: 67; 5–7 ft: No recovery; 7–9 ft: 25; 9.5 ft
B10: 0–3 ft: Rock armor; 3–5 ft: No recovery; 5–7 ft: 380; 7–9 ft: 670; 9–11 ft: 36; 10.5 ft
B12: 0–1 ft: Rock armor; 1–3 ft: 150; 3–5 ft: 3.2 JQ; 12 ft
A15: 0–3 ft: Rock armor; 3–3.5 ft: No recovery; 3.5–5 ft: 300; 5–7.5 ft: No recovery; 7.5–9 ft: 24; 14 ft
A12: 0–1.5 ft: Rock armor; 1.5–3 ft: 8.4; 3–5 ft: 3.4; 5–9 ft: No recovery; 9–10 ft: 6.6; 10 ft
A14: 0–2 ft: Rock armor; 2–4 ft: 4.4; 4–5 ft: 3.6; 13 ft
A18: 0–3 ft: Rock armor; 3–7 ft: No recovery; 7–9 ft: 3.4 U; 9–10 ft: 3.5 U; 10–11 ft: No recovery; 11–13 ft: 3.5 U
C3: 0–2 ft: 3.3 UJ; 2–4 ft: 3.4 U; 4–6 ft: 3.5 U; 13.5 ft

2011 DMMU-2
2011 DMMU-3
Proposed Pier 4
Existing Pier 4
Former Slip 2
Pier 3
Pier 4
MHW (+10.9' MLLW)

A A' B B' C1 C2 C3 C4 C5 D1 D2 D3 D4

0 75 150 300
Scale in Feet
1 inch = 150 feet

Qualifiers:
J The analyte was detected, the concentration is considered an estimate.
JQ The analyte was detected between the method detection limit (MDL) and reporting limit (MRL), the concentration is considered an estimate.
U The analyte was not detected at the given reporting limit.

Legend

- In-water Grab
- Mud Rotary Boring
- Sonic Boring
- In-water Sonic Boring
- In-water Core
- In-water Core and Grab
- Upland Boring
- Ambient Water Sample Location
- DRET Location
- Approximate Outfall Location[1]
- Cross Section Designation and Location
- Location of Former Slip[2]
- Station Reference Line
- Pierhead Line
- Channel Line
- 2012 Post-dredge Bathymetric Contour in feet MLLW
- In-water DMMU Area A
- In-water DMMU Area B
- Cutback DMMU Area C
- Cutback DMMU Area D
- Anchor QEA 2012 DMMU-2 Boundary
- Proposed Pier 4
- Existing Pier 4

Location ID:
- Rock Armor Present
- No Recovery
- Less than Screening Level
- Greater than DMMP Bulk TBT Screening Level (73 µg/kg)
- Z-Layer Interval
- Presumed Native Interface

Location ID:	
Depth (bml):	Result (µg/kg)

Port of Tacoma
FLOYD | SNIDER
strategy • science • engineering

Phase 1 Project Description Document
Pier 4 Phase 1 Removal Action Project
Tacoma, Washington

Figure 2.1
Pier 4 Sediment and Soil TBT and DRET Sampling Results

I:\GIS\Projects\POT_Pier_4\MXD\P1 Project Description Doc\Figure 2.1 Pier 4 Sediment TBT Sampling Results.mxd 9/12/2014

Notes:
- All field locations are actual locations as measured on-site during the sampling events.
- Results from April 2013 Geoprobe sampling did not exceed the DMMP TBT screening level and are not shown on this figure.
- Existing and proposed Pier 4 locations provided by KPFF.
- Bathymetric contour data provided by Port of Tacoma.
- Background aerial imagery provided by Esri, 2011.

1. Based on Anchor QEA data.
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OHWM = Ordinary high water mark
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USEPA = U.S. Environmental Protection Agency

Blair Waterway

Ambient Site Water Result
6 ft above mudline 0.005 U µg/L[5]

DRET Result at A16
0–4 ft: **0.23** µg/L[4]

DRET Result at A17
0–8 ft (dup): **0.16** µg/L[4]
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30+00 35+00 40+00 45+00

A10: 0–0.33 ft: 32
A5: 0–0.33 ft: 35,000; 0.33–1 ft: 3,500; 1–2 ft: 3,200; 2–3 ft: 3,000; 12 ft
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A8: 0–2 ft: 33,000; 2–4 ft: 5,800; 4–6 ft: 2,500; 6–8 ft: 50,000; 8–8.5 ft: 7,900; 8.5–10.5 ft: 2,200; 10.5 ft
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B5: 0–0.33 ft: 1,800
B4: 0–0.33 ft: 570
B9: 0–0.33 ft: 33
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B17: 0–2 ft: 3.6 U; 15 ft
B1, B2, B3 Composite: 0–4 ft: 0.084 µg/L[3]
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2011 DMMU-2
2011 DMMU-3
Proposed Pier 4
Existing Pier 4
Former Slip 2
Pier 3
Pier 4
OHWM (+10.78' MLLW)

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U The analyte was not detected at the given reporting limit.

0 75 150 300
Scale in Feet
1 inch = 150 feet

Legend

- In-Water Grab
- Mud Rotary Boring
- Sonic Boring
- In-Water Sonic Boring
- In-Water Core
- In-Water Core and Grab
- Upland Boring
- Ambient Water Sample Location
- DRET Location
- Approximate Outfall Location[1]
- Cross Section Designation and Location
- Location of Former Slip[2]
- Station Reference Line
- Pierhead Line
- Channel Line
- 2012 Post-Dredge Bathymetric Contour in Feet MLLW
- In-Water DMMU Area A
- In-Water DMMU Area B
- Cutback DMMU Area C
- Cutback DMMU Area D
- Anchor QEA 2012 DMMU-2 Boundary
- Proposed Pier 4
- Existing Pier 4

Location ID:
- Rock Armor Present
- No Recovery
- Less than Screening Level
- Greater than DMMP Bulk TBT Screening Level (73 µg/kg)
- Z-Layer Interval
- Presumed Native Interface

Location ID:	
Depth (bml):	Result (µg/kg)

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Removal Site Evaluation Report
Pier 4 Phase 1 Removal Action Project
Tacoma, Washington

Figure 4.1
Pier 4 Sediment, Soil, Ambient Site Water, and DRET Sample Results

I:\GIS\Projects\POT_Pier_4\MXD\Removal_Site_Eval_Report\Figure 4.1 Pier 4 Sediment and Soil TBT and DRET Sampling Results.mxd 9/18/2014

Notes:
1. Dredge cut thicknesses shown do not include over-dredge allowance.
2. Provided by Hart Crowser, Inc.
* Indicates a DMMU composite sample result. Result shown for the Sample Location B1, B2, and B3 composite is a TBT concentration in porewater (in µg/L) and is less than the DMMP porewater screening level of 0.15 µg/L.
· All field locations are actual locations as measured on-site during the sampling events.
· Existing and proposed Pier 4 locations provided by KPFF.
· Bathymetric contour data provided by Port of Tacoma.
· Background aerial imagery provided by Esri, 2011.

Abbreviations:
bgs = Below ground surface
bml = Below mudline
DMMP = Dredged Material Management Program
DMMU = Dredged Material Management Unit
ft = Feet
MLLW = Mean lower low water
µg/kg = Micrograms per kilograms
µg/L = Micrograms per liter
OHWM = Ordinary High Water Mark
TBT = Tributyltin

Blair Waterway

30+00
35+00
40+00
45+00

End of Pier and Surface Slope B (Pier face to -53 ft MLLW and upper 8 ft of slope)[1]
Southern Hot Spot Area (-54 ft MLLW)
Pier Face and Surface Slope B (Pier face to -55 ft MLLW and upper 11 ft of slope)[1]
Central Hot Spot Area (-57 ft MLLW)
Pier Face and Surface Slope A (Pier face to -55 ft MLLW and upper 9 ft of slope)[1]
Pier 4 Phase 2 Cutback Area
OHWM (+12.78' MLLW)
Approximate Extent of Phase 1 Cleanup Dredge Prism
Proposed Pier 4
Existing Pier 4
Former Slip 2

2011 DMMU-2
2011 DMMU-3

Pier 4
Pier 3

A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18
B1* B2* B3* B4 B5 B5B B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18A B19
C1* C2* C3 C4 C5
D1* D2* D3 D4

0 75 150 300
Scale in Feet
1 inch = 150 feet

Legend

TBT Concentration (µg/kg)
- 0–73
- 74–1,000
- 1,001–1,300
- 1,301–10,000
- 10,001–50,000
- Analyte was not Detected at the Given Reporting Limit
- No Data (sample not analyzed)

Sample Depth (bml or bgs)
- ≤ 2 ft (surface sample)
- 2–4 ft
- 4–6 ft
- 6–10 ft
- > 10 ft

- Location of Former Slip[2]
- Station Reference Line
- Pierhead Line
- Channel Line
- 2012 Post-Dredge Bathymetric Contour in Feet MLLW

- In-Water DMMU Area A
- In-Water DMMU Area B
- Cutback DMMU Area C
- Cutback DMMU Area D
- Anchor QEA 2012 DMMU-2 Boundary
- Proposed Pier 4
- Existing Pier 4

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Removal Action Work Plan
Pier 4 Phase 1 Removal Action Project
Tacoma, Washington

Figure A.2
Phase 1 Dredge Areas and Design Dredge Cut Thicknesses

I:\GIS\Projects\POT_Pier_4\MXD\Task 8040\Post-Dredge Confirmation Plan\Figure A.2 Phase 1 Dredge Areas and Design Dredge Cut Thicknesses.mxd 11/12/2014

2007 and 2022 U.S. Oil NPDES Permit Sediment Sampling Environmental Data

Other Point Sources – According to Ecology's Permitting and Reporting Information System (PARIS), other nearby point source outfalls that discharge to the Blair Waterway include industrial sites with coverage under the Industrial Stormwater General Permit (ISGP) and/or Construction Stormwater General Permit, and sites with an industrial NPDES individual permit.

Non-point Sources – Stormwater runoff from roads also discharges to the Blair Waterway. Heavy industrial traffic may result in pollutants entering the Blair Waterway near Outfall 001.

2.2 PREVIOUS SEDIMENT STUDIES AND MAINTENANCE DREDGING

In 1984, two samples were collected in the vicinity of Outfall 001 to support the Commencement Bay Remedial Investigation. Samples were analyzed for polycyclic aromatic hydrocarbons, semivolatile organic compounds (SVOCs), pesticides, metals, polychlorinated biphenyl (PCB) Aroclors, grain size, total organic carbon (TOC), total solids (TS), and total volatile solids. One of the samples was also analyzed for sulfide. The depth intervals for these samples were not reported. Data are available in EIM under the study identifiers (IDs) CBBLAIR and CBMSQS.

In 1994, USOR collected two sediment samples from the Lincoln Avenue Ditch and submitted the results of chemical analysis to Ecology. Samples were analyzed for metals (antimony, arsenic, beryllium, cadmium, chromium, copper lead, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium and zinc), cyanide, organochlorine pesticides (4,4'-Dichlorodiphenyltrichloroethane), volatile organic compounds, base neutral/acid SVOCs, grain size, and TOC.

Maintenance dredging in the Blair Waterway was completed by the Port in 1993–1994 and in 2000 to increase the depth of the Blair Waterway to -51 feet. No post-dredging sediment sampling investigations were identified; however, some sediment contamination was noted in dredged sediments (DOF 2007a).

In 2007, in accordance with the requirements outlined in the 2002 NPDES permit, sampling was conducted to determine baseline sediment quality in the vicinity of Outfall 001. Two sediment samples were analyzed for the following parameters: metals (arsenic, chromium, cadmium, copper, mercury, nickel, lead, silver, and zinc), volatile organic compounds (VOCs), SVOCs, TOC, grain size, TS, ammonia, and sulfides. None of the samples exceeded sediment quality standards and bioassay testing was not required. The data report was submitted to Ecology in 2007 (DOF 2007b) and the data are available in EIM under the study ID USOIL07.

2.3 SUMMARY OF ON-SITE WASTE DISPOSAL PRACTICES

Waste disposal practices that may impact stormwater runoff, such as processes that generate waste or recyclable material that is stored outside prior to being transported off-site, or spill containment areas that drain to the refinery wastewater treatment system, are summarized in this section.

Marine Terminal
003
Outfall 001
(Lincoln Avenue
Stormwater Culvert
and Tidal Gate)(1)
Blair Waterway
Navigation Channel
City of Tacoma Storm Sewer
001B
002
006
001A
Outfall Line to
City of Tacoma
Storm Sewer
Puyallup River
Lincoln Avenue
Ditch
U.S. Oil &
Refining Co.
USOR Refinery
and Tank Farm
004
005
Erdahl Ditch

Legend

- USOR Outfall
- USOR Ditch
- Outfall Discharge to Ditch
- Chronic Mixing Zone
- Facility Boundary

Notes:
1. Outfall 001 is maintained by the City of Tacoma.
· Aerial imagery obtained from Nearmap, 2021.

Abbreviation:
USOR = U.S. Oil & Refining Co.

0 400 800 1,600
Scale in Feet

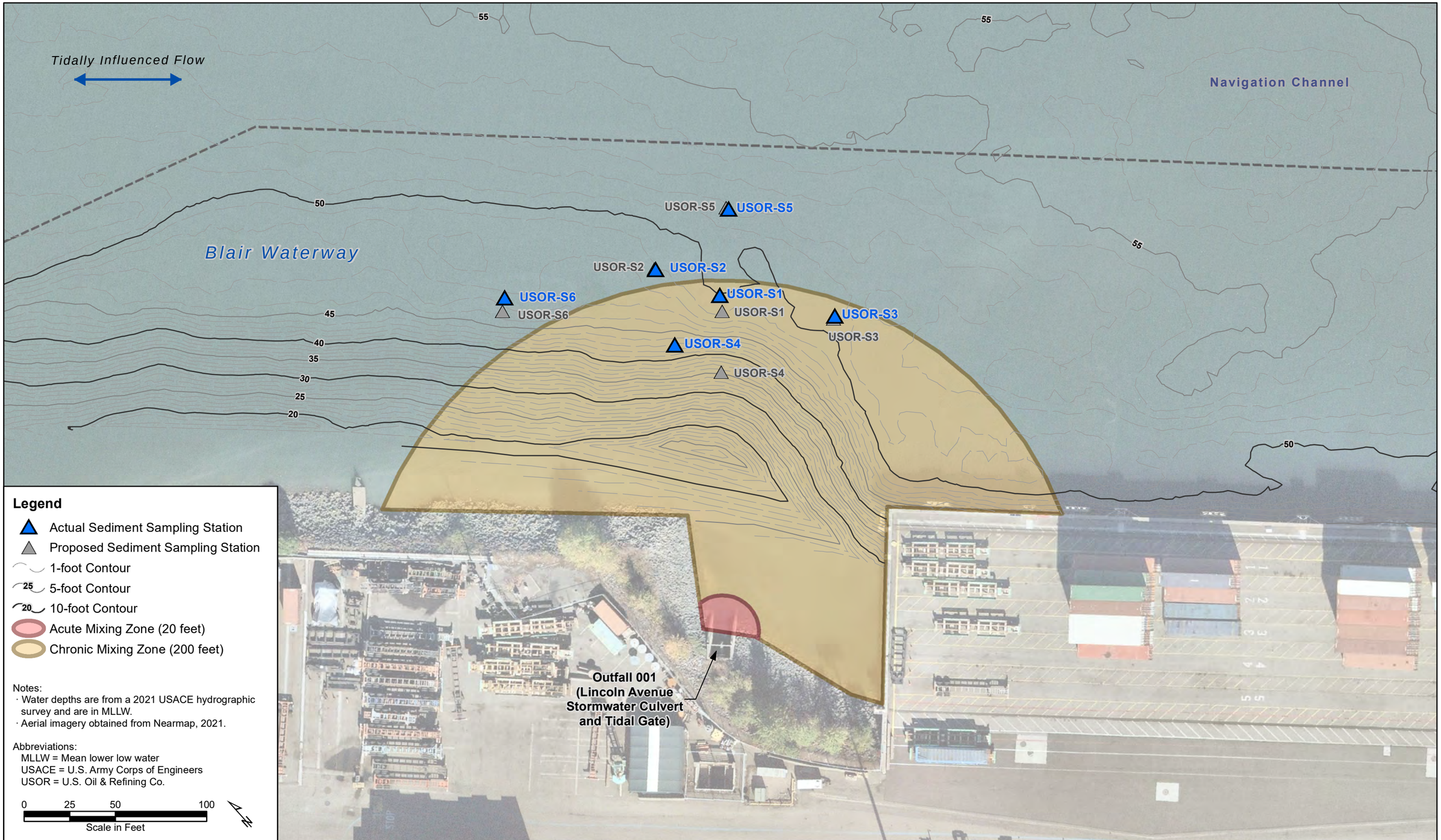
N

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Sediment Data Report
USOR Refinery
Tacoma, Washington

Figure 1.2
Facility Plan

I:\GIS\Projects\USOR-NPDES\01 Map Documents\2022 Sediment Data Report\Figure 1.2 Facility Plan.mxd
2/8/2023



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Sediment Data Report
USOR Refinery
Tacoma, Washington

Figure 2.1
Sediment Sampling Locations

I:\GIS\Projects\USOR-NPDES\01 Map Documents\2022 Sediment Data Report\Figure 2.1 Sediment Sampling Locations.mxd
3/13/2023

Table 3.1
Sediment Analytical Results

			Location Name		USOR-S1		USOR-S2		USOR-S2		USOR-S3		USOR-S4		USOR-S5		USOR-S6	
			Sample Name		USOR-S1-0-10		USOR-S2-0-10		USOR-S52-0-10		USOR-S3-0-10		USOR-S4-0-10 [1]		USOR-S5-0-10 [1]		USOR-S6-0-10	
			Date		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022	
			Depth Range (cm)		0–10		0–10		0–10		0–10		0–10		0–10		0–10	
	Marine Sediment AETs [2]		SMS Marine Sediment [3]															
Analyte	**SQS**	**SIZmax**	**SQS**	**SIZmax**														
Conventionals (mg/kg dw)	**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**	
Ammonia (as nitrogen)	--	--	--	--	7.55		10.8		11		11.7		21.2		10.9		9.55	
Sulfide	--	--	--	--	1.38 U		1.56 U		1.94 J		26.2 J		1.47 U		1.84 J		5.41 J	
Conventionals (%)	**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**	
Total organic carbon	--	--	--	--	0.56 J		0.55 J		0.52 J		0.67 J		0.47 J		0.49 J		0.67 J	
Total solids	--	--	--	--	64.98		64.2		63.59		60.68		67.5		67.45		61.67	
Total volatile solids	--	--	--	--	2.49		2.56		2.84		3.06		2.65		2.29		3.08	
Total solids, sulfide	--	--	--	--	63.11		63.2		63.94		59.6		62.73		66.44		63.32	
Metals	**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**		**mg/kg dw**	
Arsenic	57	93	57	93	5.99		5.65		5.54		6.55		5.89		6.07		5.93	
Cadmium	5.1	6.7	5.1	6.7	0.0700 JQ		0.0800 JQ		0.0900 JQ		0.0900 JQ		0.0600 JQ		0.0600 JQ		0.0800 JQ	
Chromium	260	270	260	270	12.3 J		12.3 J		12.8 J		13.7 J		12.1 J		13.1 J		13.8 J	
Copper	390	390	390	390	24.7		24.8		23.6		28.5		22.3		23.9		27.0	
Lead	450	530	450	530	4.81		4.50		4.64		5.52		4.64		4.27		5.68	
Mercury	0.41	0.59	0.41	0.59	0.0297 JQ		0.0306		0.0313		0.0353		0.0268 JQ		0.0255 JQ		0.0277 JQ	
Silver	6.1	6.1	6.1	6.1	0.0900 JQ		0.0800 JQ		0.0800 JQ		0.100 JQ		0.0900 JQ		0.0800 JQ		0.0900 JQ	
Zinc	410	960	410	960	35.9		35.1		34.7		42.7		34.5		34.5		40.7	
Polycyclic Aromatic Hydrocarbons	**µg/kg dw**		**mg/kg-OC**		**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**
Total LPAH (U=0) [4]	5,200	5,200	370	780	40 J	7.1 J	22 J	3.9 J	25 J	4.8 J	36 J	5.4 J	34 J	7.3 J	26 J	5.3 J	52 J	7.8 J
2-Methylnaphthalene	670	670	38	64	9.5 JQ	1.7 JQ	6.6 JQ	1.2 JQ	8.6 JQ	1.7 JQ	9.5 JQ	1.4 JQ	7.0 JQ	1.5 JQ	7.5 JQ	1.5 JQ	12 JQ	1.8 JQ
Acenaphthene	500	500	16	57	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Acenaphthylene	1,300	1,300	66	66	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Anthracene	960	960	220	1,200	7.5 JQ	1.3 JQ	20 U	3.6 U	20 U	3.8 U	7.6 JQ	1.1 JQ	7.9 JQ	1.7 JQ	20 U	4.0 U	12 JQ	1.8 JQ
Fluorene	540	540	23	79	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Naphthalene	2,100	2,100	99	170	11 JQ	1.9 JQ	6.0 JQ	1.1 JQ	7.5 JQ	1.4 JQ	8.9 JQ	1.3 JQ	6.9 JQ	1.5 JQ	6.5 JQ	1.3 JQ	12 JQ	1.8 JQ
Phenanthrene	1,500	1,500	100	480	21	3.8	16 JQ	2.9 JQ	18 JQ	3.4 JQ	20	2.9	19 JQ	4.1 JQ	20 JQ	4.0 JQ	28	4.2
Total HPAH (U=0) [5]	12,000	17,000	960	5,300	320 J	57 J	240 J	44 J	210 J	40 J	310 J	46 J	340 J	73 J	260 J	54 J	320 J	48 J
Benzo(a)anthracene	1,300	1,600	110	270	19 JQ	3.4 JQ	15 JQ	2.7 JQ	17 JQ	3.2 JQ	19 JQ	2.8 JQ	20 JQ	4.1 JQ	22	4.5	22	3.3
Benzo(a)pyrene	1,600	1,600	99	210	28	5.0	20 JQ	3.6 JQ	19 JQ	3.7 JQ	20	3.0	26	5.6	24	4.9	26	3.8
Benzo(g,h,i)perylene	670	720	31	78	28	5.0	19 JQ	3.5 JQ	16 JQ	3.1 JQ	20	3.0	28	6.0	18 JQ	3.7 JQ	21	3.1
Benzofluoranthenes (total)	3,200	3,600	230	450	66	12	50	9.1	49	9.3	58	8.7	64	14	63	13	67	10
Chrysene	1,400	2,800	110	460	29	5.1	25	4.5	27	5.1	34	5.0	38	8.0	32	6.5	44	6.6
Dibenzo(a,h)anthracene	230	230	12	33	31	5.6	19 JQ	3.4 JQ	20 U	3.8 U	19 U	2.9 U	22	4.8	20 U	4.0 U	20 U	2.9 U
Fluoranthene	1,700	2,500	160	1,200	40	7.2	38	6.9	39	7.5	75	11	62	13	44	9.0	62	9.2
Indeno(1,2,3-c,d)pyrene	600	690	34	88	32	5.7	22	4.1	20 U	3.8 U	17 JQ	2.6 JQ	27	5.7	19 JQ	3.8 JQ	18 JQ	2.7 JQ
Pyrene	2,600	3,300	1,000	1,400	43	7.6	37	6.7	43	8.2	62	9.3	58	12	42	8.6	64	9.6
Organic and Chlorinated Organic Chemicals	**µg/kg dw**		**mg/kg-OC**		**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**
1,2,4-Trichlorobenzene [6]	31	51	0.81	1.8	2.6 U	0.46 U	2.7 U	0.49 U	2.7 U	0.52 U	2.6 U	0.39 U	2.7 U	0.57 U	2.7 U	0.55 U	2.6 U	0.39 U
1,2-Dichlorobenzene	35	50	2.3	2.3	4.9 U	0.88 U	5.0 U	0.91 U	4.9 U	0.94 U	4.8 U	0.72 U	5.0 U	1.1 U	5.0 U	1.0 U	2.4 JQ	0.36 JQ
1,4-Dichlorobenzene	110	110	3.1	9	4.9 U	0.88 U	5.0 U	0.91 U	0.90 JQ	0.17 JQ	1.1 JQ	0.16 JQ	1.0 JQ	0.21 JQ	0.70 JQ	0.14 JQ	1.8 JQ	0.27 JQ
Dibenzofuran	540	540	15	58	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Hexachlorobenzene [6]	22	70	0.38	2.3	0.70 U	0.13 U	0.70 U	0.13 U	0.70 U	0.13 U	0.70 U	0.10 U	0.70 U	0.15 U	0.70 U	0.14 U	0.70 U	0.10 U
Hexachlorobutadiene	11	120	3.9	6.2	4.9 U	0.88 U	5.0 U	0.91 U	4.9 U	0.94 U	4.8 U	0.72 U	5.0 U	1.1 U	5.0 U	1.0 U	4.9 U	0.73 U
N-Nitrosodiphenylamine	28	40	11	11	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U

Table 3.1
Sediment Analytical Results

			Location Name		USOR-S1		USOR-S2		USOR-S2		USOR-S3		USOR-S4		USOR-S5		USOR-S6	
			Sample Name		USOR-S1-0-10		USOR-S2-0-10		USOR-S52-0-10		USOR-S3-0-10		USOR-S4-0-10 [1]		USOR-S5-0-10 [1]		USOR-S6-0-10	
			Date		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022		9/27/2022	
			Depth Range (cm)		0–10		0–10		0–10		0–10		0–10		0–10		0–10	
	Marine Sediment AETs [2]		SMS Marine Sediment [3]															
Analyte	**SQS**	**SIZmax**	**SQS**	**SIZmax**														
Organics—Phthalate Esters	**µg/kg dw**		**mg/kg-OC**		**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**
Bis(2-ethylhexyl)phthalate	1,300	1,900	47	78	58	10	32 JQ	5.7 JQ	38 JQ	7.4 JQ	43 JQ	6.4 JQ	44 JQ	9.3 JQ	33 JQ	6.8 JQ	48 JQ	7.1 JQ
Butyl benzyl phthalate	63	900	4.9	64	20 U	3.5 U	11 JQ	1.9 JQ	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Diethylphthalate	200	1,200	61	110	49 U	8.8 U	50 U	9.0 U	50 U	9.5 U	48 U	7.2 U	50 U	11 U	50 U	10 U	49 U	7.3 U
Dimethyl phthalate	71	160	53	53	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Di-n-butyl phthalate	1,400	1,400	220	1,700	7.4 JQ	1.3 JQ	20 U	3.6 U	7.6 JQ	1.5 JQ	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	5.6 JQ	0.84 JQ
Di-n-octyl phthalate	6,200	6,200	58	4,500	20 U	3.5 U	20 U	3.6 U	20 U	3.8 U	19 U	2.9 U	20 U	4.3 U	20 U	4.0 U	20 U	2.9 U
Organics—Ionizable Compounds	**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**	
2,4-Dimethylphenol	29	29	29	29	20 U		20 U		20 U		19 U		20 U		20 U		20 U	
2-Methylphenol	63	63	63	63	20 U		20 U		20 U		19 U		20 U		20 U		20 U	
4-Methylphenol	670	670	670	670	20 U		20 U		33		19 U		20 U		20 U		18 JQ	
Benzoic acid	650	650	650	650	79 JQ		52 JQ		200 U		60 JQ		200 U		200 U		48 JQ	
Benzyl alcohol	57	73	57	73	20 U		20 U		20 U		19 U		20 U		20 U		20 U	
Pentachlorophenol	360	690	360	690	7.7 JQ		3.6 JQ		2.2 JQ		4.1 JQ		4.0 JQ		2.1 JQ		3.8 JQ	
Phenol	420	1,200	420	1,200	19 JQ		15 JQ		31		17 JQ		14 JQ		17 JQ		21	
Polychlorinated Biphenyls (PCBs)	**µg/kg dw**		**mg/kg-OC**		**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**	**µg/kg dw**	**mg/kg-OC**
Aroclor 1016	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 UJ	0.60 UJ	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1221	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 UJ	0.60 UJ	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1232	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 UJ	0.60 UJ	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1242	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 UJ	0.60 UJ	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1248	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 UJ	0.60 UJ	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1254	--	--	--	--	3.8 JQ	0.68 JQ	2.5 JQ	0.45 JQ	2.5 JQ	0.48 JQ	3.3 JQ	0.49 JQ	2.1 JQ	0.45 JQ	2.7 JQ	0.55 JQ	3.2 JQ	0.48 JQ
Aroclor 1260	--	--	--	--	2.4 JQ	0.43 JQ	1.7 JQ	0.31 JQ	1.6 JQ	0.31 JQ	2.3 JQ	0.34 JQ	1.8 JQ	0.38 JQ	2.1 JQ	0.43 JQ	3.3 JQ	0.49 JQ
Aroclor 1262	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 U	0.60 U	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
Aroclor 1268	--	--	--	--	3.8 U	0.68 U	3.9 U	0.71 U	4.0 U	0.77 U	4.0 U	0.60 U	3.9 U	0.83 U	3.9 U	0.80 U	4.0 U	0.60 U
PCBs (Total, Aroclors)	130	1,000	12	65	6.2 J	1.1 J	4.2 J	0.76 J	4.1 J	0.79 J	5.6 J	0.84 J	3.9 J	0.83 J	4.8 J	0.98 J	6.5 J	0.97 J
Volatile Organic Compounds—BTEX [7]	**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**		**µg/kg dw**	
Benzene	--	--	--	--	1.4 U		1.4 U		0.42 JQ		1.6 UJ		1.2 U		0.48 JQ		0.57 JQ	
Toluene	--	--	--	--	0.48 JQ		0.56 JQ		0.55 JQ		0.61 JQ		0.42 JQ		1.3 JQ		0.60 JQ	
Ethylbenzene	--	--	--	--	1.4 U		1.4 U		1.3 U		1.6 UJ		1.2 U		1.5 U		1.8 U	
Xylene (meta & para)	--	--	--	--	2.8 U		2.8 U		2.5 U		3.1 UJ		2.5 U		3.0 U		3.5 U	
Xylene (ortho)	--	--	--	--	1.4 U		1.4 U		1.3 U		1.6 UJ		1.2 U		1.5 U		1.8 U	
Xylene (total)	--	--	--	--	2.8 U		2.8 U		2.5 U		3.1 UJ		2.5 U		3.0 U		3.5 U	

2008, 2014, and 2022 Urban Waters Initiative Sediment Quality in Commencement Bay

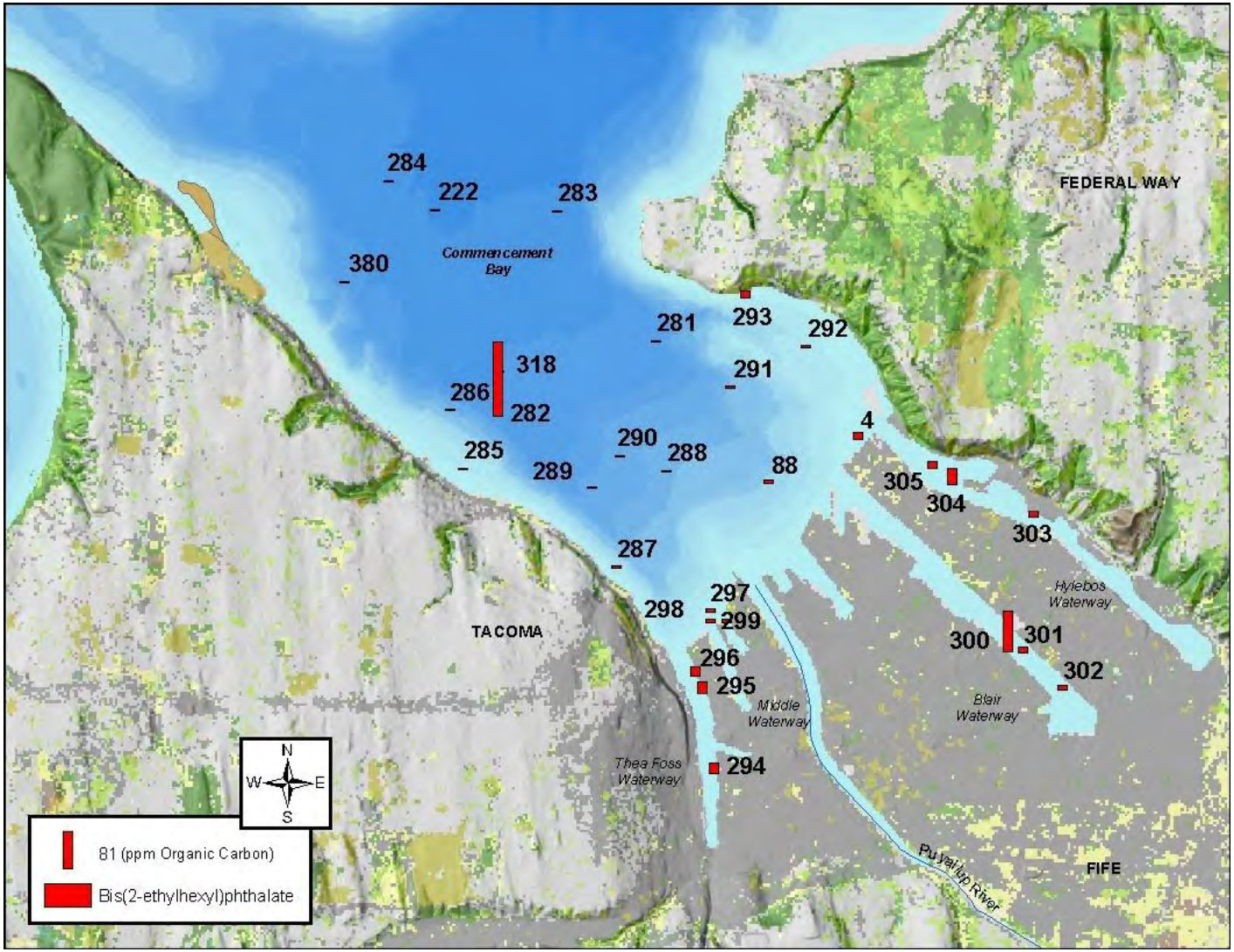


Figure 15. Spatial patterns in TOC-normalized bis(2-ethylhexyl)phthalate at the 30 stations sampled for the 2008 Urban Waters Initiative sediment study.

The Sediment Quality Standard for bis(2-ethylhexyl)phthalate is 47 ppm organic carbon. The numbers on the map are the station identifications.

Sample	Location	Sample weights (km^2)	Mean ERM quotient	Compounds Exceeding SQS	Compounds Exceeding CSL	Amphipod survival as % of control	% survival significantly different than controls & <80% of controls)	Mean Urchin fertilization in 100% pore water as % of control	Significance (<80% of controls)	Total Abundance	Taxa Richness	Eveness J'	Species Dominance	Annelid Abundance	Arthropod Abundance	Mollusca Abundance	Echinoderm Abundance	Misc. Taxa Abundance	Impaired infaunal assemblages		Count
299	Middle Waterway	0.016	0.11			99		101.3		1629	80	0.59	7	539	22	932	115	21	No	Parvilucina tenuisculpta	629
																				Axinopsida serricata	200
																				Amphiodia sp	111
																				Scoletoma luti	105
																				Aphelochaeta sp N5	82
																				Prionospio (Prionospio) steenstrupi	67
																				Rochefortia tumida	55
																				Prionospio (Minuspio) lighti	33
																				Heteromastus filobranchus	27
																				Cossura pygodactylata	21
300	Blair Waterway	0.387	0.04	Bis(2-Ethylhexyl) Phthalate	Bis(2-Ethylhexyl) Phthalate	90		101.3		578	53	0.61	8	256	8	296	15	3	Yes	Axinopsida serricata	255
																				Aphelochaeta sp N5	81
																				Terebellides californica	28
																				Scalibregma californicum	21
																				Levinsenia gracilis	20
																				Rochefortia tumida	13
																				Prionospio (Prionospio) steenstrupi	11
																				Alvania compacta	11
																				Prionospio (Minuspio) lighti	10
																				Scoletoma luti	8
301	Blair Waterway	0.387	0.05			93	*	100.9		535	59	0.75	12	320	26	167	18	4	No	Axinopsida serricata	103
																				Aphelochaeta sp N5	77
																				Terebellides californica	51
																				Alvania compacta	41
																				Scalibregma californicum	28
																				Levinsenia gracilis	22
																				Prionospio (Minuspio) lighti	20
																				Aphelochaeta monilaris	16
																				Prionospio (Prionospio) steenstrupi	13
																				Rochefortia tumida	12

Chemical	300				301		302		303				304		305		318		380	
			Lab Dup								Field Dup									
Priority Pollutant Metals (mg/kg dry w																				
Arsenic	5.48				5.46		6.39		23.6		23.8		7.13		9.98		5.31		8.43	
Cadmium	0.12				0.12		0.14		0.32		0.31		0.18		0.27		0.11		0.14	
Chromium	15.3				15.7		17.6		26		26.8		18.2		17.1		19.1		25.8	
Copper	25.6				25.7		30		80.1		83.8		41.1		55.8	J	28.8		25.9	
Lead	6.35				6.27		7.13		42.8		42.9		18.3		28.2		8.08		10.8	
Mercury	0.034				0.035		0.043		0.155		0.147		0.0896		0.116		0.068		0.071	
Nickel	10.5				10.7		12.5		16.7		17.2		12.8		13.2		14.3		23.6	
Selenium	0.5	U			0.5	U	0.5	U	0.71		0.5	U	0.5	U	1.6		0.5	U	0.5	U
Silver	0.084				0.078		0.084		0.21		0.21		0.14		0.18		0.098		0.1	
Zinc	34.7				34.8		39.3	J	102		102		48		83.3	J	39		47	
Trace Elements																				
Tin	0.5				0.48		0.64		2.99		3.28		1.09		1.43	J	0.6		0.8	
Organic Compounds (ug/kg dry weight)																				
Chlorinated Alkanes																				
Hexachlorobutadiene	10	UJ			10	U	10	UJ	8	J	8.6	J	7.3	J	7.4	J	12	U	11	U
Chlorinated and Nitro-Substituted P																				
Pentachlorophenol	200	UJ			204	UJ	208	UJ	230	UJ	238	UJ	203	UJ	251	UJ	242	UJ	219	UJ
Chlorinated Aromatic Compounds																				
1,2,4-Trichlorobenzene	10	UJ			10	U	10	UJ	12	UJ	3.8	NJ	10	UJ	12	U	12	U	11	U
1,2-Dichlorobenzene	10	UJ			10	UJ	10	UJ	12	UJ	12	U	10	UJ	12	U	12	U	11	U
1,3-Dichlorobenzene	10	UJ			10	UJ	10	UJ	12	UJ	12	U	10	UJ	12	U	12	U	11	U
1,4-Dichlorobenzene	10	UJ			10	UJ	10	UJ	12	UJ	12	U	10	UJ	12	U	12	U	11	U
2-Chloronaphthalene	10	UJ			10	U	10	U	10	U	3.4	UJ	10	U	10	U	2.5	U	1.4	UJ
Hexachlorobenzene	10	UJ			10	UJ	10	U	5.7	NJ	10	J	7.8	J	12	U	12	U	11	U
Chlorinated Pesticides																				
2,4'-DDD	0.5	U			0.51	U	0.5	U	0.67		0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
2,4'-DDE	0.5	U			0.51	U	0.5	U	2.8	UJ	3.1	UJ	0.8	UJ	0.52	U	0.5	U	0.5	U
2,4'-DDT	0.5	U			0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
4,4'-DDD	0.5	U			0.51	U	0.5	U	5.9	J	5.4	J	1.4		3.3	J	0.5	U	0.5	U
4,4'-DDE	0.5	U			0.51	U	0.5	U	3.4	UJ	3.6	UJ	0.97	UJ	2	UJ	0.5	U	0.5	U
4,4'-DDT	0.5	U			0.51	U	0.5	U	4.3	J	4	J	1.2	UJ	2.5	J	0.5	U	0.5	U
Aldrin	0.5	UJ			0.51	UJ	0.5	UJ	0.51	UJ	0.5	U	0.5	UJ	0.52	UJ	0.5	U	0.5	U
Cis-Chlordane (Alpha-Chlordane)	0.5	U			0.51	U	0.5	U	0.9	UJ	0.98	UJ	0.5	U	0.71	UJ	0.5	U	0.5	U
Dibutylchlorendate	106				100		95		93		94		105		133		86		92	
Dieldrin	0.5	U			0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Endosulfan I	0.5	U			0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Endosulfan II	0.5	UJ			0.51	UJ	0.5	UJ	0.51	UJ	0.5	U	0.5	UJ	0.52	UJ	0.5	U	0.5	U
Endosulfan Sulfate	0.5	UJ			0.51	U	0.5	U	1.6	UJ	0.91	UJ	0.6	UJ	1.8	UJ	0.5	U	0.5	U
Endrin	0.5	UJ			0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Endrin Aldehyde	0.5	UJ			0.51	UJ	0.5	UJ	0.51	UJ	0.5	UJ	0.5	UJ	0.52	UJ	0.5	UJ	0.5	UJ

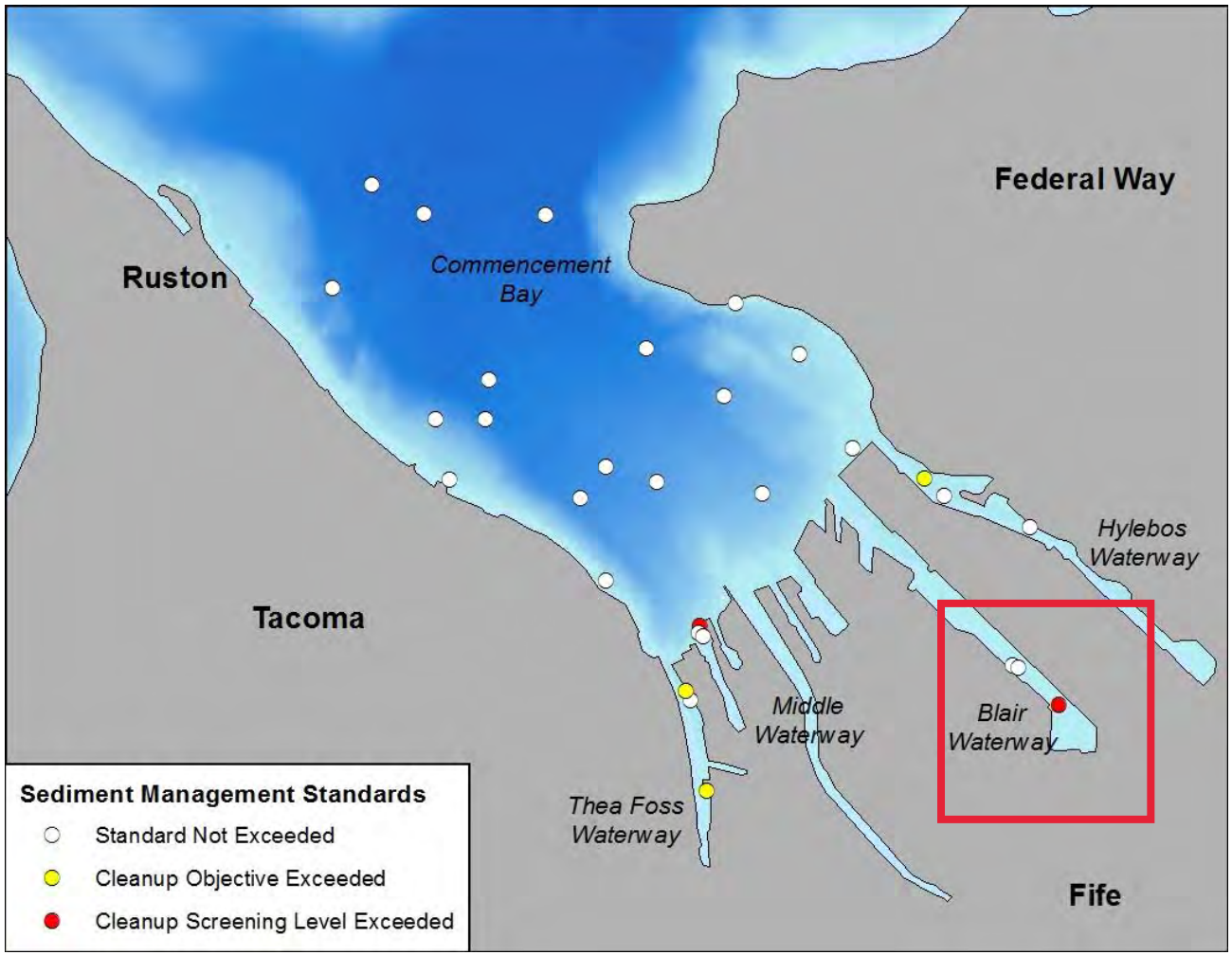
Chemical	300		301		302		303		304		305		318		380	
		Lab Dup						Field Dup								
Endrin Ketone	0.5	U	0.51	U	0.5	U	0.51	UJ	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Gamma-BHC (Lindane)	0.5	U	0.51	U	0.5	U	0.51	U	1.8	UJ	0.5	U	0.52	U	0.5	U	0.5	U
Heptachlor	0.5	U	0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Heptachlor Epoxide	0.5	U	0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Mirex	0.5	U	0.51	U	0.5	U	1.8	UJ	3	UJ	0.65	UJ	1.2	UJ	0.5	U	0.5	U
Oxychlordane	0.5	U	0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.52	U	0.5	U	0.5	U
Toxaphene	5	U	5.1	U	0.92	U	94	J	124		61	J	103	J	5	U	5	U
Trans-Chlordane (Gamma)	0.5	U	0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.72	UJ	0.5	U	0.5	U
Polynuclear Aromatic Hydrocarbons																		
LPAHs																		
Biphenyl	9.4		12		10		45		30		16		24		14		6.8	
1,6,7-Trimethylnaphthalene	19		20		20		61		69		40		43		38		27	
1-Methylnaphthalene	17		20		19		62		54		34		41		56		17	J
2,6-Dimethylnaphthalene	26		28		34		99		80		58		98		63		22	J
2-Methylnaphthalene	21		26		24		92		72		45		57		69		19	J
2-Methylphenanthrene	22		26		24		88		100		58		65		70		24	
Acenaphthene	14		24		12		103		113		22		24		33		8.4	J
Acenaphthylene	12		12		8.3		101		76		27		40		14		20	
Anthracene	35		52		28		265		264		75		91		32		20	
Dibenzothiophene	11		16		9.8		52		64		17		23		14		5.4	
Fluorene	17		26		15		101		132		28		36		26		10	
Naphthalene	35		44		30		294	J	212		94		122	J	167	J	60	J
Phenanthrene	63		86		51		409		389		125		169		108		55	
Retene	88		100		82		245		221		374		258		394	J	108	
HPAHs																		
Benzo(a)anthracene	80		128		61		301		281		100		131		36		23	
Benzo(a)pyrene	78		100		65		476		318		158		200		36		25	
Benzo(b)fluoranthene	137		164		128		868		1090		290		368		52		34	
Benzo(e)pyrene	72		86		74		513		591		174		217		30		19	
Benzo(g,h,i)perylene	48		50		56		295		224		112		146		30		21	
Benzo(k)fluoranthene	50		60		47		347		224		96		121		19		12	
Chrysene	137		177		115		803		1100		267		324		51		33	
Dibenzo(a,h)anthracene	12		13		10		63		54		27		30		6.8		3.5	
Fluoranthene	203		393		159		792		938		234		342		84		64	
Indeno(1,2,3-cd)pyrene	50		54		54		237		230		108		134		27		19	
Perylene	214		238		381		268		186		127		158		138		53	
Pyrene	175		317		146		994		1060		304		351		84		66	
Miscellaneous Extractable Compoun																		
Benzoic Acid	1120	J	102	UJ	512	J	549	J	1840		571	J	2200	J	1600	J	2880	J
Benzyl Alcohol	20	UJ	20	UJ	21	UJ	23	UJ	24	UJ	20	UJ	25	UJ	24	UJ	22	UJ
Beta-Coprostanol	40	UJ	41	UJ	685	J	786	J	48	UJ	340	J	50	UJ	580	J	47	J
Carbazole	7.5		8.9		7.8		62		57	J	14		20		8		3.5	

	Chemical	300				301		302		303				304		305		318		380	
				Lab Dup								Field Dup									
	Cholesterol	487	J			644	J	2260	J	2580	J	9030	J	1400	J	4210		2070	J	612	J
	Dibenzofuran	27				44		22		124		134		39		65		41		20	
	Isophorone	18	J			20	U	21	UJ	36	J	50		20	UJ	96		28		22	U
Organonitrogen Compounds																					
	Caffeine	10	UJ			10	UJ	10	U	12	U	12	U	10	UJ	12	U	12	U	11	U
	N-Nitrosodiphenylamine	20	UJ			20	UJ	21	UJ	23	UJ	24	UJ	20	UJ	25	UJ	24	UJ	22	UJ
Phenols																					
	2,4-Dimethylphenol	20	UJ			20	UJ	21	UJ	23	UJ	24	UJ	20	UJ	25	UJ	24	UJ	22	UJ
	2-Methylphenol	20	UJ			20	UJ	29	J	23	UJ	24	UJ	20	UJ	41	J	24	UJ	22	UJ
	4-Methylphenol	50	J			48	J	47	J	70	J	105		47	J	68		58		49	
	Phenol	20	UJ			20	UJ	97	J	64	UJ	24	U	20	UJ	25	U	72		22	U
	Phenol, 4-Nonyl-	10	UJ			10	UJ	10	UJ	12	UJ	12	UJ	10	UJ	12	UJ	12	UJ	11	UJ
Phthalate Esters																					
	Bis(2-Ethylhexyl) Phthalate	521	J			81	J	88	J	263		170	J	350	J	265	J	35	J	18	J
	Butylbenzylphthalate	10	UJ			10	UJ	10	UJ	12	U	12	UJ	10	UJ	12	UJ	12	UJ	11	UJ
	Diethylphthalate	10	UJ			10	UJ	10	U	12	U	12	U	10	UJ	12	U	12	U	11	U
	Dimethylphthalate	10	UJ			10	UJ	10	U	12	U	12	U	10	UJ	12	U	12	U	11	U
	Di-N-Butylphthalate	10	UJ			10	UJ	10	U	12	U	12	U	10	UJ	12	U	12	U	11	U
	Di-N-Octyl Phthalate	10	UJ			10	UJ	10	UJ	12	U	12	UJ	10	U	12	U	12	UJ	11	UJ

	Chemical	300				301		302		303				304		305		318		380	
				Lab Dup								Field Dup									
Polychlorinated Biphenyls (PCB)																					
PCB Congeners																					
	PCB Congener 8	0.5	U			0.51	U	0.5	U	44	UJ	31	UJ	0.5	U	0.52	U	0.5	U	0.5	U
	PCB Congener 28	0.5	U			0.51	U	0.5	U	1.8	J	2	J	0.72	J	1.2	J	0.5	U	0.5	U
	PCB Congener 44	0.5	U			0.51	U	0.5	U	5	J	3.5	UJ	1.8	J	2	J	0.5	U	0.5	U
	PCB Congener 52	0.5	U			0.51	U	0.5	U	5.7	J	6.1	J	2	J	2.6	J	0.5	U	0.5	U
	PCB Congener 66	0.5	U			0.51	U	0.5	U	3.2	J	3.2	J	1.6	J	2.2	UJ	0.5	U	0.5	U
	PCB Congener 77	0.5	U			0.51	U	0.5	U	0.51	U	0.5	U	2.1	J	0.52	U	0.5	U	0.5	U
	PCB Congener 101	0.5	U			0.51	U	0.5	U	12	J	13	J	4.7		4.8	J	0.5	U	0.5	U
	PCB Congener 105	0.5	U			0.51	U	0.5	U	7.4		5.4		1.8	J	2	J	0.5	U	0.5	U
	PCB Congener 118	0.5	U			0.51	U	0.5	U	13		14		4.6		5.6		0.5	U	0.5	U
	PCB Congener 126	0.5	U			0.51	U	0.5	U	0.51	U	0.5	U	0.5	U	0.54	UJ	0.5	U	0.5	U
	PCB Congener 128	0.5	U			0.51	U	0.5	U	4	J	3.7	J	1.1	J	1.3	J	0.5	U	0.5	U
	PCB Congener 138	0.5	U			0.51	U	0.5	U	17		16		5.4		5.4	J	0.5	U	0.5	U
	PCB Congener 153	0.5	U			0.51	U	0.5	U	17		16	J	5.6		5.3	J	0.5	U	0.5	U
	PCB Congener 169	0.5	U			0.51	U	0.5	U	1.5	UJ	2.2	J	0.62	UJ	1.2	UJ	0.5	U	0.5	U
	PCB Congener 170	0.5	U			0.51	U	0.5	U	4.5	UJ	4.4	J	1.4	UJ	1.6	UJ	0.5	U	0.5	U
	PCB Congener 18	0.5	U			0.51	U	0.5	U	1.6	UJ	3.7	UJ	0.5	U	1.7	UJ	0.5	U	0.5	U
	PCB Congener 180	0.5	U			0.51	U	0.5	U	12	UJ	11		3.8	UJ	4.3	UJ	0.5	U	0.5	U
	PCB Congener 187	0.5	U			0.51	U	0.5	U	11		9.6		3.6		3.1		0.5	U	0.5	U
	PCB Congener 195	0.5	U			0.51	U	0.5	U	1.5		1.5		0.5	U	0.52	U	0.5	U	0.5	U
	PCB Congener 206	0.5	U			0.51	U	0.5	U	15		16		9		11		0.5	U	0.5	U
	PCB Congener 209	0.5	U			0.51	U	0.5	U	18		18		9.8		18		0.5	U	0.5	U
PCB Aroclors																					
	PCB Aroclor 1016	5	U			5.1	U	5	U	20	UJ	60	UJ	40	UJ	21	UJ	5	U	5	U
	PCB Aroclor 1221	5	U			5.1	U	5	U	41	UJ	100	UJ	40	UJ	41	UJ	5	U	5	U
	PCB Aroclor 1232	5	U			5.1	U	5	U	41	UJ	100	UJ	40	UJ	41	UJ	5	U	5	U
	PCB Aroclor 1242	5	U			5.1	U	5	U	41	UJ	42	J	20	UJ	41	UJ	5	U	5	U
	PCB Aroclor 1248	5	U			5.1	U	5	U	41	UJ	100	UJ	20	UJ	41	UJ	5	U	5	U
	PCB Aroclor 1254	7.6				5.9		7.9		219		183		59		80	J	5	U	5.1	
	PCB Aroclor 1260	5	U			5.1	U	5	U	157	J	100	UJ	55	UJ	62	UJ	5	U	5	U
	PCB Aroclor 1262	5	U			5.1	U	5	U	101	UJ	140	UJ	40	UJ	41	UJ	5	U	5	U
	PCB Aroclor 1268	5	U			5.1	U	5	U	61	UJ	46	J	40	UJ	41	UJ	5	U	5	U

	Chemical	300				301		302		303				304		305		318		380	
				Lab Dup								Field Dup									
Polybrominated Diphenylethers (PBI																					
PBDE Congeners																					
	PBDE-47	0.89				0.66		1.6		3.5		2.4		1.6		2.4		0.41		0.38	
	PBDE-49	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	1.4		0.21	U	0.2	U	0.2	U
	PBDE-66	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.21	U	0.2	U	0.2	U
	PBDE-71	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.21	U	0.2	U	0.2	U
	PBDE-99	0.68				0.53		2.3		2.2		1.5		1.1		1.4		0.33	UJ	0.3	UJ
	PBDE-100	0.18	J			0.2	U	0.43		0.2	U	0.2	U	0.2	U	0.21	U	0.1	J	0.2	U
	PBDE-138	0.4	U			0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.41	U	0.4	U	0.4	U
	PBDE-153	0.4	U			0.4	U	0.39	J	0.4	U	0.4	U	0.4	U	0.29	J	0.4	U	0.4	U
	PBDE-154	0.4	U			0.4	U	0.21	J	0.97		0.4	U	0.4	U	0.2	J	0.4	U	0.4	U
	PBDE-183	0.4	U			0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.41	U	0.4	U	0.4	U
	PBDE-184	0.4	U			0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.41	U	0.4	U	0.4	U
	PBDE-191	0.4	U			0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.41	U	0.4	U	0.4	U
	PBDE-209	2.6				5.8		1	U	23		42		5.3		23		5.6	J	10	U

Chemical Contamination



Spatial patterns of stations with chemicals exceeding the Washington State Sediment Management Standards criteria in the 2014 Urban Waters Initiative sediment survey.

The numbers on the map are the station identifiers.

Number of 2014 Urban Waters Initiative sediment study samples exceeding Washington State sediment-quality standards[a] and estimated spatial extent of chemical contamination.

Total sampling area = 24.06 km^2.

Parameter	Criterion	> SQS[b] No.	Area (km^2)	% of Total area	Station number	Criterion	> CSL[b] No.	Area (km^2)	% of Total area	Station number
Trace Metals (ppm dry weight)										
Arsenic	57	No criteria exceeded				93	No criteria exceeded			
Cadmium	5.1					6.7				
Chromium	260					270				
Copper	390					390				
Lead	450					530				
Mercury	0.41					0.59				
Silver	6.1					6.1				
Zinc	410					960				
Organic Compounds										
LPAH (ppm organic carbon)										
2-Methylnaphthalene	38	No criteria exceeded					No criteria exceeded			
Acenaphthene	16	1	0.13	0.5	294, Thea Foss Waterway					
Acenaphthylene	66	No criteria exceeded								
Anthracene	220									
Fluorene	23									
Naphthalene	99									
Phenanthrene	100									
Total LPAH (ppm organic carbon)										
Sum of 6 LPAH	370	No criteria exceeded				780	No criteria exceeded			

Parameter	Criterion	> SQS[b]				Criterion	> CSL[b]			
		No.	Area (km^2)	% of Total area	Station number		No.	Area (km^2)	% of Total area	Station number
HPAH (ppm organic carbon)										
Benzo(a)anthracene	110	No criteria exceeded				270	No criteria exceeded			
Benzo(a)pyrene	99					210				
Benzo(g,h,i)perylene	31	2	0.25	1.0	294 and 296 Thea Foss Waterway	78				
Chrysene	110	No criteria exceeded				460				
Dibenzo(a,h)anthracene	12					33				
Fluoranthene	160					1200				
Indeno(1,2,3-c,d)pyrene	34	1	0.13	0.5	294, Thea Foss Waterway	88				
Pyrene	1000	No criteria exceeded				1400				
Total Benzofluoranthenes	230					450				
Total HPAH (ppm organic carbon)										
Sum of 9 HPAH	960	No criteria exceeded				5300	No criteria exceeded			
Phenols (ppb dry weight)										
Pentachlorophenol	360	No criteria exceeded				690	No criteria exceeded			
Phthalate Esters (ppm organic carbon)										
Bis(2-ethylhexyl)phthalate	47	1	0.39	1.6	302, Blair Waterway	78	1	0.39	1.6	302, Blair Waterway
Butylbenzylphthalate	4.9	2	0.51	2.1	294, Thea Foss Waterway; 302, Blair Waterway	64	No criteria exceeded			
Diethylphthalate	61	No criteria exceeded				110				
Dimethylphthalate	53					53				
Di-N-Butyl Phthalate	220					1700				
Di-N-Octyl Phthalate	58					4500				
Total PCB (ppm organic carbon)										

Parameter	Criterion	> SQS[b]				Criterion	> CSL[b]			
		No.	Area (km^2)	% of Total area	Station number		No.	Area (km^2)	% of Total area	Station number
Total Aroclors	12	No criteria exceeded				65	No criteria exceeded			
Miscellaneous Compounds (ppm organic carbon)										
1,2-Dichlorobenzene	2.3	No criteria exceeded				2.3	No criteria exceeded			
1,2,4-Trichlorobenzene	0.81					1.8				
1,4-Dichlorobenzene	3.1					9				
Dibenzofuran	15					58				
Hexachlorobenzene	0.38					2.3				
Hexachlorobutadiene	3.9					6.2				
N-Nitrosodiphenylamine	11					11				

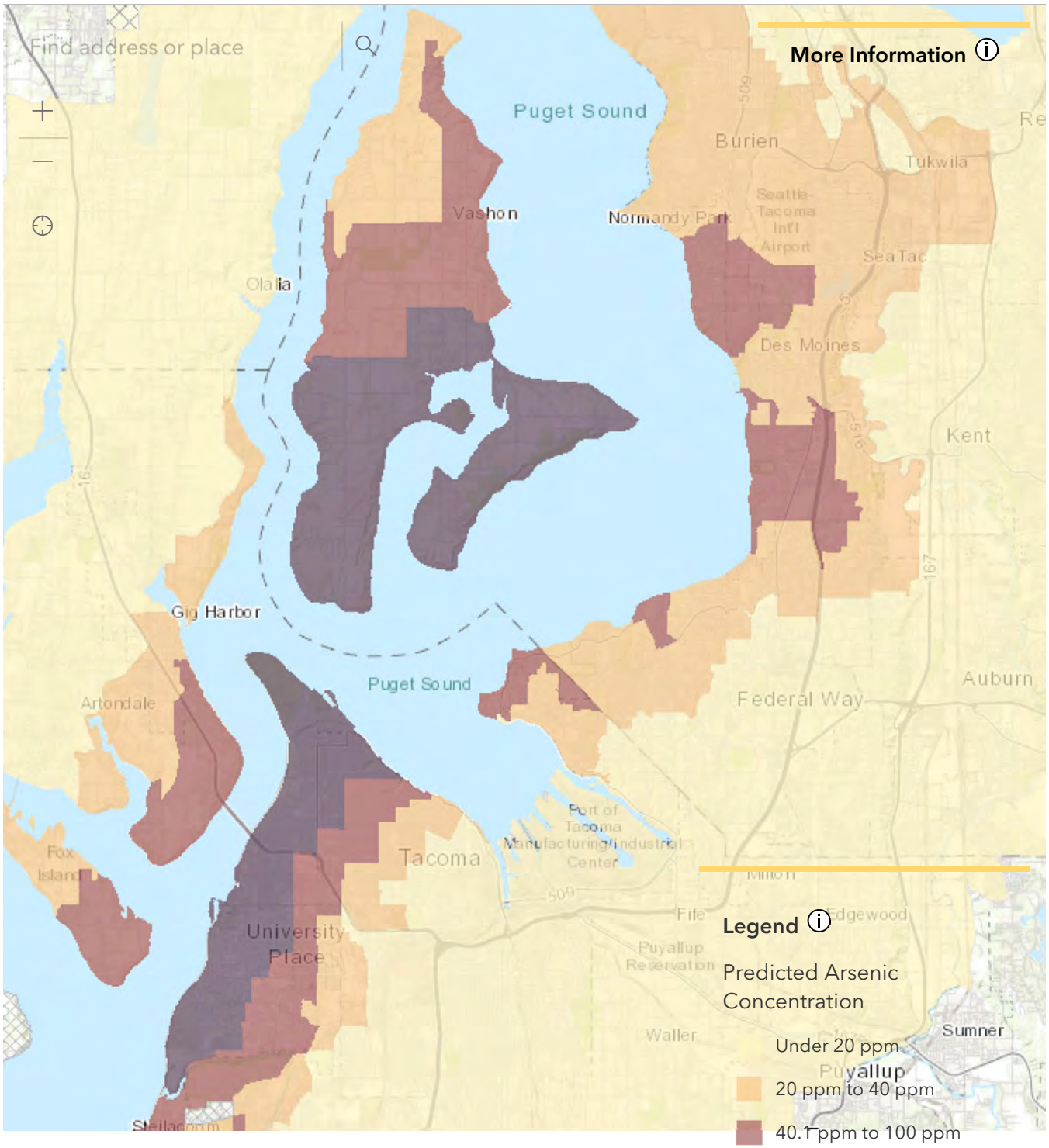
[a] Excluding Benzoic Acid, Benzyl Alcohol, Phenol, 2-Methylphenol, 4-Methylphenol, and 2,4-Dimethylphenol.

[b] SQS = Sediment Quality Standard, CSL = Cleanup Screening Levels (Washington State Sediment Management Standards - Chapter 173-204 WAC).

Asarco Smelter

DEPARTMENT OF ECOLOGY State of Washington

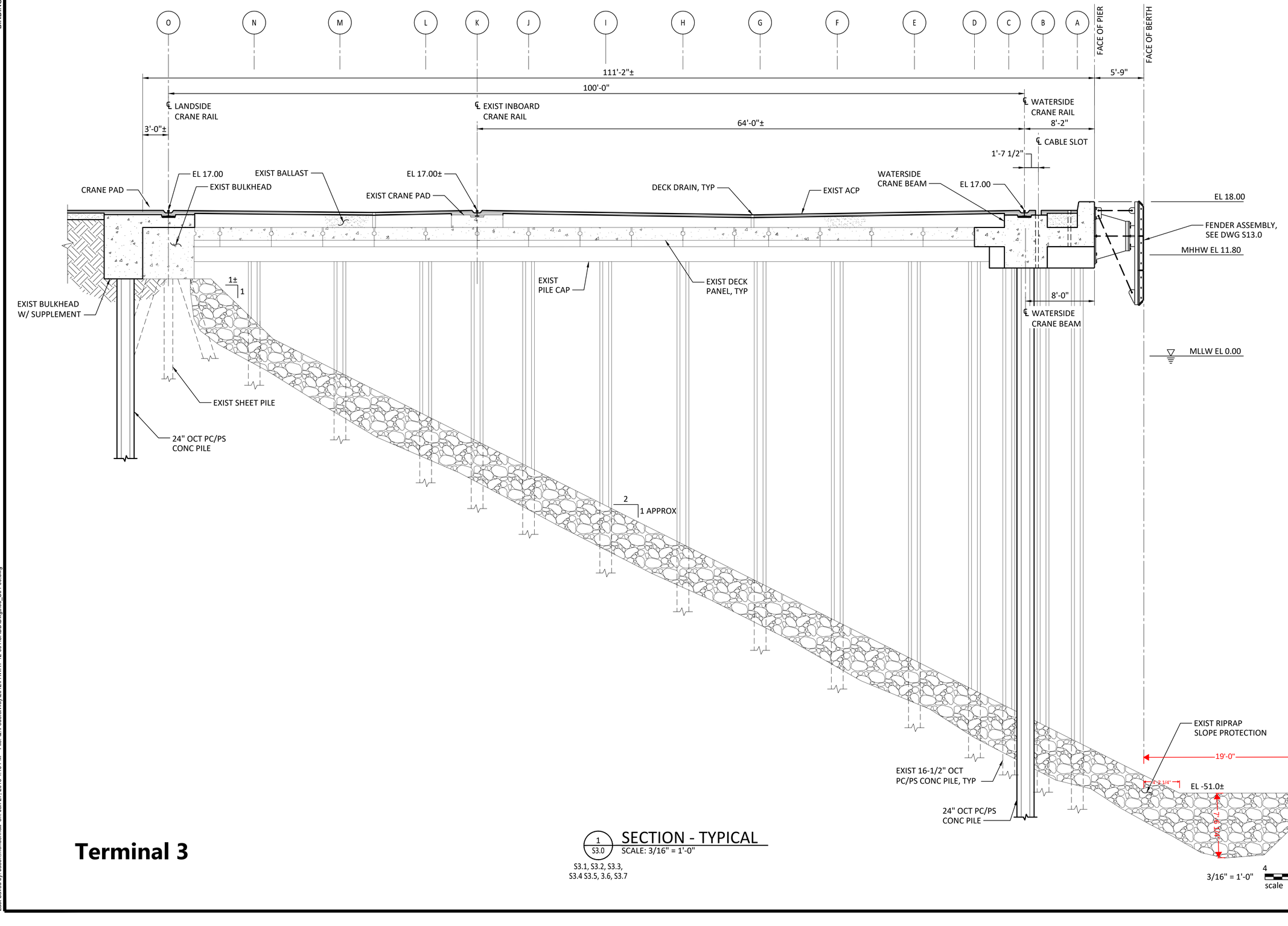
Dirt Alert



Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS Powered by Esri

Appendix B
Structural As-Builts

BINDING EDGE



1 / S3.0 SECTION - TYPICAL
SCALE: 3/16" = 1'-0"

S3.1, S3.2, S3.3, S3.4 S3.5, 3.6, S3.7

Terminal 3

BergerABAM
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Federal Way, Washington 98003-2600
(206) 431-2300 Fax: (206) 431-2250

Port of Tacoma
P.O. BOX 1837 TACOMA, WA 98401 (253)383-5841

MARK:	REVISION:	BY:	APPR:	DATE:

RECORD DRAWINGS:
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APPROVED:

DC 7/17/13
DIR OF ENG DATE

PRINTED BY: jason.mendenhall
PORT ADDRESS: ONE SITCUM WAY TACOMA, WA 98421-2300
DRAWING SCALE: AS SHOWN

CSB 7/17/13
CHECKED BY DATE

JRG 7/17/13
PROJ. ENGR DATE

CONT/CONS:	069458	TOWNSHIP: 21 N	RANGE: 3 E
MASTER ID NO:	092935	DAT-HRZ: NAD 83-07	VERT: NOS TIDAL (MLLW = 0.0)
PHASE:	RECORD DRAWINGS	PARCEL: 27	SECTION: 27

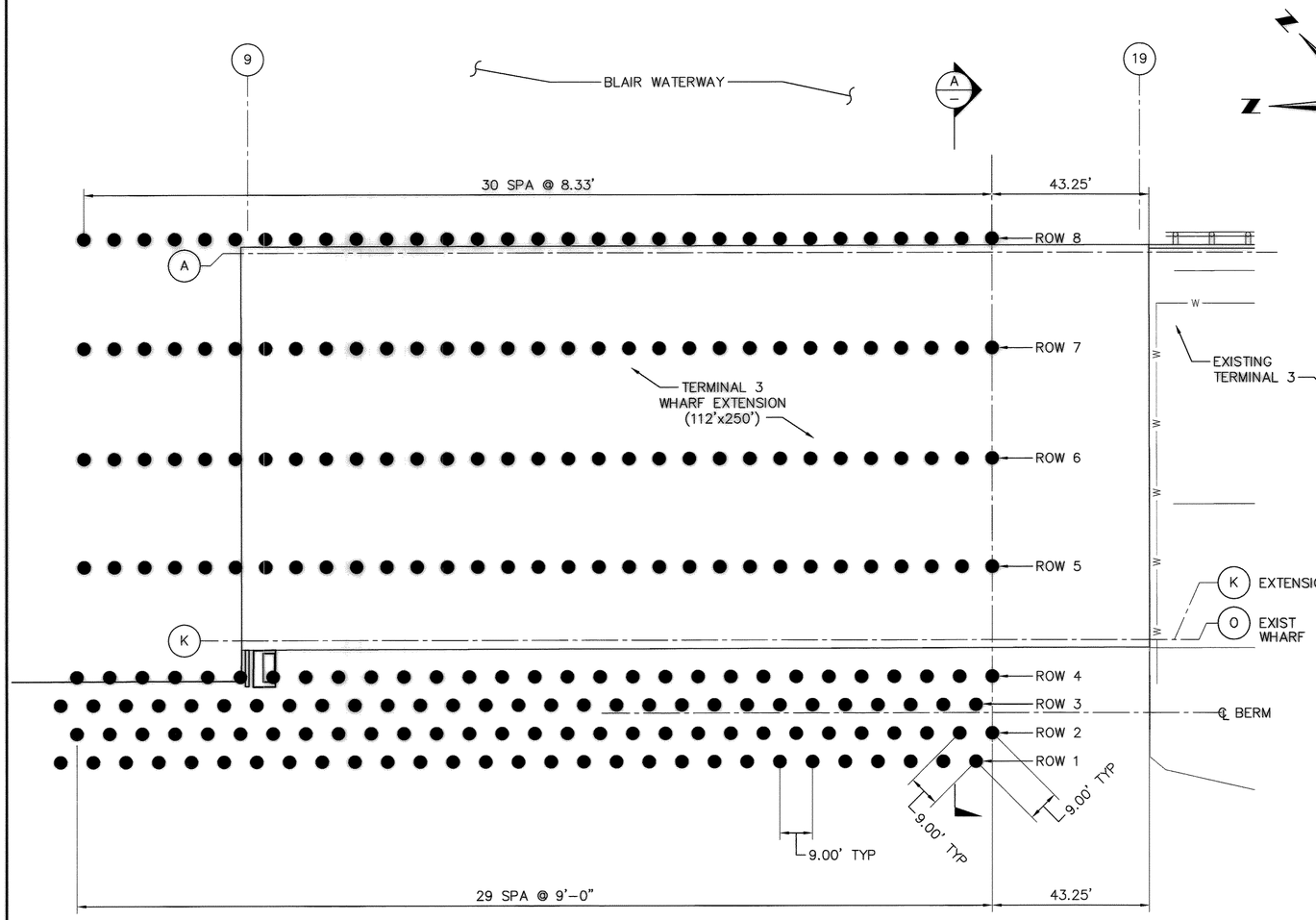
PIER 3 UPGRADE

TYPICAL SECTION
SHEET 1

6502
S4.0
SHEET 52 OF 129

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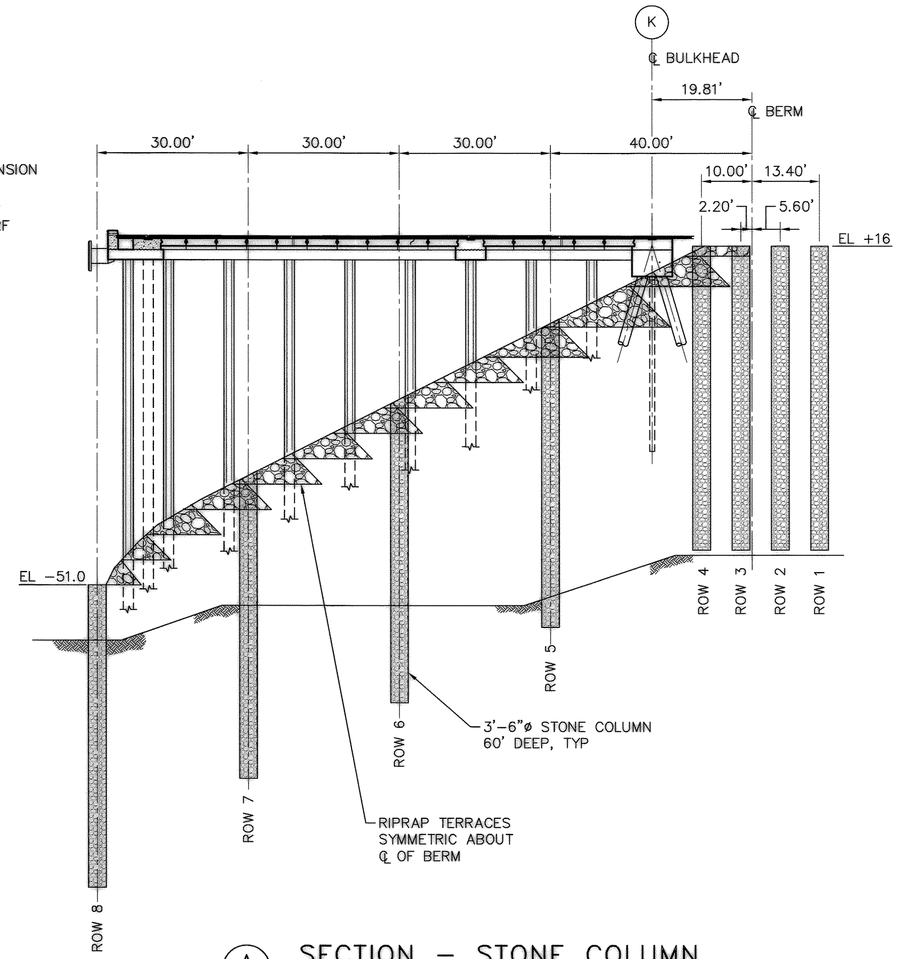


1 — STONE COLUMN PLAN
SCALE: 1"=20'-0"

1"=20' scale 20 0 20 40 feet

STONE COLUMN NOTES:

1. STONE COLUMNS SHALL PROVIDE A MINIMUM 13% REPLACEMENT RATION (OR REPLACEMENT) IN THE IN-SITU SOILS. REPLACEMENT RATION SHALL BE CALCULATED AS THE RATIO OF VOLUME OF STONE PLACED TO THE VOLUME OF THE UNIT CELL, OR THE VOLUME OF SOIL TRIBUTARY TO THE STONE COLUMN.
2. THE UNIT CELL FOR ALL STONE COLUMNS MAY BE TAKEN TO BE A 9'x7.8' AREA OVER THE 60' (NOM) LENGTH OF THE COLUMN FOR THE FOUR ROWS AT TOP OF BERM. CELLS MAY BE TAKEN AS 8.33'x8.33' AREA FOR THE OTHER ROWS.
3. SEE THE SPECIFICATIONS FOR OTHER ACCEPTANCE CRITERIA.
4. INSTALL AND TEST STONE COLUMNS IN ROWS 1 THROUGH 4 PRIOR TO START OF UNDERWATER STONE COLUMN INSTALLATION.
5. INSTALL STONE COLUMNS PRIOR TO START OF PILE INSTALLATION.



A — SECTION — STONE COLUMN
SCALE: N.T.S.

Terminal 3 Stone Columns in 2005 section

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TACOMA, WA 98401 253-383-5841
33301 9TH AVENUE SOUTH
FEDERAL WAY, WASHINGTON
98003-2600
(206)431-2300 FAX:(206)431-2250
BERGER/ABAM ENGINEERS INC.

MARK	REVISION	BY	APPROVED	DATE
1	RECORD DRAWINGS	SPM	DTJ	4/06

DTJ 11/1/04 CHECKED BY – DATE
SPM 11/1/04 PROJECT ENGR.– DATE
APPROVED
CHIEF ENGINEER DATE

DRAWING DATE: 1 Nov 2004
PORT ADDRESS:
PORT PARCEL:

DARRELL T. JOLLIE — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
EXPIRES OCTOBER 13, 2005

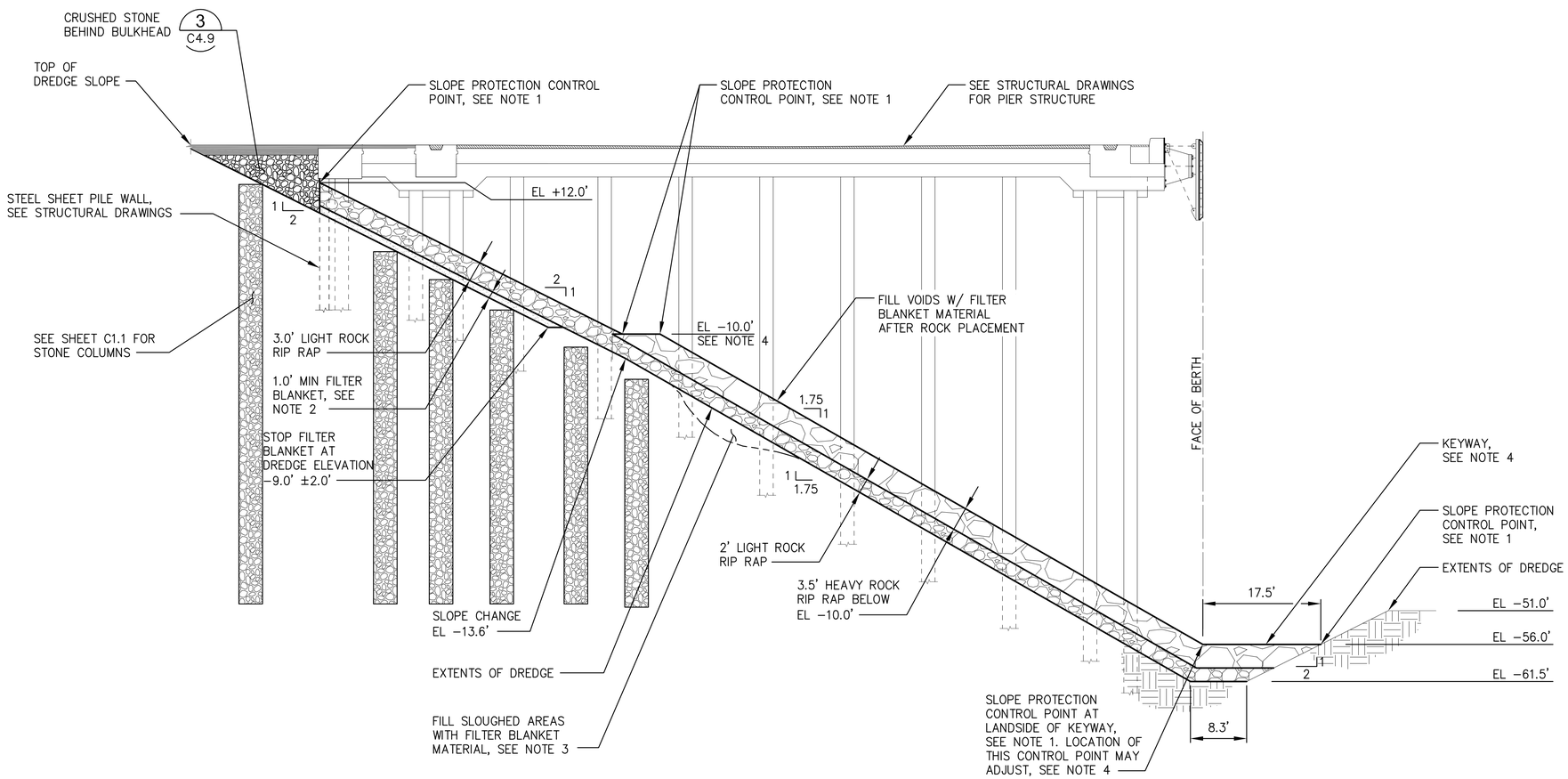
TERMINAL 3 & 4 REDEVELOPMENT
PHASE II
STONE COLUMNS

EP-6260-13
C2.17
SHEET 147 OF 185

TOWNSHIP: 20 RANGE: 3 SECTION: VARIOUS
DATUM: HORIZ: NAD 83-91 VERT: NOS TIDAL (MLLW = 0.0)
DRAWING SCALE: AS SHOWN
CONTRACT NUMBER: 998203
E NUMBER: E2323
PHASE: RECORD DRAWING

Last Saved on Fri Jun 02 2006 at 12:23PM by Jef File Name: O:\2004\FAWAT-04-138\CADD\dwgs\C2_17.dwg Scale: 1

BINDING EDGE



A SLOPE PROTECTION SECTION

C1.4, C3.1 SCALE: 1"=10'

NOTES

1. SEE C3.1 FOR SLOPE PROTECTION CONTROL POINT COORDINATES.
2. FILTER BLANKET THICKNESS MAY VARY TO ACHIEVE THE TOP SURFACE OF FINISHED ROCK FACE AS DEFINED BY THE SLOPE PROTECTION CONTROL POINTS.
3. IF SLOPE SLOUGHING OCCURS DURING OR AFTER DREDGING, SLOUGHED AREAS SHALL BE FILLED WITH FILTER BLANKET MATERIAL PRIOR TO PLACEMENT OF LIGHT RIPRAP.
4. THE ELEVATION OF THE BENCH SHOWN AT -10.0' MLLW, THE TOP SURFACE OF THE LIGHT ROCK RIP RAP LAYER AND HEAVY ROCK RIP RAP LAYER, AND THE HORIZONTAL LOCATION OF THE LANDSIDE CONTROL POINT AT THE KEYWAY MAY BE ADJUSTED AT ENGINEER'S DIRECTION BASED ON REVIEW OF THE POST-DREDGE SURVEY. THE ADJUSTMENT WILL BE MADE TO MINIMIZE THE VOLUME OF LIGHT ROCK RIP RAP MATERIAL PLACED WITHIN THE PAYABLE OVERDREDGE AREA.

Terminal 4

10' 0 10' 20'
5' 15'
SCALE: 1"=10'

RECORD DRAWINGS

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P.O. BOX 1837 TACOMA, WA 98401-2503/253-383-5841
kpff
2407 North 31st Street, Suite 100
Tacoma, Washington 98407
(253) 396-0150 Fax (253) 396-0162

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APPROVED:

DIRECTOR ENG. DATE	PROJ. ENGR DATE	CHECKED BY DATE

PRINTED BY: smillett Jul 18, 2018
PORT ADDRESS:ONE SITCUM PLAZA
TACOMA, WA 98401-1837

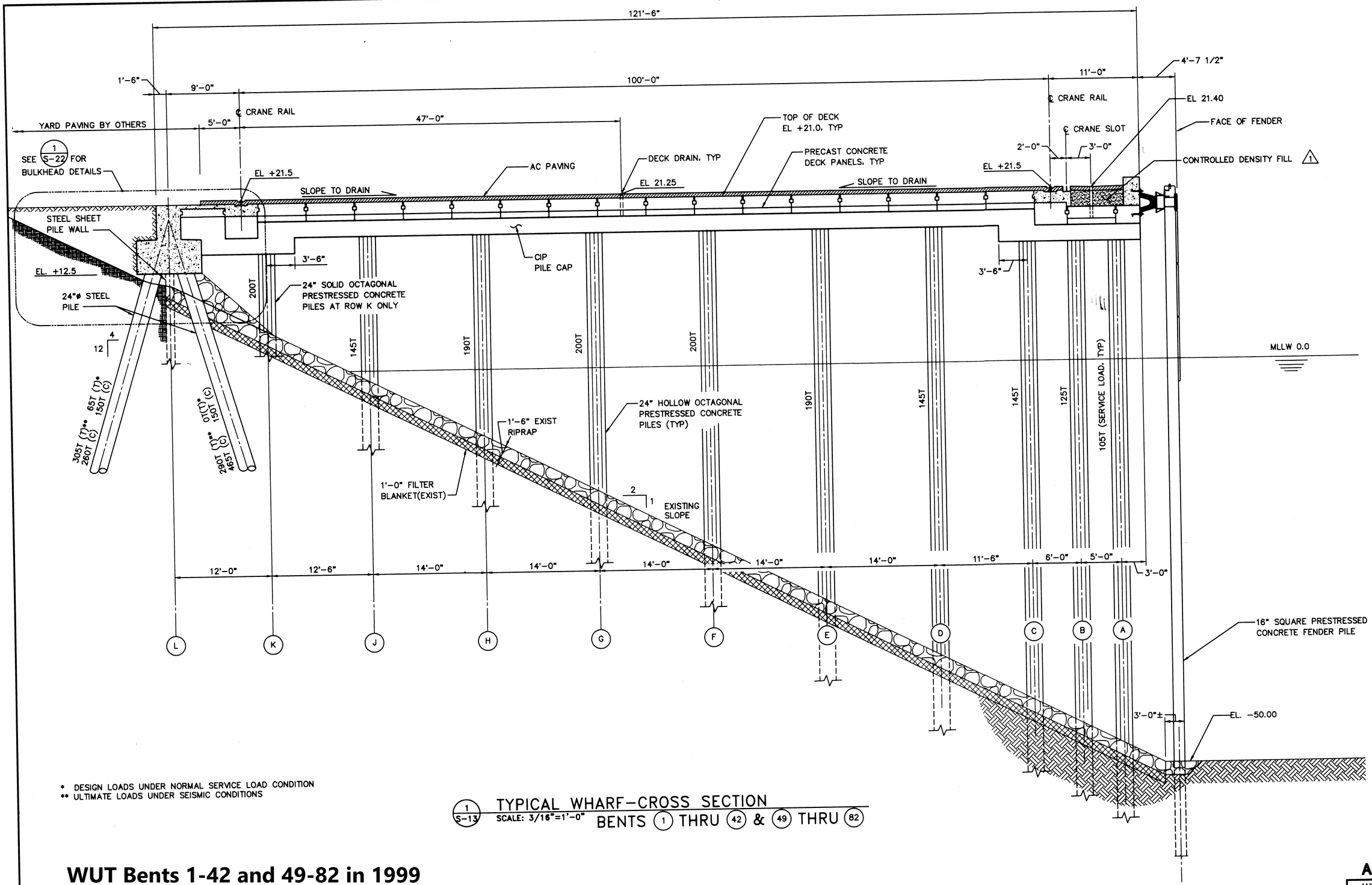
PIER 4 PHASE 2
RECONFIGURATION
SLOPE PROTECTION SECTIONS - SHEET 1

CONT/CONS: 070136	TOWNSHIP:	RANGE:	SECTION:
M. ID: 091251	DAT-HRZ: WA83-SF	VERT: MLLW 19.39' @ Tide 22 1933	
PHASE: CONFORMED	PARCEL:	DRAWING SCALE: AS NOTED	

6552
C3.2
SH 53 OF 499

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PORT OF TACOMA FILE: M:\20141114096 POT Pier 4 Reconfiguration\Drawings\Current Civil As-Built\091251-C3.2-C3.5 (Typical Slope Protection Detail)



* DESIGN LOADS UNDER NORMAL SERVICE LOAD CONDITION
** ULTIMATE LOADS UNDER SEISMIC CONDITIONS

1/S-13 TYPICAL WHARF-CROSS SECTION
SCALE: 3/16"=1'-0"
BENTS (1) THRU (42) & (49) THRU (82)

WUT Bents 1-42 and 49-82 in 1999

AS-BUILT

AUTOCAD FILE NO. 5012S13 | S-13

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(206) 383-5841

BERGER/ABAM ENGINEERS INC.
33301 9TH AVENUE SOUTH
FEDERAL WAY, WASHINGTON 98003-6395
(206)431-2300 FAX:(206)431-2250

APPROVED 1/11/99 DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

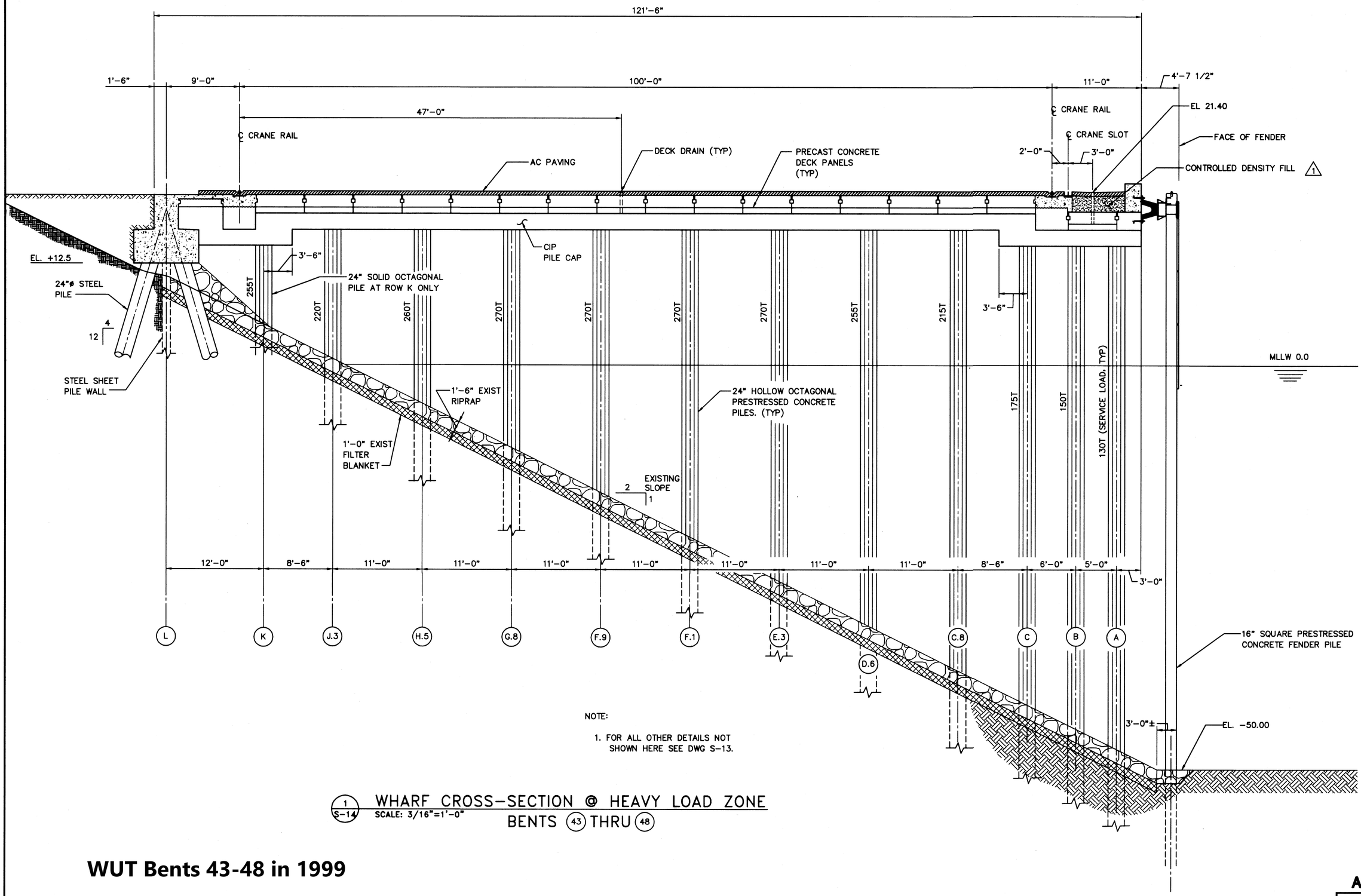
MMD 9/97	BCM 9/97	JAS 1/4/99
DRAWN BY DATE	CHECKED BY DATE	
DESIGNED BY 9/97 DATE	JAS 9/97	
	PROJ ENGR DATE	

MARK	REVISION	BY	APP.	DATE
1	AS-BUILT	RDD	JAS	1/4/99

HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
WHARF CROSS-SECTION - TYPICAL

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 22 OF 58

PLOTTED: Thu Jan 07 1999 2:00pm FILENAME: V:\1997\A97093\CAD\S-13.dwg SCALE: 64



NOTE:

1. FOR ALL OTHER DETAILS NOT SHOWN HERE SEE DWG S-13.

(1) / S-14 WHARF CROSS-SECTION @ HEAVY LOAD ZONE
SCALE: 3/16"=1'-0"
BENTS (43) THRU (48)

WUT Bents 43-48 in 1999

AS-BUILT

AUTOCAD FILE NO. 5012S14 | S-14

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FEDERAL WAY, WASHINGTON 98003-6385
(206)431-2300 FAX:(206)431-2250

APPROVED [signature] P.E. 1/11/99 DATE
CURTIS L. RATCLIFFE P.E.
CHIEF ENGINEER

MMD	9/97	BCM	9/97	
DRAWN BY	DATE	CHECKED BY	DATE	
	9/97	JAS	9/97	
DESIGNED BY	DATE	PROJ ENGR	DATE	

MARK	REVISION	BY	APP.	DATE
1	AS-BUILT	RDD	JAS	1/4/99

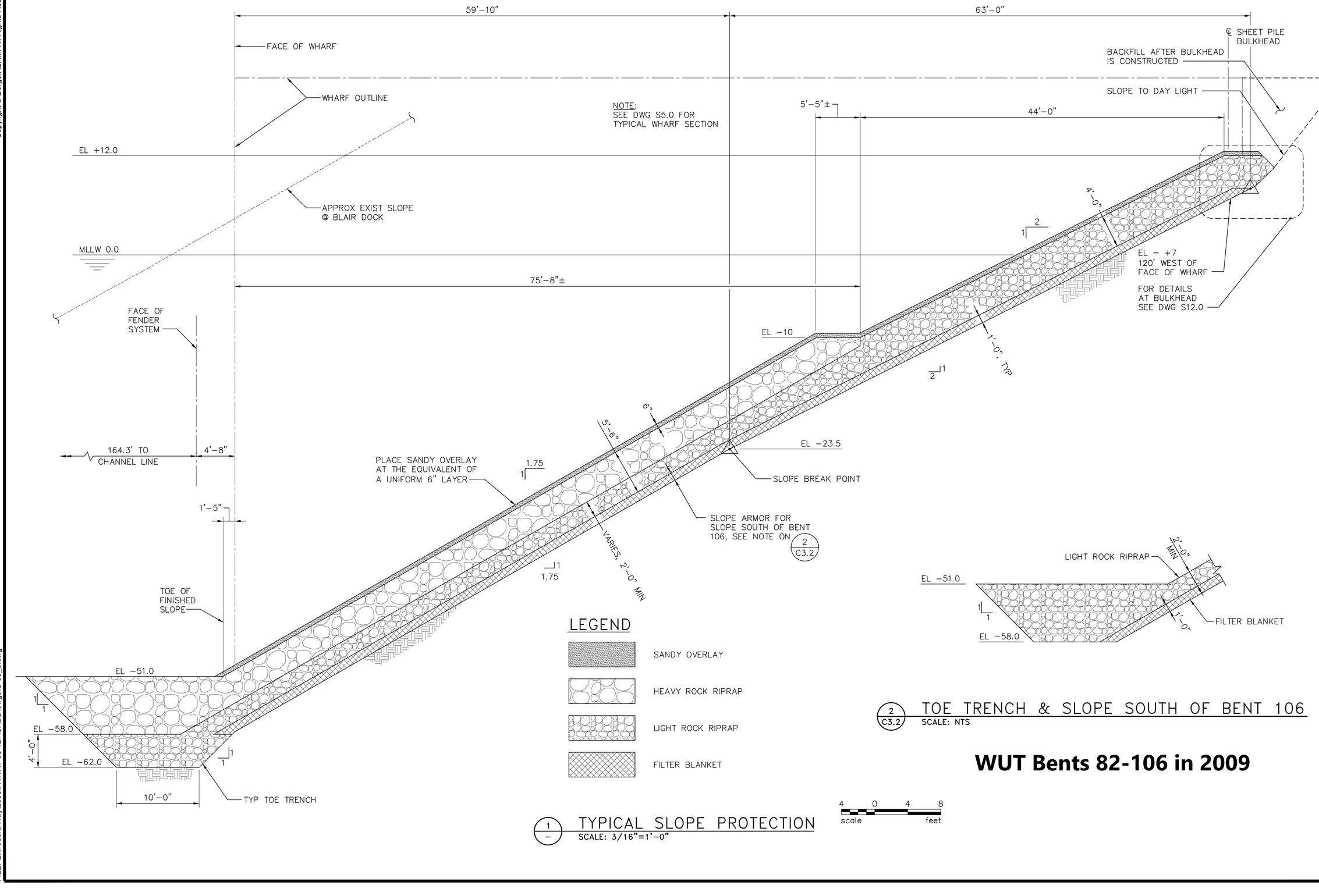
HYUNDAI MERCHANT MARINE TERMINAL
WHARF
PORT OF TACOMA
WHARF CROSS-SECTION - HEAVY LOAD ZONE

DRAWING NO. EP-5012-26
CONTRACT NO. 978038
SHEET NO. 23 OF 58

PLOTTED: Thu Jan 07 1999 2:01pm FILENAME: V:\1997\A97093\CAD\S-14.dwg SCALE: 64

BINDING EDGE

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1/– TYPICAL SLOPE PROTECTION
SCALE: 3/16"=1'–0"

2/C3.2 TOE TRENCH & SLOPE SOUTH OF BENT 106
SCALE: NTS

WUT Bents 82-106 in 2009

PORT OF TACOMA P.O. BOX 1837, TACOMA, WA 98401 (253)383-9841
BergerABAM
33301 9th Avenue South, Suite 300
Federal Way, Washington 98003-2600
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MARK:	REVISION:	BY:	APPR:	DATE:
1	RECORD DRAWINGS	DSE	DSE	9/30/13

PORT of TACOMA U.S.A.

ELWIN W. OTOLIN — STATE OF WASHINGTON — 19466 — REGISTERED PROFESSIONAL ENGINEER

APPROVED:		EWO	10/2/09
		CHECKED BY	DATE
		DSE	10/2/09
		PROJ. ENGR	DATE
	SNR PM DATE	PRINTED BY:	
		PORT ADDRESS:	1815 PORT OF TACOMA RD
			TACOMA, WA 98401–1837

WUT BERTH EXTENSION

SLOPE PROTECTION

CONT/CONS:	068064	TOWNSHIP:	21 N
E. NUMBER:	E8022	DAT–HRZ:	NAD 83–07
PHASE:	RECORD DRAWINGS	PARCEL:	24 & 25
		RANGE:	3 E
		VERT:	NOS TIDAL (MLLW = 0.0)
		DRAWING SCALE:	AS SHOWN
		SECTION:	SE 1/4 35

6345
C3.5
SHEET 31 OF 179

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FILE: Q:\FederalWay\2008\FAWAT-08-127\CADD\dwgs\C-03_5.dwg

Appendix C
Field Forms

Daily Log

ANCHOR QEA

PROJECT NAME: **DATE:**

SITE ADDRESS: **PERSONNEL:**

WEATHER: **WIND FROM:**

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY

SUNNY	CLOUDY	RAIN	?

TEMPERATURE: ° F . ° C

[Circle appropriate units]

TIME	COMMENTS

Signature: _____

Sediment Grab Collection Log

Job: Port of Tacoma Husky and WUT Berths	**Station:**
Job No: Date:	
Field Staff: Proposed Coordinates:	Sample Method: Box Corer
Contractor: Lat:	
Water Depth: Long:	
DTM Depth Sounder:	Sample Acceptability Criteria:
Tide Measurements	1) Overlying water is present
Time:	2) Water has low turbidity
Height:	3) Sampler is not overfilled
	4) Surface is flat
	5) Desired penetration depth

Mudline Elevation (datum): calculated after sampling

Notes:

Grab #	Time	Actual Coordinates (datum)		Sample Accepted (Y/N)	Recovery Depth (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		NAD 83 (N)	NAD 83 (E)			

Sample Description surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Composite sample:

Sample Containers:

Analyses:

Sediment Core Collection Log

Job:	**Station ID:**
Job No:	**Attempt No.**
Field Staff:	**Date:**
Contractor:	**Logged By:**
Vertical Datum:	**Horizontal Datum: NAD83 WA State Plane North, feet**

Field Collection Coordinates:

Lat/Northing: Long/Easting:

A. Water Depth

DTM Depth Sounder:

DTM Lead Line:

B. Water Level Measurements

Time:

Height:

Source:

C. Mudline Elevation

Recovery Measurements (prior to cuts)

Core Collection Recovery Details:

Core Accepted: Yes / No

Core Tube Length:

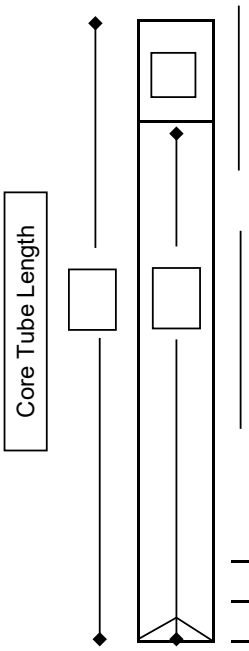
Drive Penetration:

Headspace Measurement:

Recovery Measurement:

Recovery Percentage:

Total Length of Core To Process:



Sections To Process:

A:

B:

C:

D:

Drive Notes:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

Sediment Core Processing Log

ANCHOR QEA

Job:	Station ID:
Job No.	Date/Time:
No. of Sections:	Core Logged By:
Drive Length:	Attempt #:
Recovery:	Type of Core ☐ Mudmole ☐ Vibracore ☐ Diver Core
% Recovery:	Diameter of Core (inches)
Notes:	

Recovered Length (ft)	Size % Gravel	Size % Sand	Size % Fines	**Classification and Remarks** (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch

Appendix B
Field Forms

Sediment Grab Collection Log

ANCHOR QEA

Job: Port of Tacoma Husky and WUT Berths		**Station:** HT-SC01
Job No:	Date: 11/14/24	
Field Staff: AW, CW	Proposed Coordinates:	Sample Method: Box Corer → Power grab
Contractor: Gravity	Lat: 712885.3	
Water Depth: 63.2'	Long: 1167163.4	
DTM Depth Sounder: —		
Tide Measurements		
Time: ~~951~~ 944		
Height: 6.34'		

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Mudline Elevation (datum): calculated after sampling -56.86

Notes:

Grab #	Time	Actual Coordinates (datum) NAD 83 (N) Y	Actual Coordinates (datum) NAD 83 (E) X	Sample Accepted (Y/N)	Recovery Depth (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	922	712883.55	1167169.41	N	10	Rock in jaw
2	931	712883.60	1167168.01	N	20	Jaws closed
3	936	712882.75	1167162.82	N	11	Jaws closed
4	944	712872.45	1167156.20	Y	24	Jaws closed, good seal, overlying water surface intact

Sample Description surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-4cm Loose, saturated to very moist, dark tan silty SAND (SM), no odor, no sheen, trace plant debris (wood pieces <2cm), shells, biota (marine worms)

4-24cm Medium dense, very moist, grey to dark grey silty SAND (SM), no odor, no sheen, trace woody debris (<2 cm), no shells, no biota

Composite sample: TS/TVS/TOC, Sulfide, Metals, Butylins, SVOCs, Pesticides, PCBs, D/F Bioassay DMMU 1

Sample Containers:

Analyses: Chem archive

Sediment Grab Collection Log

ANCHOR QEA

Job: Port of Tacoma Husky and WUT Berths	**Station:** HT-SC02
Job No:	Date: 11/14/24
Field Staff: AW, CW	Proposed Coordinates: Sample Method: Box Corer → Power grab
Contractor: Gravity	Lat: 1166793.60
Water Depth: 63.91'	Long: 713243.2
DTM Depth Sounder: —	
Tide Measurements	
Time: 1141	
Height: 3.96'	

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Mudline Elevation (datum): calculated after sampling 54.94

Notes:

Grab #	Time	Actual Coordinates (datum)		Sample Accepted (Y/N)	Recovery Depth (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		NAD 83 (N)	NAD 83 (E)			
1	1134	713254.30	1166785.44	N	18	Jaws closed, poor recovery
2	1141	713254.13	1166792.62	Y	38	jaws closed, good seal
3	1207	713245.06	1166776.04	N	30	jaws closed, some plant debris stuck in jaws

Sample Description surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Attempt #2
0-38cm Loose to medium dense, very moist, grey to dark grey (grades darker w/ depth) silty SAND (SM), no odor, no sheen, moderate shells & plant matter (wood pieces, algae, fibrous pieces), biota (marine worms)

Composite sample: DMMU 1

Sample Containers:

Analyses: TS/TVS/TOC, Sulfide, Metals, butyltins, SVOCs, Pesticides, PCBs, D/F, Bioassay, chem archive

Sediment Grab Collection Log

ANCHOR QEA

Job: Port of Tacoma Husky and WUT Berths		**Station:** HT-SC03
Job No:	Date: 11/14/24	
Field Staff: AW, CW	Proposed Coordinates:	Sample Method: Box Corer → Power grab
Contractor: Gravity	Lat: 1166484.0	
Water Depth: 61.3'	Long: 713545.0	
DTM Depth Sounder: —		
Tide Measurements		
Time: 1030		
Height: 7.11		

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Mudline Elevation (datum): calculated after sampling -54.19

Notes: 12' back from target location due to ship anchor lines presenting access hazard (canal tide was rising)

Grab #	Time	Actual Coordinates (datum) NAD 83 (N) Y	NAD 83 (E) X	Sample Accepted (Y/N)	Recovery Depth (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1030	713514.74	1166493.38	Y	38	Jaws closed, overlying water, intact surface
2	1101	713521.31	1166499.10	N	25	Jaws closed, overlying water
3	1110	713522.22	1166507.62	N	20	Rope stuck in jaw, surface disturbed

Sample Description surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Attempt #1
0-1cm Loose, saturated, dark tan silty SAND (SM), no odor, no sheen, plant debris (algae), shells, biota (marine worms)
1-38cm Loose to medium dense, very moist, grey to dark grey silty SAND (SM), no odor, trace plant debris (wood pieces to 2cm), biota (marine worms), sand grades darker with depth

Composite sample:	TS/TVS/TOC, sulfide, metals, butyltins, SVOCs, pesticides, PCBs, DF, bioassay DMMU 1
Sample Containers:	
Analyses:	

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: ALW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC04
Attempt No. 1
Date: 10/29/24
Logged By: ALW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/~~Northing: 1167627.06 x
~~Long/~~Easting: 712656.26 y

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 56.1' (start) | 57.0' (end)

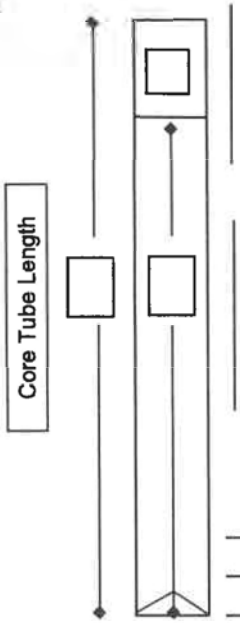
B. Water Level Measurements
Time: 1140 | 1202
Height: 5.1' | 5.72
Source: Noaa | Noaa
9446484 start | end

C. Mudline Elevation
-51.0'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6.7'
Headspace Measurement: 7.0'
Recovery Measurement: 5.0'
Recovery Percentage: 74.6%
Total Length of Core To Process: 5.0'

Drive Notes:
Refusal @ 6.7', smooth drive until then

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCG in bottom/shoe, trace sticky silt on core barrel

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC05
Attempt No. 1
Date: 10/29/2024
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1167496.77 x
Long/Easting: 712651.70 y

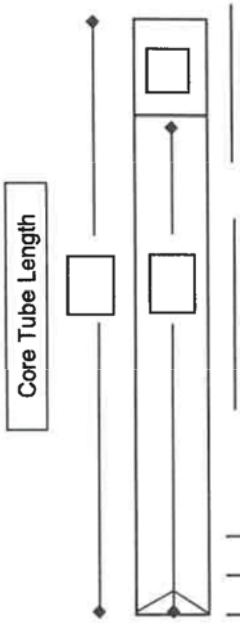
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 55.5'

B. Water Level Measurements
Time: 1030
Height: 4.1' MLLW
Source: Noaa9447484

C. Mudline Elevation
−51.4 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 7.5'
Headspace Measurement: 5.2'
Recovery Measurement: 6.8'
Recovery Percentage: 90.67'
Total Length of Core To Process: 6.8'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, refusal at 7.5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC06
Attempt No. 1
Date: 10/29/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1167422.02 x
Long/Easting: 712779.18 y

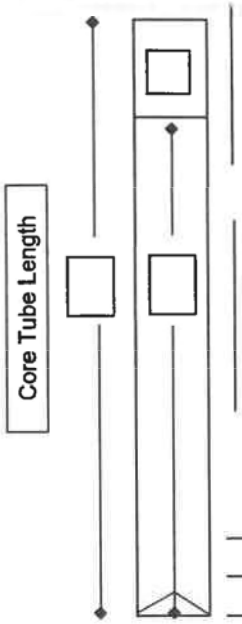
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 56.0 ft

B. Water Level Measurements
Time: 934
Height: 4.12' MLLW
Source: Noaa 9446484

C. Mudline Elevation
-51.88 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 10.4
Headspace Measurement: 0.5
Recovery Measurement: 5.5'
Recovery Percentage: 85.9%
Total Length of Core To Process: 5.5'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal @ 10.4', relatively smooth drive until then

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Wood chips at top of core, clean sand w/MCG at bottom/in shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC07
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1147279.37 x
Long/Easting: 712858.22 y

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.8' / 57.4'
start end

B. Water Level Measurements

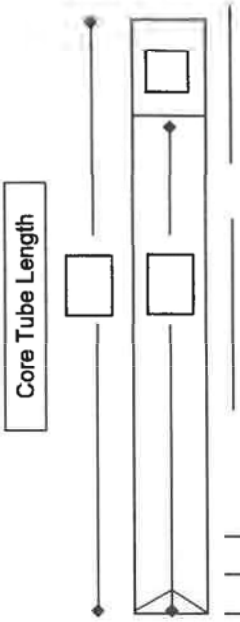
	start	end
Time:	9 48	10 11
Height:	5.57'	5.36'
Source:	Noaa	Noaa

9446484

C. Mudline Elevation
-52.23' MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 5.0'
Headspace Measurement: 7.5'
Recovery Measurement: 4.5'
Recovery Percentage: 90%
Total Length of Core To Process: 4.5'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal @5.0', hard drive, very slow (sandy)

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on bottom of outside of core barrel, clean sand with MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC08
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1167340.51 X
Long/Easting: 712930.98 Y

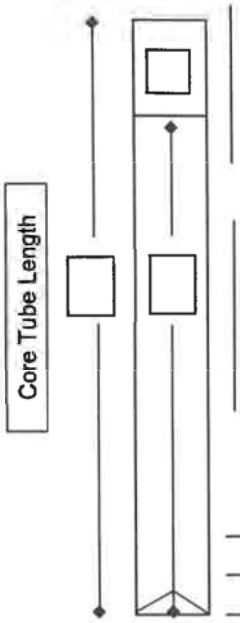
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: # 57.1'

B. Water Level Measurements
Time: 918
Height: 0.1' MLLW
Source: Nosa9446484

C. Mudline Elevation
~ 5' MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6.0'
Headspace Measurement: 6.6'
Recovery Measurement: 5.4'
Recovery Percentage: 90%
Total Length of Core To Process: 5.4'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal @ 6.0'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC09
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1167125.35 x
Long/Easting: 713009.48 y

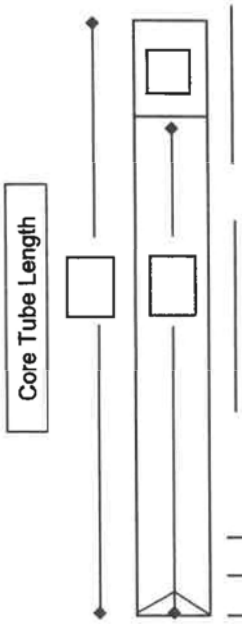
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: ~~58.0~~

B. Water Level Measurements
Time: 1130
Height: ~~5.66~~
Source: Nona 9444484

C. Mudline Elevation
-52.34'

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 12'
Drive Penetration: 5.8'
Headspace Measurement: 8.6'
Recovery Measurement: 3.4'
Recovery Percentage: 58.6%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Hard slow drive refusal at 5.8'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC09
Attempt No. 2
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1167136.17 x
~~Long/Easting~~: 713004.02 y

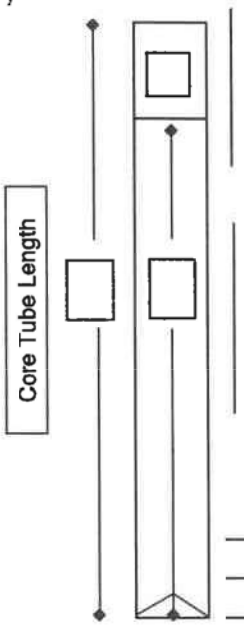
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.8'

B. Water Level Measurements
Time: 1220
Height: 6.45'
Source: Noaa9446484

C. Mudline Elevation
−52.35'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 5.5'
Headspace Measurement: 3.4'
Recovery Measurement: 4.6'
Recovery Percentage: 83.6%
Total Length of Core To Process: 4.6

Recovery Measurements (prior to cuts)



Drive Notes:
Refusal at 55', hard drive

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC10
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 1167190.44 (X)
~~Long~~/Easting: 713080.08 (Y)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.1' (start) | 57.5' (end)

B. Water Level Measurements

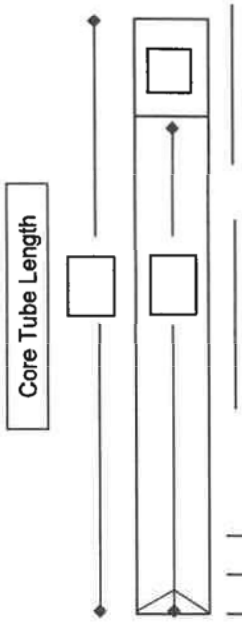
	start	end
Time:	1050	1108
Height:	5.28'	5.34
Source:	Noaa	Noaa

9446484

C. Mudline Elevation
-51.82' MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 5.9
Headspace Measurement: 5.8'
Recovery Measurement: 6.2'
Recovery Percentage: 105%
Total Length of Core To Process: 6.2'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow hard drive, refusal at 5.9'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom/shoe

Notes:
Particularly hard drive can account for slight expansion of sediment during coring

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC11
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1167045.04 x
Long/Easting: 713143.91 y

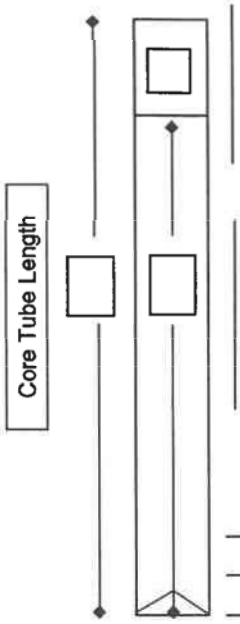
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 60.2'

B. Water Level Measurements
Time: 1312
Height: 7.74
Source: Dana 9446484

C. Mudline Elevation
-52.46'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 0.1'
Recovery Measurement: 11.9'
Recovery Percentage: 99.2%
Total Length of Core To Process: 11.9'

Recovery Measurements (prior to cuts)



Drive Notes:
Smooth drive

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type. moisture. color. minor modifier. MAJOR modifier. other constituents. odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky ~~see~~ silt on outside of core barrel, clean sand w/ MCGs in bottom/shoe
Top of core appears silty with some trace woody debris

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC12
Attempt No. 1
Date: 10/30/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 1166895.57
~~Long~~/Easting: 713231.41

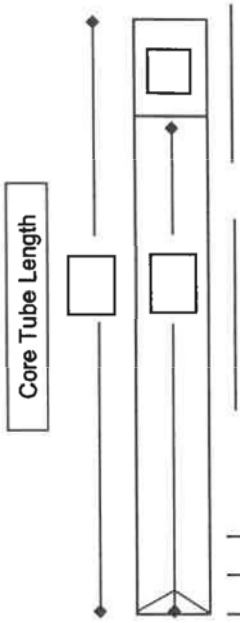
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 61.3'

B. Water Level Measurements
Time: 1450
Height: 10.32'
Source: Noaa 9446484

C. Mudline Elevation
-50.98'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 9.5'
Headspace Measurement: 2.9'
Recovery Measurement: 9.1'
Recovery Percentage: 95.8%
Total Length of Core To Process: 9.1'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal at 9.5', slow hard drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs on bottom

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blaine Waterway
Job No: 240092-03.02
Field Staff: ACO
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC13
Attempt No. 1
Date: 10/30/24
Logged By: ACO
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1160953.88 (x)
Long/Easting: 713298.30 (y)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 601.6' (start) | 607.0 (end)

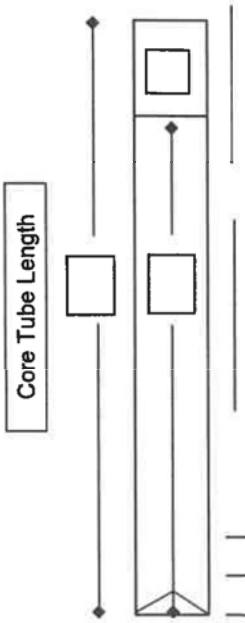
B. Water Level Measurements
Time: 1402 | 1440
Height: 9.11' | 10.18'
Source: Noaa | Noaa

C. Mudline Elevation
-52.49'

Core Collection Recovery Details:
Core Accepted: Yes / No — as 11/1/24
Core Tube Length: 12'
Drive Penetration: 12'
~~Headspace Measurement~~: 0.3'
Recovery Measurement: 5.7'
Recovery Percentage: 47.5%
Total Length of Core To Process: 5.7'

start 9446484 end

Recovery Measurements (prior to cuts)



Drive Notes:
Hard drive in places

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on outside of core barrel, clean sand w/ MCGS in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC13
Attempt No. 2
Date: 10/31/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1166952.76 (X)
Long/Easting: 713305.19 (Y)

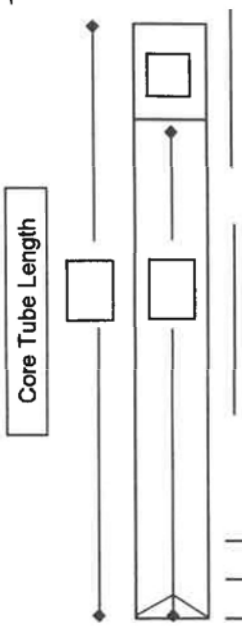
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 61.5'

B. Water Level Measurements
Time: 1444
Height: 9.51'
Source: Noaa9447484

C. Mudline Elevation
-51.99'

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 12'
Drive Penetration: 5.5'
Headspace Measurement: ~~7.8'~~
Recovery Measurement: 4.2'
Recovery Percentage: 76.4%
Total Length of Core To Process: 4.2 ac

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive, refusal at 5.5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/ MCG in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: ~~Gravity~~
Vertical Datum: MLLW

Station ID: HT-SC13
Attempt No. 3
Date: 10/31/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1166956.74 (X)
~~Long/Easting~~: 713302.80 (Y)

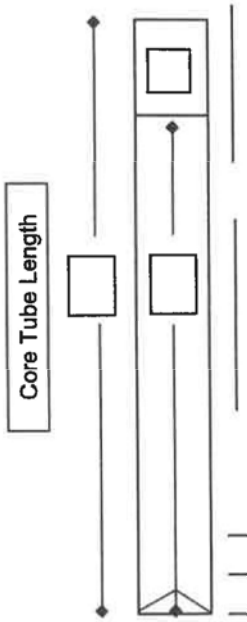
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.1'

B. Water Level Measurements
Time: 15:16
Height: 10.28'
Source: Noaa9446484

C. Mudline Elevation
-51.82'

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 2.2'
Recovery Measurement: 5.8
Recovery Percentage: 72.5'
Total Length of Core To Process: 5.8'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, slow progress

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCG on bottom

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: ACW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC14
Attempt No. 1
Date: 10/31/24
Logged By: ACW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 1166773.28 (X)
~~Long~~/Easting: 713475.93 (Y)

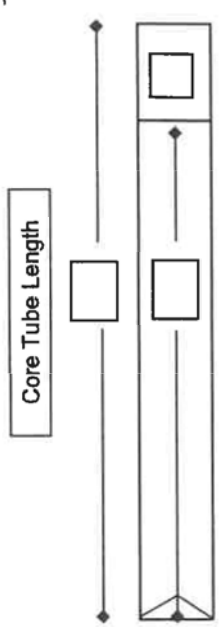
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 10.2'

B. Water Level Measurements
Time: 854
Height: 8.02'
Source: noaa 9446484

C. Mudline Elevation
-53.18'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 10.3'
Headspace Measurement: 10.2'
Recovery Measurement: 5.8'
Recovery Percentage: 92.1%
Total Length of Core To Process: 5.8

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard slow drive refusal at 10.3'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/ MCGs on bottom / in shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC15
Attempt No. 1
Date: 10/31/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 1166625.88 (X)
~~Long~~/Easting: 713482.45 (Y)

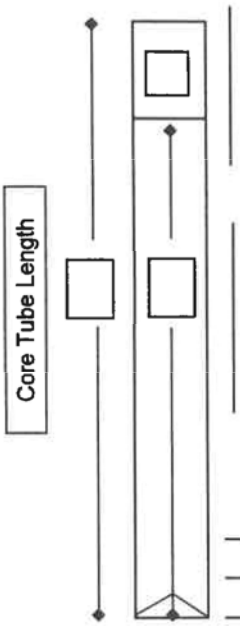
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.3'

B. Water Level Measurements
Time: 1143
Height: 6.84'
Source: Noaa9446484

C. Mudline Elevation
-51.46 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 9'
Headspace Measurement: 5.5'
Recovery Measurement: 6.5'
Recovery Percentage: 72.2%
Total Length of Core To Process: 6.5'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
slow, hard drive, refusal @ 9.0'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of core barrel, clean sand w/MCG in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC16
Attempt No. 1
Date: 10/31/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1116627.012 (X)
~~Long~~/Easting: 713617.22 (Y)

A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 60.7'

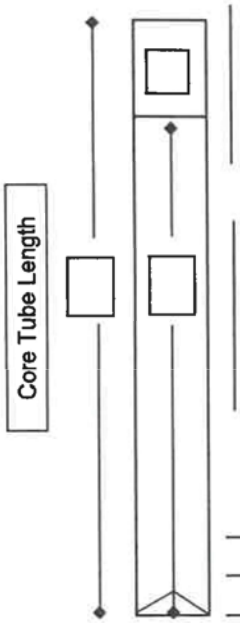
B. Water Level Measurements
Time: 1035
Height: 6.02' MLLW
Source: Noaa9446484

C. Mudline Elevation
-54.68 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No

	Post-Extraction
Core Tube Length: 12'	
Drive Penetration: 12'	
Headspace Measurement: 0	
Recovery Measurement: 12'	11.3'
Recovery Percentage: 100%	94.2'
Total Length of Core To Process: 12'	11.3'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, full recovery

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of core barrel, clean sand w/ MCGs in bottom

Notes:
~~Sand Lean~~ Very hard extraction, lost ~0.7' of material from bottom of core

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC17
Attempt No.: 1
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713634.27 Y
Long/Easting: 1166484.20 X
SN

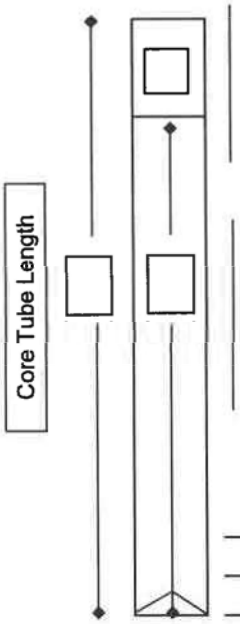
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 65.3'

B. Water Level Measurements
Time: 815
Height: 10.6'
Source: Nooa 9446484 Tac

C. Mudline Elevation
-54.7'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 6'
Headspace Measurement: 5.5'
Recovery Measurement: 2.5'
Recovery Percentage: 41.66%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth until 4', hard drive until refusal at 6'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top of core feels firm

Notes:
Happy star on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: MT-SC17
Attempt No. 2
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713632.83 Y
Long/Easting: 1166474.50 X

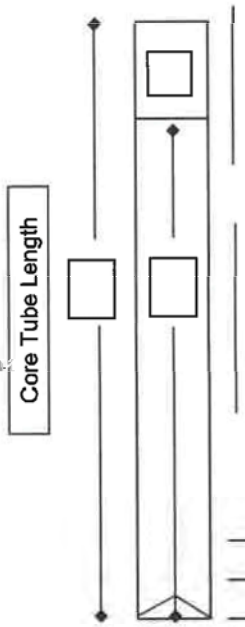
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.9'

B. Water Level Measurements
Time: 1240
Height: 10.91'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-53.99'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 4'
Headspace Measurement: ~~3.3~~ 4.7'
Recovery Measurement: ~~3.3~~
Recovery Percentage: 82.5 %
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Hard drive, refusal at 4'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/ MCGs in bottom

Notes:
Cool cat on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC17
Attempt No. 3
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713622.59 Y
Long/Easting: 1166483.99 X

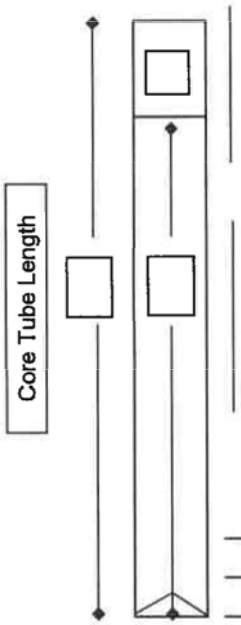
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 44.5

B. Water Level Measurements
Time: 902
Height: 11.16'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-53.34'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 2.4'
Recovery Measurement: 5.6'
Recovery Percentage: 70%
Total Length of Core To Process: 5.6'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/ MCGs in bottom

Notes:
Cube on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240042-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: LIT-SC18
Attempt No. 1
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713816.47 Y
Long/Easting: 1166425.86 X

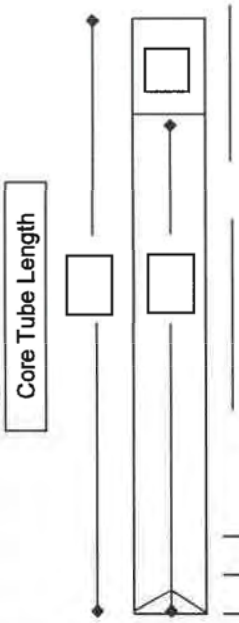
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 67.8

B. Water Level Measurements
Time: 1000
Height: 11.44'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-56.36

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 1.6'
Recovery Measurement: 6.4'
Recovery Percentage: 80%
Total Length of Core To Process: 6.4'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
smooth drive to 4', harder drive past 4' but no refusal

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand w/MCGs, soft sand on top

Notes:
Basketball on label
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC19
Attempt No. 1
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713870.93 Y
Long/Easting: 1166228.36 X

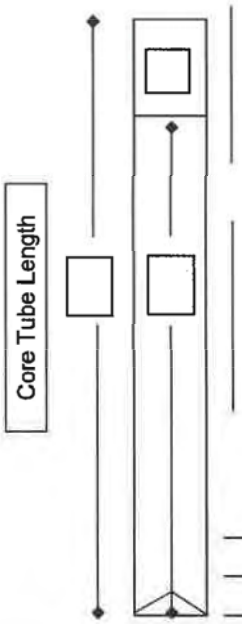
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 61.8'

B. Water Level Measurements
Time: 1134
Height: 10.79'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.01'

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 8'
Drive Penetration: 4'
Headspace Measurement: 5.8'
Recovery Measurement: 2.2'
Recovery Percentage: 55%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes: Refusal @ 4'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of core barrel

Notes:
Sad star on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC19
Attempt No. 2
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~ (Long): 1166231.67 X
~~Long/Easting~~ (Lat): 713866.45 Y

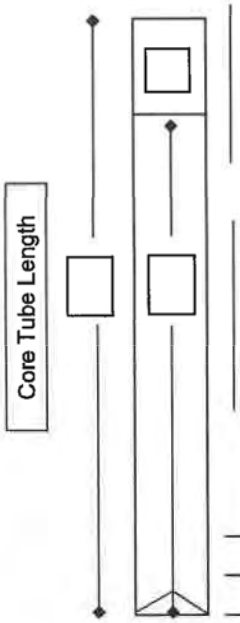
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 61.4'

B. Water Level Measurements
Time: 1203
Height: 10.39'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.01'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 5.1'
Recovery Measurement: 2.9'
Recovery Percentage: 36.25%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

silt on outside of core barrel

Notes:
Suspected cat on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: ACW
Contractor: Gradult
Vertical Datum: MLLW

Station ID: HT-SC19
Attempt No. 3
Date: 11/7/24
Logged By: ACW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713857.34 Y
Long/Easting: 1166226.59 X

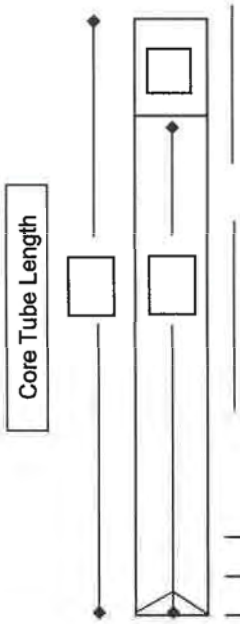
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 61.6'

B. Water Level Measurements
Time: 1238
Height: 9.86'
Source: Noaa
9446484 Tac

C. Mudline Elevation
-51.74'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 1.3'
Recovery Measurement: 6.7'
Recovery Percentage: 83.75%
Total Length of Core To Process: 6.7'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

silt on outside of barrel, clean sand w/ MCGs in bottom

Notes:
Chicken on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Page 1 of 1

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC20
Attempt No. 1
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 713945.00 Y
Long/Easting: 1166293.99 X

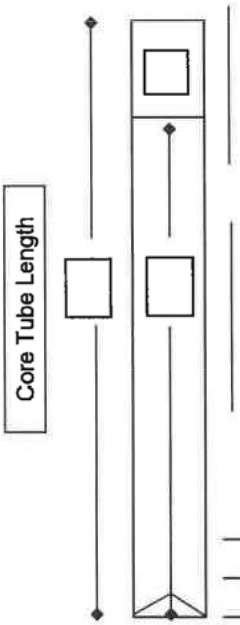
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.2'

B. Water Level Measurements
Time: 1058
Height: 11.1'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-53.1'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 0.6'
Recovery Measurement: 7.4'
Recovery Percentage: 92.5%
Total Length of Core To Process: 7.4'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard spot at 4', hard drive from 4'-8'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs on bottom

Notes:
Unhappy cat on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240042-03.02
Field Staff: AW
Contractor: Cmouth
Vertical Datum: MLLW

Station ID: HT-SC21
Attempt No. 1
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714021.15 Y
Long/Easting: 1160675.57 X

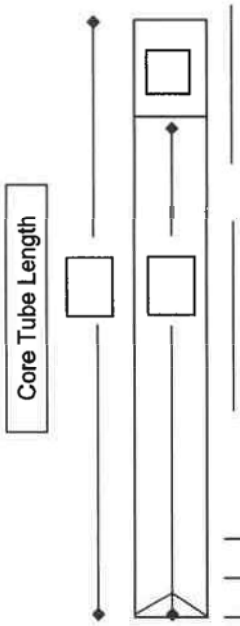
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.0'

B. Water Level Measurements
Time: 1504
Height: 7.89'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-52.11'

Core Collection Recovery Details:
Core Accepted: Yes No Yes, accept
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 2.3'
Recovery Measurement: 5.7'
Recovery Percentage: 71.25%
Total Length of Core To Process: 5.7'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom, silt on outside of barrel

Notes:
Happy cloud on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC21
Attempt No. 2
Date: 11/7/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714030.34 Y
Long/Easting: 1160064.19 X

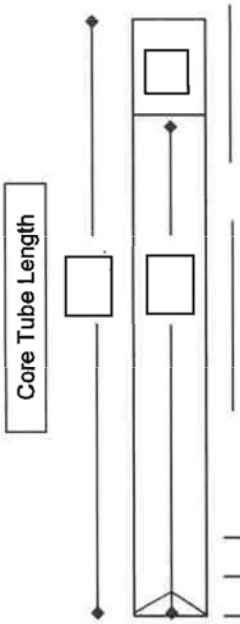
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 59.4'

B. Water Level Measurements
Time: 1537
Height: 7.77'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.63'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: ~~8~~ 8'
Drive Penetration: 8'
Headspace Measurement: 5.4'
Recovery Measurement: 2.6'
Recovery Percentage: 32.5%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, lost core barrel

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:
~~Spiral on label~~ Spiral on label
Lost core barrel, retrieved using ROV on 11/8 AM

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC21
Attempt No. 3
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714025.18 Y
Long/Easting: 1160665.71 X

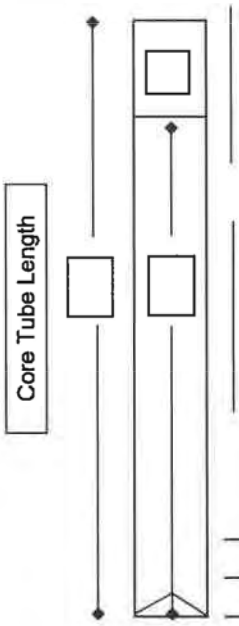
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.7'

B. Water Level Measurements
Time: 1052
Height: 11.58'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-52.12'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 6.3'
Recovery Measurement: 1.7'
Recovery Percentage: 21.25%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Steady smooth drive, resistance around 7.5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sediment on core barrel

Notes:
Happy house on label
Large crab (deceased) in core

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC22
Attempt No. 1
Date: 11/27/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: ~~714096.24~~ 714096.24 Y
Long/Easting: 1166164.06 X

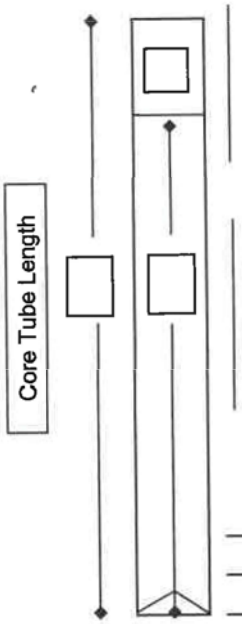
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.8'

B. Water Level Measurements
Time: 1336
Height: 8.85'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.95

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 4.5'
Recovery Measurement: 3.5'
Recovery Percentage: 43.75%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Hard spot at 5'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of barrel

Notes:
Sleepy cat on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC22
Attempt No. 2
Date: 11/7/21
Logged By:
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714083.59 Y
Long/Easting: 1166149.46 X

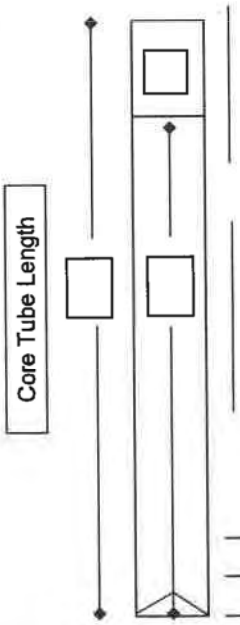
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.0

B. Water Level Measurements
Time: 1410
Height: 8.27'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.73

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 3.8'
Recovery Measurement: 4.2'
Recovery Percentage: 52.5%
Total Length of Core To Process: 4.2'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Very smooth drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of barrel

Notes:
sleepy dog on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: ALW
Contractor: Gravity
Vertical Datum:

Station ID: MT-SC22
Attempt No. 3
Date: 11/7/24
Logged By:
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 71408.23 Y
Long/Easting: 1136138.76 X

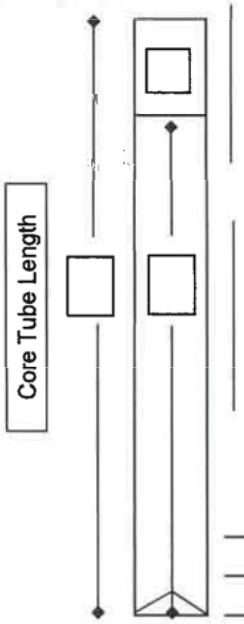
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.0'

B. Water Level Measurements
Time: 1434
Height: 8.09'
Source: Nocia 9446484 Tac

C. Mudline Elevation
-51.91

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 5.3'
Recovery Measurement: 2.7'
Recovery Percentage: 33.75
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Easy drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:
Smiley on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff:
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC23
Attempt No. 1
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714282.11 Y
Long/Easting: 1165952.79 X

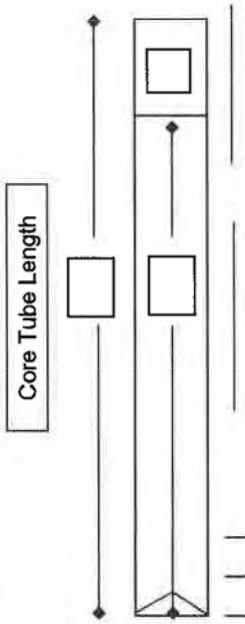
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: ~~62.5~~ 62.4

B. Water Level Measurements
Time: ~~1232~~ 1240
Height: 10.76'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.64

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 10'
Drive Penetration: 5'
Headspace Measurement: 0.9'
Recovery Measurement: 3.1'
Recovery Percentage: ~~50~~ 62%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



Drive Notes:
Refusal at 5'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of barrel

Notes:
Love cat on label ♡

ANCHOR QEA

Sediment Core Collection Log

Job: Blair waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC23
Attempt No. 2
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714276.03 ✓
Long/Easting: 1045958.70 ✗

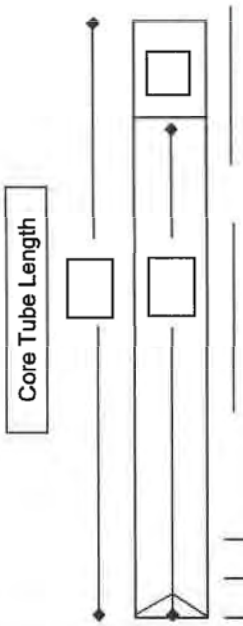
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 102.0

B. Water Level Measurements
Time: 1258
Height: 10.51'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.49

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 10'
Drive Penetration: 8'
Headspace Measurement: 6.4'
Recovery Measurement: 3.6'
Recovery Percentage: 45%
Total Length of Core To Process: 3.6'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom

Notes:
confused cat on label

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC23
Attempt No. 3
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714273.02 Y
Long/Easting: 1165951.35 X

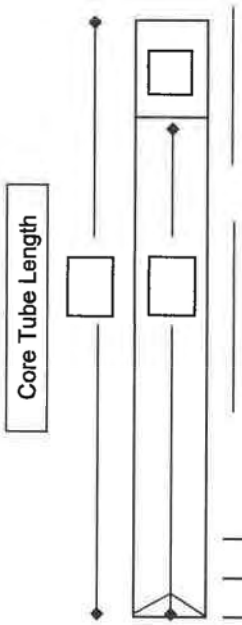
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 61.7'

B. Water Level Measurements
Time: 1320
Height: 10.11'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.59

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 10'
Drive Penetration: 3.3'
Headspace Measurement: 7.8'
Recovery Measurement: 2.2'
Recovery Percentage: 66.7%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal at 3.3'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

silt on outside of barrel

Notes:
winking cat on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: HT-SC2[illegible]4
Attempt No. 1
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1165886.91 Y
Long/Easting: 714210.80 X

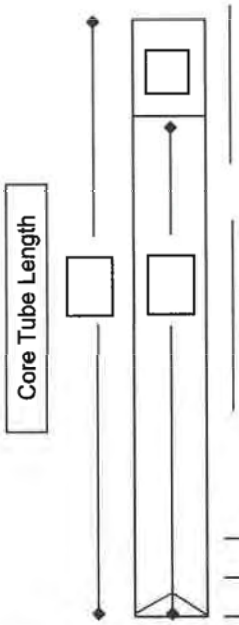
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.2'

B. Water Level Measurements
Time: 1344
Height: [illegible]'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.54'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 10'
Drive Penetration: 2.6'
Headspace Measurement: 7.4'
Recovery Measurement: 2.6'
Recovery Percentage: 100%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal at 2.6'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of barrel

Notes:
Sweep on label

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: AW
Contractor: Gravity
Vertical Datum:

Station ID: MT-SC24
Attempt No. 2
Date: 11/8/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 714206.23
Long/Easting: 1165882.04

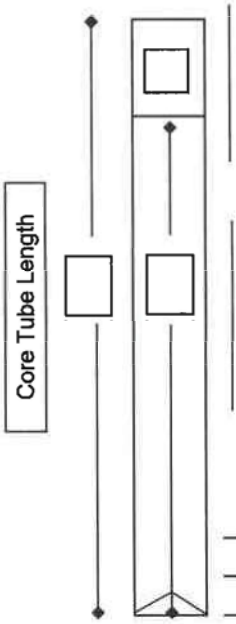
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 60.6

B. Water Level Measurements
Time: 1400
Height: 9.36'
Source: Noaa 9446484 Tac

C. Mudline Elevation
-51.24

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 10'
Drive Penetration: 8'
Headspace Measurement: 3'
Recovery Measurement: 7'
Recovery Percentage: 87.5%
Total Length of Core To Process: 7.0'

Recovery Measurements (prior to cuts)



Drive Notes:
Smooth drive

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCGs in bottom, silt on outside of core barrel

Notes:
Confused star on label
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC25
Attempt No. 1
Date: 10/25/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1105752.44 (X)
~~Long/Easting~~: 714343.62 (Y)

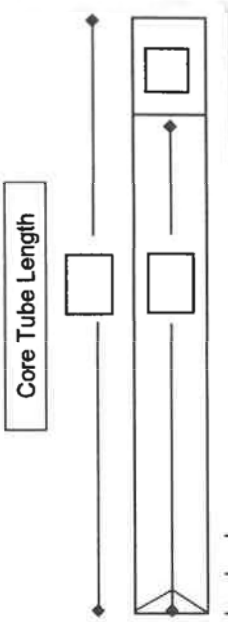
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.2'

B. Water Level Measurements
Time: 13:00
Height: 11.73'
Source: Noaa9447484

C. Mudline Elevation
-51.67ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 7.7'
Recovery Measurement: 4.3'
Recovery Percentage: 35.8%
Total Length of Core To Process: ~~4.3~~

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth until 6', gets harder at 6' but got full drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents. odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on outside of core barrel, clean sand w/MCG on bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravelly
Vertical Datum: MLLW

Station ID: HT-SC25
Attempt No. 2
Date: 10/25/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165750.86 (X)
~~Long/Easting~~: 714334.90 (Y)

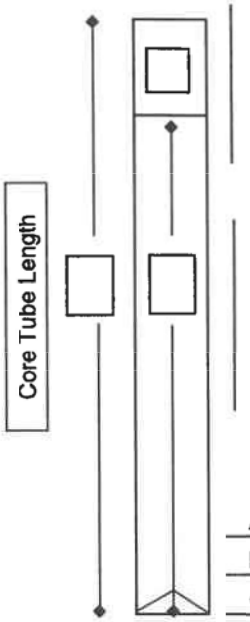
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.8'

B. Water Level Measurements
Time: 1333
Height: 11.92' MLLW
Source: Noaa9446484

C. Mudline Elevation
-51.88 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 12'
Drive Penetration: 7.2'
Headspace Measurement: 7.4'
Recovery Measurement: 4.6'
Recovery Percentage: 63.9%
Total Length of Core To Process: 4.6'

Recovery Measurements (prior to cuts)



Drive Notes:
Hit refusal at 7.2'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents. odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on outside of core barrel, clean sand w/ MCG in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC26
Attempt No. 1
Date: 10/25/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1165815.36
Long/Easting: 714413.90

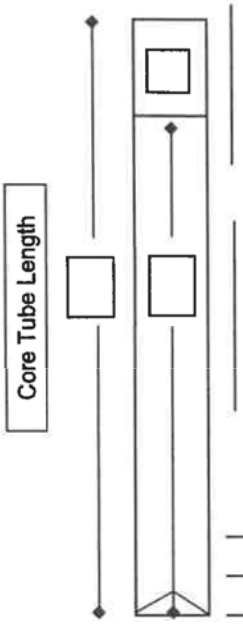
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.4'

B. Water Level Measurements
Time: 1217
Height: 11.2'
Source: Noaa 9447484

C. Mudline Elevation
— 51.2' MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 5.8'
Recovery Measurement: 6.2'
Recovery Percentage: 51.6%
Total Length of Core To Process: 6.2'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
smooth drive, went slow and didn't hit recovery

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on outside of core barrel, clean sand w/ MCG on bottom

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC27
Attempt No. 1
Date: 10/25/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1165634.32 (X)
Long/Easting: 714428.05 (Y)

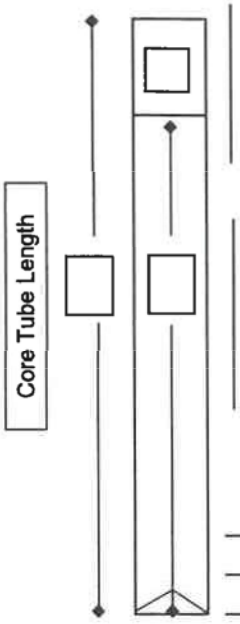
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 61.8'

B. Water Level Measurements
Time: 1106
Height: 9.51
Source: Noaa 9447484

C. Mudline Elevation
-52.29ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 1.1'
Recovery Measurement: 10.9'
Recovery Percentage: 90.8%
Total Length of Core To Process: 10.9

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, didnt hit refusal @ ~6' like common in this area

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

sticky dark grey silt on outside of barrel, clean sand on bottom/shoe (with MCG)

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240012-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC28
Attempt No. 1
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165236.02 (X)
~~Long~~/Easting: 714579.38 (Y)

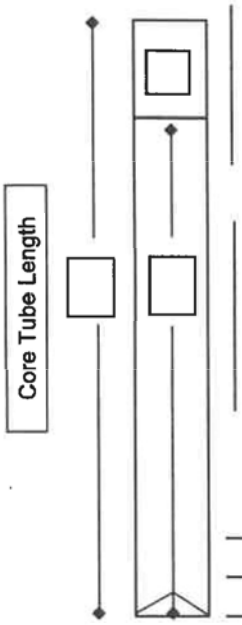
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.5'

B. Water Level Measurements
Time: ~~10:59~~ 1445
Height: 10.59 ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-51.91 ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 12'
Drive Penetration: 5.3'
Headspace Measurement: 2.4'
Recovery Measurement: 3.0'
Recovery Percentage: 67.9%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hit refusal @ 5.3', smooth drive until then

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand on bottom (MCG present)

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC28
Attempt No. 2
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1165641.85 (X)
Long/Easting: 714571.46 (Y)

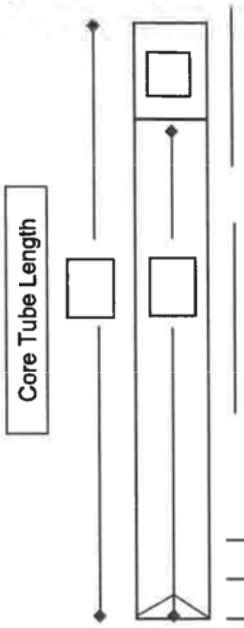
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 102.2'

B. Water Level Measurements
Time: 15:11
Height: 10.25' MLLW
Source: Noaa9446484

C. Mudline Elevation
-51.95 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 8.0'
Headspace Measurement: 7.0'
Recovery Measurement: 5.0'
Recovery Percentage: 62.5%
Total Length of Core To Process: 5.0'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Refusal at 8', smooth drive until then

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of barrel, sand with MCG at bottom (native)

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC29
Attempt No. 1
Date: 10/25/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165474.75 (X)
~~Long/Easting~~: 7146606.03 (Y)

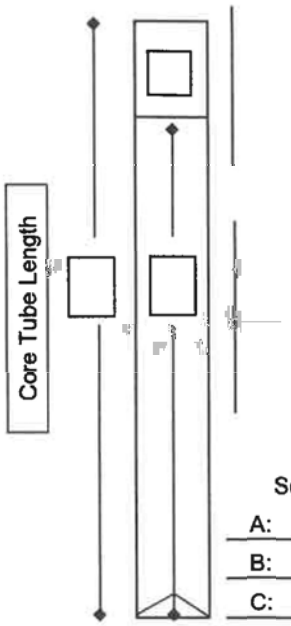
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.1'

B. Water Level Measurements
Time: 856
Height: 4.44'
Source: Noaa 9446484

C. Mudline Elevation
-52.66ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 4.0'
Headspace Measurement: 8.7'
Recovery Measurement: 3.3'
Recovery Percentage: 82.5%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
refusal @ 4.0'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: ALW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC29
Attempt No. 2
Date: 10/25/24
Logged By: ALW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165466.02 (X)
~~Long/Easting~~: 714605.18 (Y)

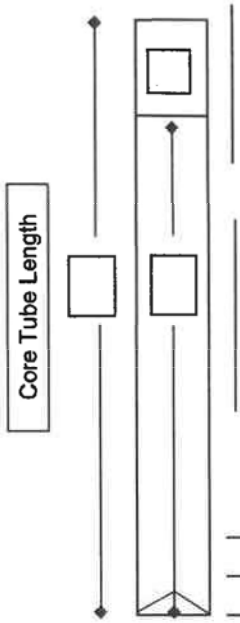
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.6' (start)
59.0 (end)

B. Water Level Measurements
Time: 9:27 (start)
Height: 5.53'
Source: Noaa-9446484
T: 9:55 (end)
H: 7.18'
S: Noaa

C. Mudline Elevation
-52.07 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6'
Headspace Measurement: 0.2'
Recovery Measurement: 5.8'
Recovery Percentage: 96.7%
Total Length of Core To Process: 5.8'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive until refusal @ 6'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand at bottom of core

Notes:
*Tides changing quickly, may affect drive depth

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC30
Attempt No. 1
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165470.75 (X)
~~Long/Easting~~: 714747.26 (Y)

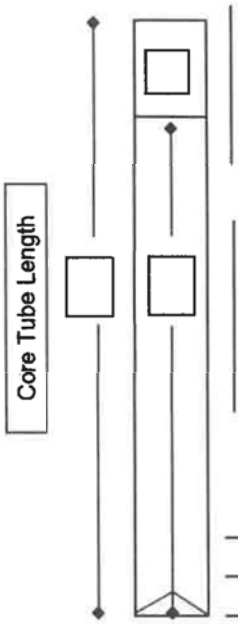
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 24.0'

B. Water Level Measurements
Time: 1225
Height: 11.46' MLLW
Source: Noaa 9446484

C. Mudline Elevation
-52.54 ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 20'
Drive Penetration: 6.1'
Headspace Measurement: 12.2'
Recovery Measurement: 7.8'
Recovery Percentage: 127 %
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth, straight drive until refusal at 6.1'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Dark grey silt on outside of core barrel, clean sand with MCG in bottom/shoe

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair waterway
Job No: 240092-03.02
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: HT-SC30
Attempt No. 2
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1165461.88 (X)
~~Long/Easting~~: 714751.34 (Y)

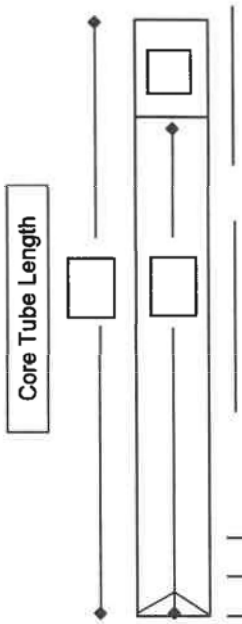
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.1

B. Water Level Measurements
Time: 1334
Height: 11.32
Source: Noaa 9446484

C. Mudline Elevation
-52.78ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 3.6'
Recovery Measurement: 8.4'
Recovery Percentage: 70%
Total Length of Core To Process: 8.4'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive, full barrel

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand on bottom

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.02
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WLT-SC01
Attempt No. 1
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708201.21 (Y)
Long/Easting: 1172428.31 (X)

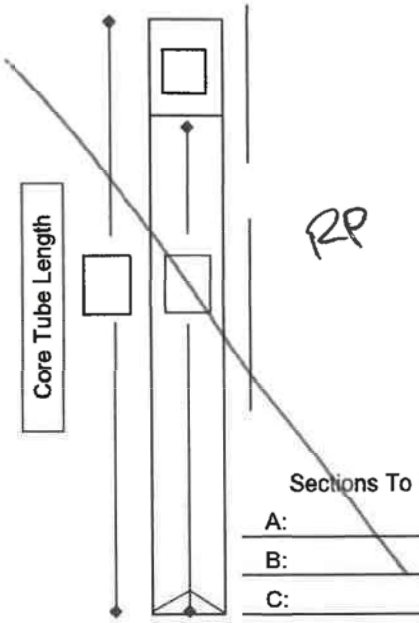
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.0'

B. Water Level Measurements
Time: 09:26
Height: 10.02' MLLW
Source: NOAA 9446484

C. Mudline Elevation
-50.0' MLLW

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 12'
Drive Penetration: 5.5'
Headspace Measurement: 9.4'
Recovery Measurement: 2.6'
Recovery Percentage: 47.3%
Total Length of Core To Process: 2.6'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive
Refusal @ 5.5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

TOP: Soft, dark brown/black brown, sandy silt, wet
SHOE: M. dense → dense, gray, wet, SAND w/ silt

Notes:
RP

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC01
Attempt No. 2
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708196.4745 (Y)
Long/Easting: 1172423.30 (X)

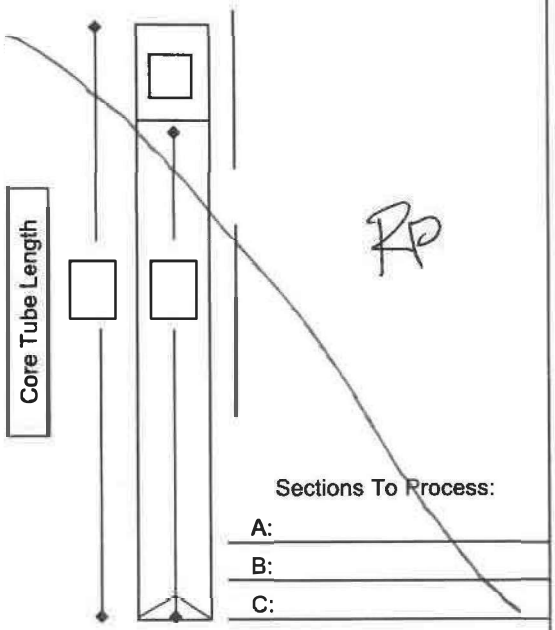
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.9'

B. Water Level Measurements
Time: 10:05
Height: 9.08' MLLW
Source: NOAA 9446484

C. Mudline Elevation
-49.8' MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 0.4'
Recovery Measurement: 7.6'
Recovery Percentage: 95.0%
Total Length of Core To Process: 7.1'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
good ✓

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

TOP: m dense-dense, wet, gray black, silty SAND
SHOE: dense, wet, black gray, SAND w/ trace silt

Notes:
lost ~ 0.2 out of top + bottom

ANCHOR QEA

Sediment Core Collection Log

RP RP

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT ~~SCH SEH~~ SC02
Attempt No. 1
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708179.64 (Y)
Long/Easting: 1172328.04 (X)

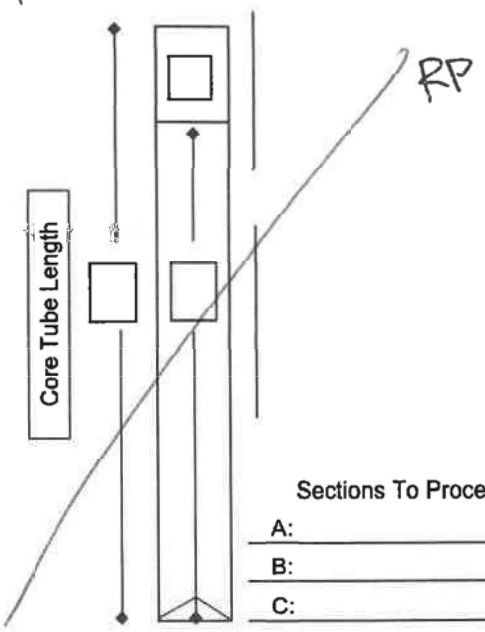
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.9'

B. Water Level Measurements
Time: 14:21
Height: 8.43' MLLW
Source: NOAA 9446484

C. Mudline Elevation
−49.5' MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 6.7'
Headspace Measurement: 3.45'
Recovery Measurement: 3.55'
Recovery Percentage: 53.0%
Total Length of Core To Process: 3.6'

Recovery Measurements (prior to cuts)



Drive Notes:
Good drive
Refusal @ 6.7'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top: m. dense to dense, SAND - layer of v. soft brown black SILT above, wet
SHOE: m. dense-dense, gray, wet, SAND

Notes:
~1.9' v. soft sediment w/ continued settlement

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC02
Attempt No. 2
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708179.04 (Y)
Long/Easting: 1172328.09 (X)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.9

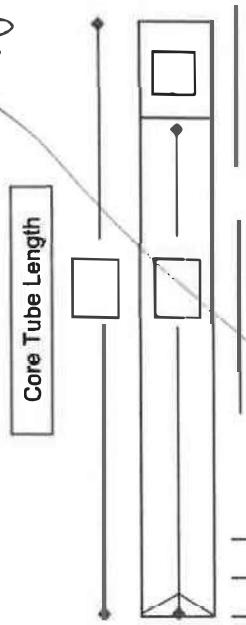
B. Water Level Measurements
Time: 15:05
Height: 9.38'
Source: NOAA 9446484

C. Mudline Elevation
-48.5'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 7'
Headspace Measurement: 1.1'
Recovery Measurement: 6.9'
Recovery Percentage: 98.0%
Total Length of Core To Process: 6.9'

Recovery Measurements (prior to cuts)

RP



Sections To Process:
A:
B:
C:
D:

Drive Notes:
good, straight

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top: black brown, soft, SILT w/ sand, wet
shoe: gray, m. dense, wet, SAND w/ silt

Notes:
RP

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC03
Attempt No. 1
Date: 11/4/2024
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1172238.51 (X)
~~Long/Easting~~: 708274.72 (Y)

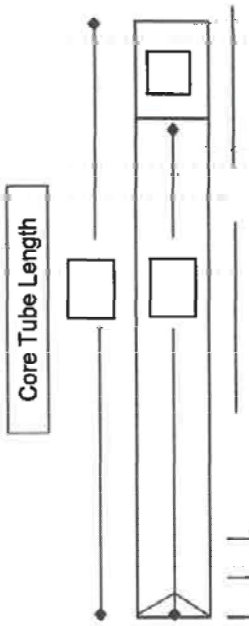
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 65.7'

B. Water Level Measurements
Time: 900
Height: 11.51'
Source: Noaa 9446484

C. Mudline Elevation
-53.79

Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 10'
Headspace Measurement: 12'
Recovery Measurement: 0'
Recovery Percentage: 0%
Total Length of Core To Process: —



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard spot at 4', hand slow above until refusal at 10'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Na

Notes:
Core liner is intact, No sediment to dispose of

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC03
Attempt No. 2
Date: 11/4/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 172231.06 (X)
Long/Easting: 708277.62 (Y)

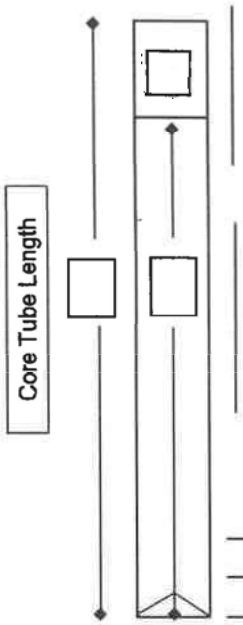
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 65.3'

B. Water Level Measurements
Time: 938
Height: 10.87'
Source: Noaa9446484

C. Mudline Elevation
-54.43'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 6'
Headspace Measurement: 8'
Recovery Measurement: 0''
Recovery Percentage: 0%
Total Length of Core To Process: 0 —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive, refusal @ 6'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Na

Notes:
No sediment to dispose of

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WIT-SC03
Attempt No. 3
Date: 11/4/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1178238.36 (X)
Long/Easting: 708266.40 (Y)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.5' | 64.1

B. Water Level Measurements

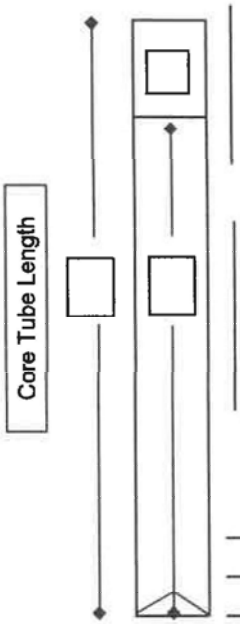
Time:	1008	1038
Height:	10.52'	9.93
Source:	Noaa	Noaa

9446484

C. Mudline Elevation
-53.98'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 8'
Headspace Measurement: 1.3'
Recovery Measurement: 6.7'
Recovery Percentage: 83.75%
Total Length of Core To Process: 6.7'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
slow drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky silt on outside of barrel, clean sand w/ MCGs in bottom

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: ~~BSC~~ WUT-SC04
Attempt No. 1
Date: 11/4/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1172235.72 (X)
Long/Easting: 708380.05 (Y)

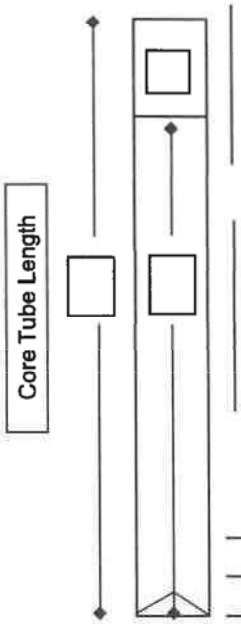
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 62.7'

B. Water Level Measurements
Time: 1206
Height: 8.87'
Source: Noaa 9446484

C. Mudline Elevation
-53.93'

Core Collection Recovery Details:
Core Accepted: ~~Yes~~ / ~~No~~ ~~Yes~~ Tentative (reject)
Core Tube Length: 12'
Drive Penetration: 8.2'
Headspace Measurement: 7.3'
Recovery Measurement: 4.7'
Recovery Percentage: 57.3%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Very windy, refusal @ 8.2'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

cream sand w/MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240096-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WIT-SC04
Attempt No. 2
Date: 11/5/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1172241.90 (X)
~~Long/Easting~~: 708375.78 (Y)

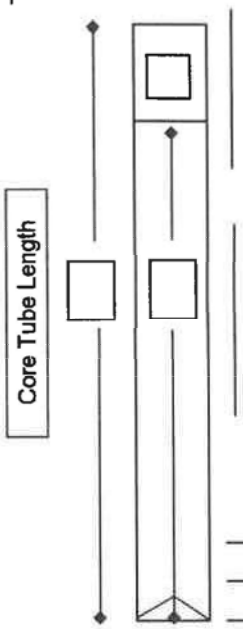
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 65.1'

B. Water Level Measurements
Time: 818
Height: 11.77'
Source: Noaa 9447484

C. Mudline Elevation
-53.33'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 0'
Recovery Measurement: 12'
Recovery Percentage: 100%
Total Length of Core To Process: 12'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive, hard spot around 4'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Gravel in top of core, clean sand w/ MCGs in bottom

Notes:
Cracked vibracore chuck, 1/4 bolts came undone

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Page 1 of 1

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC05
Attempt No. 1
Date: 11/4/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1172053.601 (X)
Long/Easting: 708455.48 (Y)

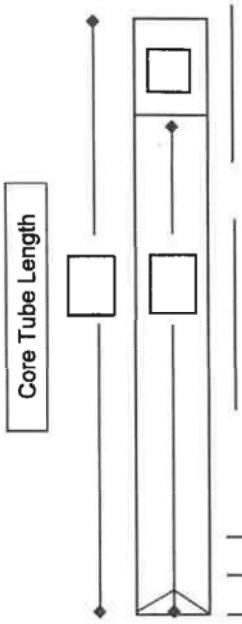
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 59.9'

B. Water Level Measurements
Time: 1117
Height: 9.48'
Source: Noaa9446484

C. Mudline Elevation
-50.42'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6.8'
Headspace Measurement: 0.5'
Recovery Measurement: 5.5'
Recovery Percentage: 80.9%
Total Length of Core To Process: 5.5'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
slow drive, hard spot @ 4', refusal @ 6.8'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

silt on outside of core barrel, clean sand w/MCGs in bottom/shoe

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WJT-SC06
Attempt No. 1
Date: 11/5/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1177059.663 (X)
~~Long/Easting~~: 708543.47 (Y)

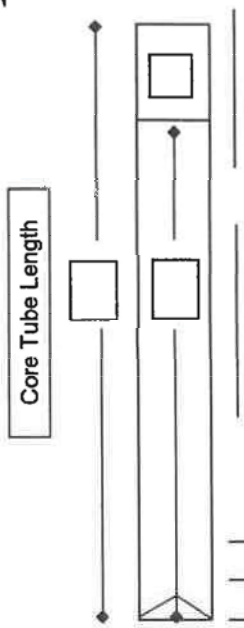
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.3'

B. Water Level Measurements
Time: 1210
Height: 8.5'
Source: Noaa9446484

C. Mudline Elevation
-51.8'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 5.0'
~~Headspace Measurement~~: 8.9'
Recovery Measurement: 3.1'
Recovery Percentage: 62%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard slow drive, refusal @ 5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Some sticky silt on outside of core barrel

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC06
Attempt No. 2
Date: 11/5/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

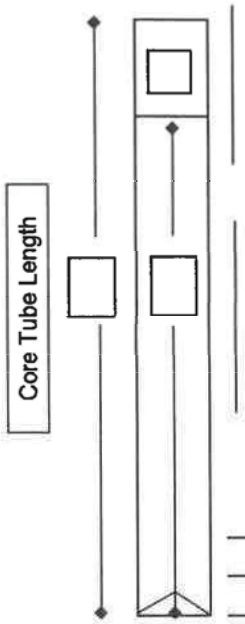
Field Collection Coordinates:
~~Lat~~/Northing: 172058.70 (X)
~~Long~~/Easting: 708532.27 (Y)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 59.8'

B. Water Level Measurements
Time: 1237
Height: ~~8.01~~ 8.01'
Source: Noaa 9446484

C. Mudline Elevation
-51.79'

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:
Core Accepted: (Yes) / No — Accept
Core Tube Length: 8'
Drive Penetration: 4'
Headspace Measurement: ~~—~~ 4.3'
Recovery Measurement: 3.7'
Recovery Percentage: ~~[illegible]~~ 92.5%
Total Length of Core To Process: 3.7

Drive Notes:
Hard drive, refusal @ 4'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt on outside of core barrel, clean sand w/ MCGs in bottom/shoe

Notes:
Accepted as best of 3 attempts

MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC06
Attempt No. 3
Date: 11/5/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 177043.05 (X)
~~Long/Easting~~: 708547.83 (Y)

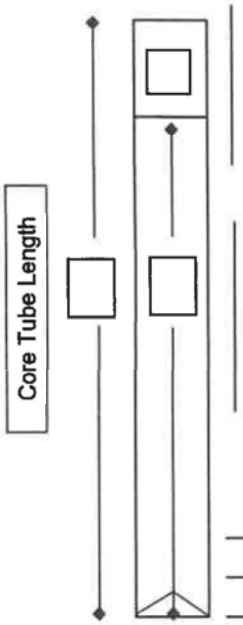
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 59.5'

B. Water Level Measurements
Time: 13:11
Height: 7.8'
Source: Noaa 9446484

C. Mudline Elevation
-51.7'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 0'
Headspace Measurement: 8'
Recovery Measurement: 0'
Recovery Percentage: 0%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Refusal at mudline, no penetration

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:
No core to dispose of

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC07
Attempt No. 1
Date: 11/1/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1171848.72 (X)
~~Long~~/Easting: 708643.49 (Y)

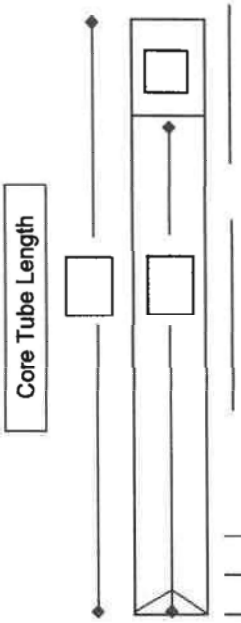
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.6'

B. Water Level Measurements
Time: 10:00
Height: 8.28'
Source: NOAA 9446484

C. Mudline Elevation
-50.32'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12
Drive Penetration: 7.2'
Headspace Measurement: 3.0'
Recovery Measurement: 4.2'
Recovery Percentage: 58 %
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Slow and Steady
hit refusal

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sand in Shoe = Sand (well graded) Grey w/ trace silt
Top Sandy Silt

Notes:

JS

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC07
Attempt No. 2
Date: 11/1/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Eat/Northing~~: 1171839.59 (X)
~~Long/Easting~~: 708638.83 (Y)

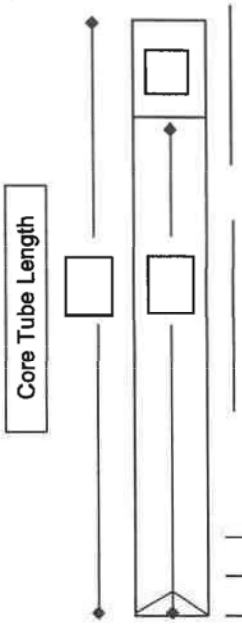
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.9 → 57.4

B. Water Level Measurements
Time: 1045
Height: 7.5'
Source: NOAA 9446484

C. Mudline Elevation
~~MW~~ -50.4'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: 7.5' → 8'
Headspace Measurement: .5'
Recovery Measurement: 7.5'
Recovery Percentage: 93.75
Total Length of Core To Process: 7.5'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Steady and slow full drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sand throughout → grey well Graded

Notes:
8ft barrel used

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS PE
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WWT-SC08
Attempt No. 1
Date: 11/1/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1171904.71 (X)
~~Long~~/Easting: 7086996.63 (Y)

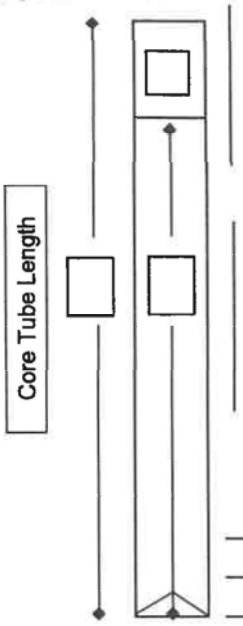
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.4 → 62.2'

B. Water Level Measurements
Time: 9:11 | 9:36
Height: 9.28 | 8.68
Source: NOAA 9446484 | NOAA

C. Mudline Elevation
~ -54.12'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6.7 → remeasure lead (7.9')
Headspace Measurement: 4.5'
Recovery Measurement: 7.5'
Recovery Percentage: 94 %
Total Length of Core To Process: 7.5'

Recovery Measurements (prior to cuts)



Drive Notes:
Steady + hard for 20 min
Refusal @ 7.9'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sand in Shoe - Silty material at top
6 Sand (well graded) Grey w/ trace silt

Notes:
remeasured lead line post vibeing due to falling tide

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: LWT-SC09
Attempt No. 1
Date: 11/1/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 708854.53 (Y) SN
~~Long~~/Easting: 1171742.21 (X) SN

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.3'

B. Water Level Measurements
Time: 1125
Height: 6.97'
Source: NOAA 9446484

C. Mudline Elevation
-51.33'

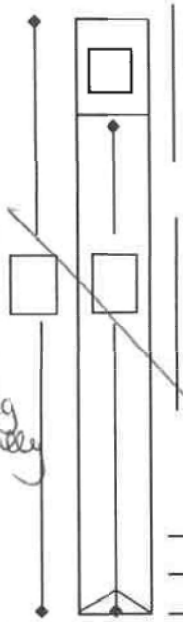
Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12.0'
Drive Penetration: 12.0'
Headspace Measurement: .3
Recovery Measurement: 11.7'
Recovery Percentage: 97.5
Total Length of Core To Process: 11.7

12 ← after removing texan tube
12
3.7
~~8.3~~
~~69%~~
8.3

Per Delaney HS and crew just change length to process keep everything else as originally collected

corrected

Recovery Measurements (prior to cuts)



JLS

Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow and steady full drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sand throughout (Top and Shoal), Grey, Well Graded, dense, no silt at top

Notes:
lost some material while removing liner

JLS

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-05.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: +MLLW

Station ID: WBT-SC10
Attempt No. 1
Date: 11/7/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1171638883.98 (x)
Long/Easting: 708800.88 (y)

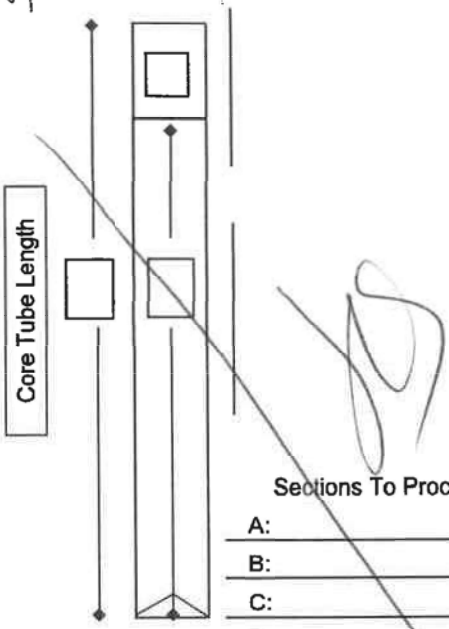
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 59.2'

B. Water Level Measurements
Time: 1330
Height: 8.05
Source: NOAA 9446984

C. Mudline Elevation
-51.15'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 8.4'
Headspace Measurement: 4.3'
Recovery Measurement: 7.7'
Recovery Percentage: 91.6%
Total Length of Core To Process: 7.7

Recovery Measurements (prior to cuts)



Drive Notes:
Steady slow drive
refusal @ 8'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top: Soft Silt w/ Sand
Shoe: Grey Sand (well graded), dense with trace silt

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WYT-SC11
Attempt No. 1
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708950.86 (Y)
Long/Easting: 1171466.08 (X)

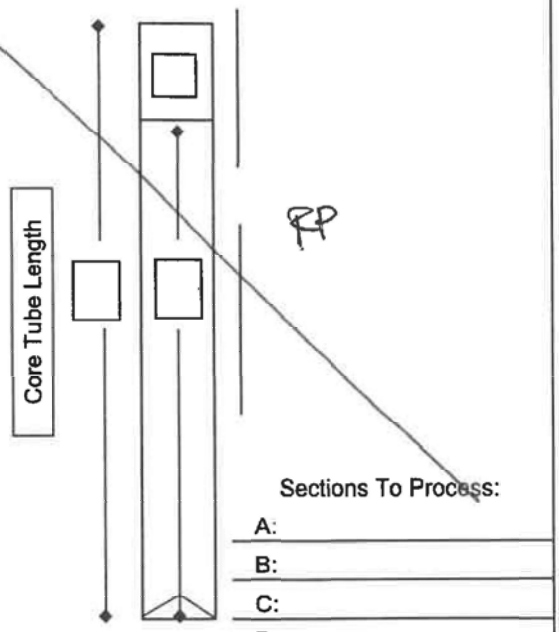
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 58.2'

B. Water Level Measurements
Time: 11:40
Height: 7.31'
Source: NOAA 9446484

C. Mudline Elevation
-50.9'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12
Drive Penetration: 6.2'
Headspace Measurement: —
Recovery Measurement: 0'
Recovery Percentage: 0%
Total Length of Core To Process: 0'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
hard - lost liner
Refusal @ 6.2'

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

RP

Notes:
Lost liner

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT - SC11
Attempt No. 2
Date: 11/21/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708943.22 (Y)
Long/Easting: 1171461.01 (X)

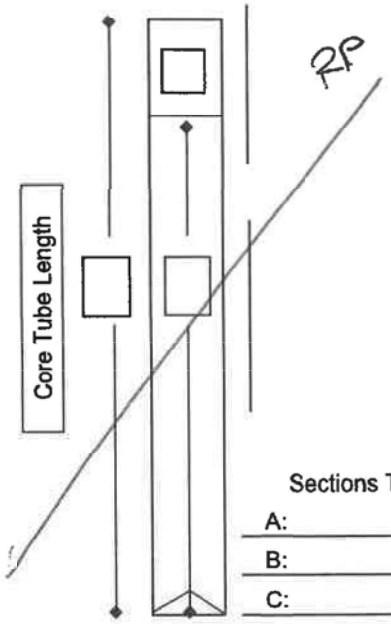
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 57.0'

B. Water Level Measurements
Time: 12:46
Height: 7.18'
Source: NOAA 9449484

C. Mudline Elevation
-49.8'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8
Drive Penetration: 5.6
Headspace Measurement: 4.0
Recovery Measurement: 3.4
Recovery Percentage: 60.7%
Total Length of Core To Process: 3.4

Recovery Measurements (prior to cuts)



Drive Notes:
Firm, sandy, tipped 2 ½ down
Refusal @ 5.6'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

TOP: very soft, wet, dark brown, SILT w/ sand
SHOE: very soft, wet, dark brown

Notes:
layer of silt settling 2'+ over 2hrs. (above measured depth)

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: RP
Contractor: Gravity
Vertical Datum: MLLW

Station ID: ~~SC~~ RP WAT-SC11
Attempt No. 3
Date: 11/2/24
Logged By: RP
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 708946.85 (Y)
Long/Easting: 1171450.77 (X)

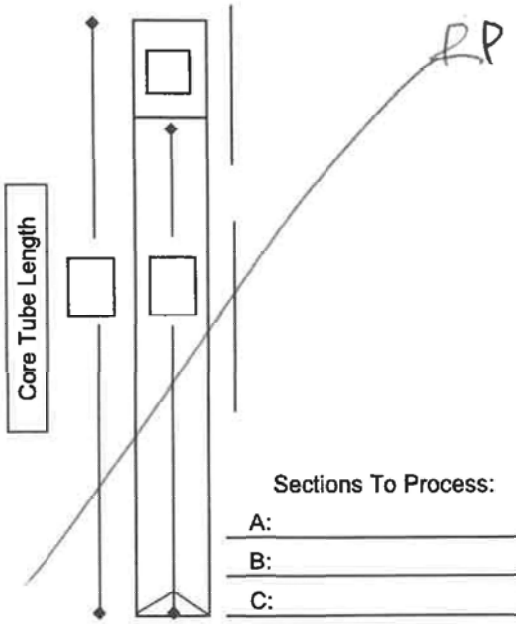
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 56.7'

B. Water Level Measurements
Time: 13:45
Height: 7.71'
Source: NOAA 9446484

C. Mudline Elevation
-49.0'

Core Collection Recovery Details:
Core Accepted: Yes (No)
Core Tube Length: 12'
Drive Penetration: 5.3'
Headspace Measurement: 0'
Recovery Measurement: 3'
Recovery Percentage: ~~5.3'~~ RP 56.6%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Good till ~3.5' then tipped
Refusal @ 5.3'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top: very soft, wet, black brown, SILT
Shoe: very soft, wet, black brown, SILT w/ sand

Notes:
RP

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WUT-SC12
Attempt No. 1
Date: 11/11/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 709079.21 (Y)
Long/Easting: 1171531.23 (X)

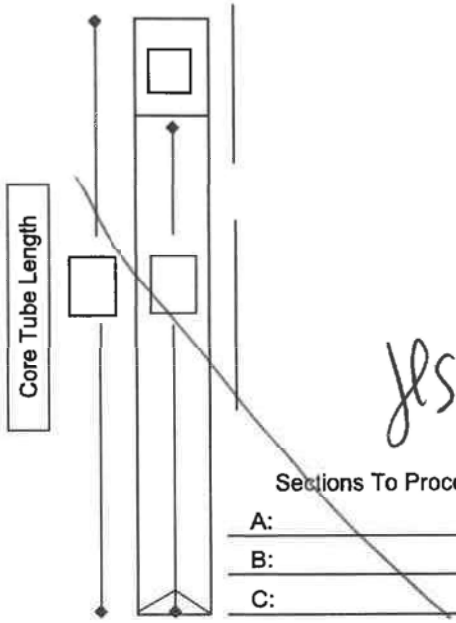
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 49.3

B. Water Level Measurements
Time: [redacted]
Height: 9.12'
Source: NOAA 9446484

C. Mudline Elevation
-40.18'

Core Collection Recovery Details:
Core Accepted: Yes / ~~No~~
Core Tube Length: 12'
Drive Penetration: 7.6'
Headspace Measurement: ~~8.8~~ 8.6'
Recovery Measurement: 3.4'
Recovery Percentage: 44.7%
Total Length of Core To Process: 3.4'

Recovery Measurements (prior to cuts)



JLS

Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow and Steady
Hit refusal @ 7.6'

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

TOP → Soft Silty Sand
SHOE → Sand, dense, Grey, trace Silt

Notes:

JLS

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WDT-SC12
Attempt No. 2
Date: 11/11/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 709088.98 (Y)
Long/Easting: 1171521.91 (X)

A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.3

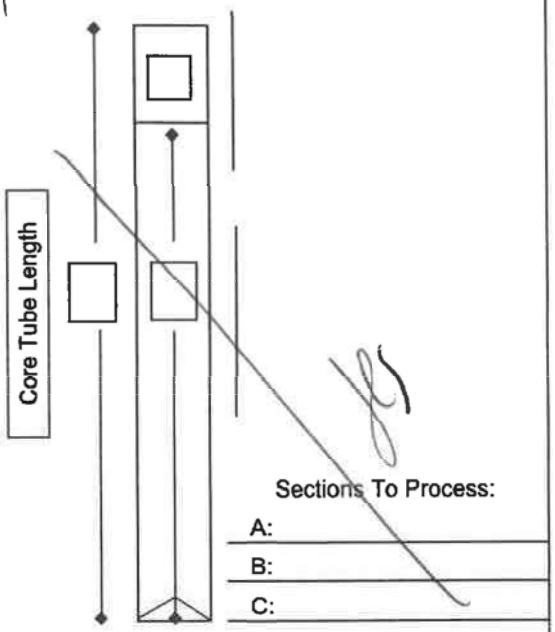
B. Water Level Measurements
Time: 1456
Height: 10.16'
Source: NOAA 9447484

C. Mudline Elevation
-52.14'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 8'
Drive Penetration: ~~4.3~~ 7.3'
Headspace Measurement: 3.7'
Recovery Measurement: 4.3'
Recovery Percentage: 58.9%
Total Length of Core To Process: 4.3'

52.14

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow and steady
Refusal @ 7.3'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

TOP: Soft silt
bottom: Grey, dense, SAND, w/ trace silt

Notes:
roughly 10ft from target

ANCHOR QEA

Sediment Core Collection Log

Job: Blair waterway
Job No: 240092-03.03
Field Staff: HS
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WWT-SC12
Attempt No. 3
Date: 11/11/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 709095.59 (Y)
Long/Easting: 1171534.40 (X)

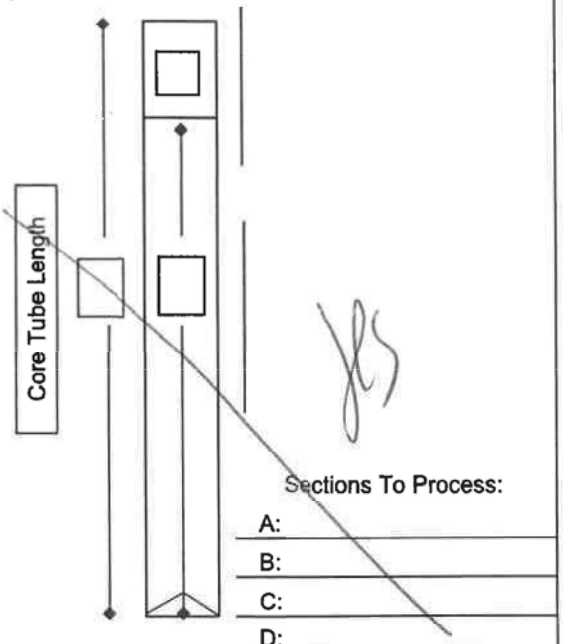
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.9'

B. Water Level Measurements
Time: 1535
Height: 10.63'
Source: NOAA 9446484

C. Mudline Elevation
52.27'

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 8'
Drive Penetration: 7'
Headspace Measurement: 5.7'
Recovery Measurement: 2.3'
Recovery Percentage: 32.8%
Total Length of Core To Process: 2.3'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Steady and slow refusal @ 7 ft

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Top firm some silt mostly SAND
Shoe: dense Grey wet SAND

Notes:
Just outside of 10' circle for 3rd Attempt

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC13
Attempt No. 1
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 171354.76 x
~~Long/Easting~~: 709130.30 y

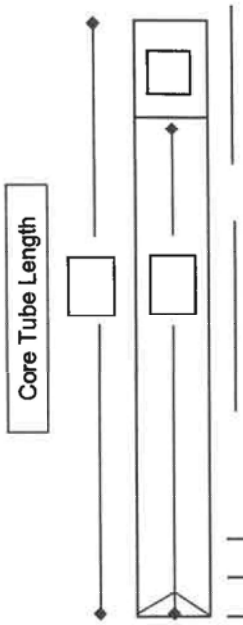
A. Water Depth
DTM Depth Sounder: ——
DTM Lead Line: 63.4'

B. Water Level Measurements
Time: 1050
Height: 10.1' MLLW
Source: Noaa 9446484

C. Mudline Elevation
−53.3 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 6.4'
Headspace Measurement: 7.1'
Recovery Measurement: 4.9'
Recovery Percentage: 76.5%
Total Length of Core To Process: 4.9'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow drive, refusal @ 6.4'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand w/ MCG on bottom/in shoe, top of core felt very soft/soupy, so may be more recovery than initially thought

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WJT-SC14
Attempt No. 1
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Cal/Northing~~: 1171367.43 (X)
~~Long/Easting~~: 709246.83 (Y)

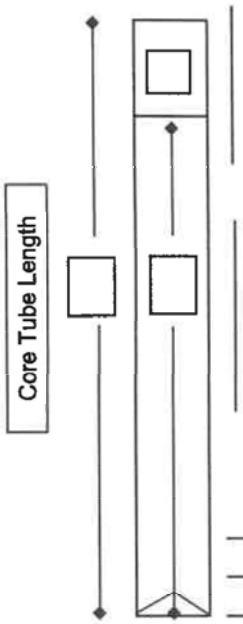
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60.1'

B. Water Level Measurements
Time: 909
Height: 6.78' MLLW
Source: Noaa 9446484

C. Mudline Elevation
-53.32 ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 12'
Drive Penetration: 5.5'
Headspace Measurement: 10.3'
Recovery Measurement: 1.7'
Recovery Percentage: 30.9%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
slow drive, refusal at 5.5'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC14
Attempt No. 2
Date: 10/24/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1171368.32 (x)
Long/Easting: 709256.59 (y)

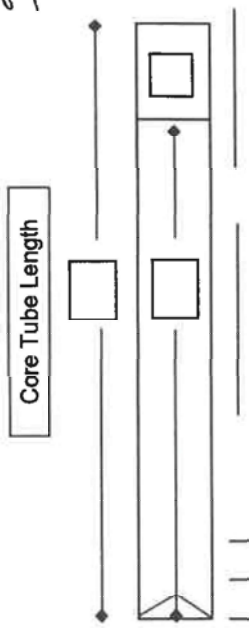
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: ~1.9'

B. Water Level Measurements
Time: 946
Height: 8.1 ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-53.8 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 8'
Headspace Measurement: 4.3'
Recovery Measurement: 7.7'
Recovery Percentage: 96.25%
Total Length of Core To Process: 7.7'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Slow drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Clean sand (with MCG) on bottom/in shoe, top of drive/core felt hard when checking headspace

Notes:
MCG: multi-colored grains

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC15
Attempt No. 1
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/~~Northing~~: 1171155.49 X
~~Long~~/Easting: 709315.05 Y

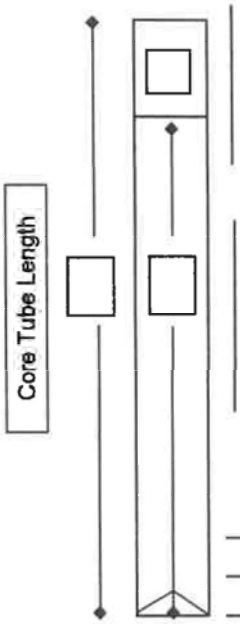
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 60'1.3'

B. Water Level Measurements
Time: 1353
Height: 10.060 ft MLLW
Source: NOAA

C. Mudline Elevation
-50.64 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: ~~8~~ 7.5'
Headspace Measurement: 4.9'
Recovery Measurement: 7.1'
Recovery Percentage: 94.6%
Total Length of Core To Process: 7.1'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
~~8~~ Hit refusal at ~~8~~ 7.5' but continued driving until 20 minutes to attempt break-through
↳ slow drive, changed vibe frequency

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand on bottom x sticky dark grey clay on outside of core barrel

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC16
Attempt No. 1
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1171226.80 (X)
~~Long/Easting~~: 709385.12 (Y)

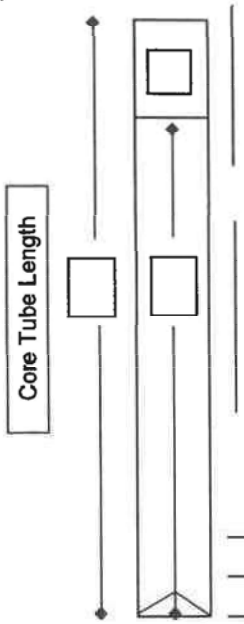
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.6'

B. Water Level Measurements
Time: 1225
Height: 11.65' ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-52.95 ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 15'
Drive Penetration: 3'
Headspace Measurement: 13'
Recovery Measurement: 2'
Recovery Percentage: 66.6%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Drive Notes:
Hard drive with very little progress over 20 mins

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

AW

Notes:

AW

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC16
Attempt No. 2
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat~~/Northing: 171217.30 (x)
~~Long~~/~~Easting~~: 709379.93 (y)

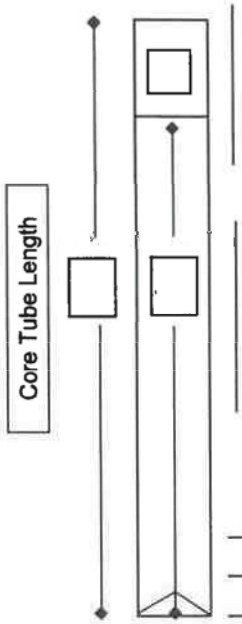
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 64.4'

B. Water Level Measurements
Time: 1304
Height: 11.39' MLLW
Source: Noaa9446484

C. Mudline Elevation
-53.01 ft MLLW

Core Collection ~~Recovery~~ Details:
Core Accepted: Yes / No
Core Tube Length: 12'
Drive Penetration: 6.5'
Headspace Measurement: 7.8'
Recovery Measurement: 4.2'
Recovery Percentage: 64.6%
Total Length of Core To Process: 4.2'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard drive, but refusal @ 6.5' but continued to vibe until 20 minutes to try to break through

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

clean sand in bottom

Notes:
* waiting on PM approval *

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC17
Attempt No. 1
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 171133.18 x
~~Long/Easting~~: 709462.70 y

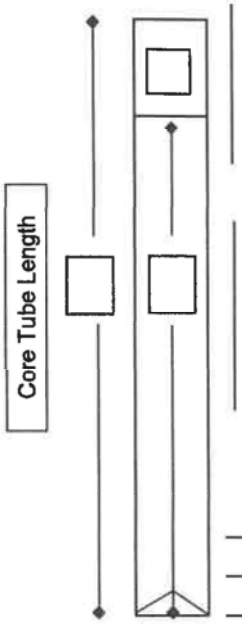
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.6'

B. Water Level Measurements
Time: 11:12
Height: 11.64' MLLW
Source: Noaa 9446484

C. Mudline Elevation
-51.96ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 6'
Recovery Measurement: 6'
Recovery Percentage: 50%
Total Length of Core To Process: 10'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
relatively smooth drive, slight tip at halfway mark (6') that didn't increase after initial change

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky grey clay on outside of barrel, clean sand ~~in~~ in bottom ~~(cement cap)~~

Notes:

ANCHOR QEA

Sediment Core Collection Log

Page 1 of 1

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC18
Attempt No. 1
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1170979.53 x
~~Long/Easting~~: 709407.48 y

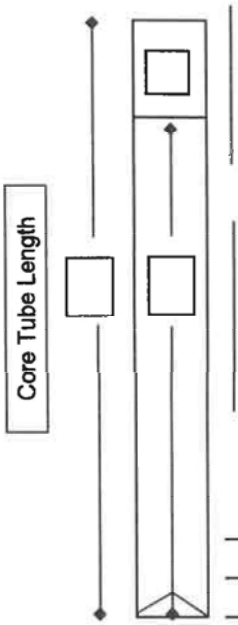
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 61.5'

B. Water Level Measurements
Time: 10:08
Height: 10.76 MLLW
Source: Noaa 9447484

C. Mudline Elevation
-50.74ft MLLW

Core Collection Recovery Details: HS percs
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 10.5'
Headspace Measurement: 5.8'
Recovery Measurement: 6.2'
Recovery Percentage: 59%
Total Length of Core To Process: 6.2'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hit refusal at 10.5' (12' core barrel), stopped drive at 11 minutes due to H2S issue (port training above vessel) and refusal

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky dark grey clay on outside of core barrel

Notes:
* Waiting on PM confirmation on acceptance or reject *

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC19
Attempt No. 1
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1170836.42 (X)
~~Long/Easting~~: 709607.31 (Y)

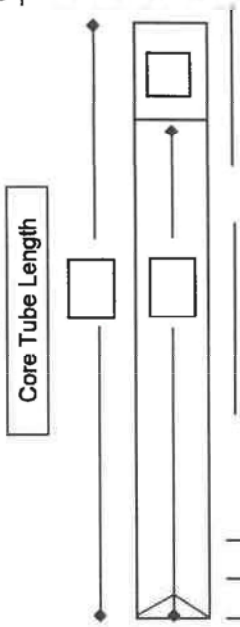
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 59.5'

B. Water Level Measurements
Time: 1452
Height: 8.32' MLLW
Source: Noaa 9446484

C. Mudline Elevation
-51.18 MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 10.5'
Headspace Measurement: 4'
Recovery Measurement: 8'
Recovery Percentage: 76.2%
Total Length of Core To Process: 8'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hit refusal @10.5'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticky dark grey silt on outside of barrel, dark grey sand in shoe

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC20
Attempt No. 1
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1170837.99 (X)
~~Long/Easting~~: 709694.34 (Y)

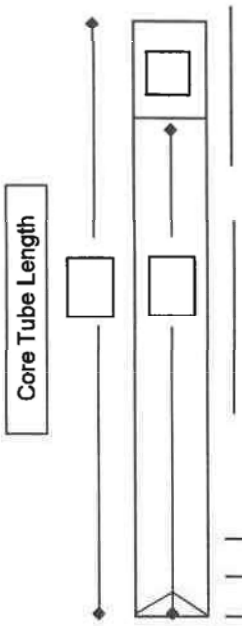
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.0'

B. Water Level Measurements
Time: 15:42
Height: 7.8' ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-54.20 ft MLLW

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: ~~10~~ 15'
Drive Penetration: 15'
Headspace Measurement: 12.1'
Recovery Measurement: 2.9'
Recovery Percentage: 19.3%
Total Length of Core To Process: —

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Steady drive

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sandy material in shoe

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC20
Attempt No. 2
Date: 10/23/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/~~Northing~~: 1170376.64 x
Long/~~Easting~~: 709676.75 y

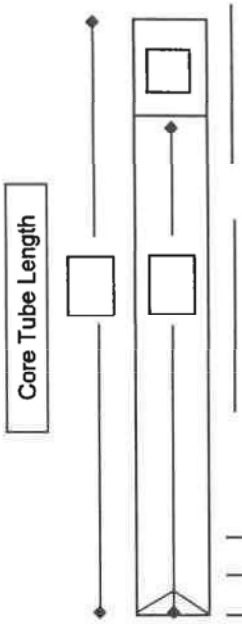
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.0'

B. Water Level Measurements
Time: 913
Height: 9.4 Ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-53.6 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 6.0'
Recovery Measurement: 6.0'
Recovery Percentage: 50%
Total Length of Core To Process: 6'

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Smooth drive until end (~11') got hard

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Originally was within 3' of original attempt, dropped lead line and felt hard surface so moved to find softer ground

Sticky dark grey clay on outside of barrel
Barrel was scuffed after coming up, implies debris

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW, HS, NB
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WUT-SC21
Attempt No. 1
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 47 15 50.366 N
Long/Easting: 122 23 31.3641 W

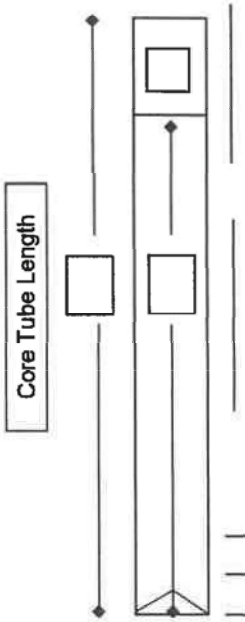
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.0

B. Water Level Measurements
Time: 1044
Height: 11.96 ft MLLW
Source: NOAA 9446484

C. Mudline Elevation
-51.04 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) ~~No~~
Core Tube Length: 70'
Drive Penetration: 5'
Headspace Measurement: ~~15.2'~~ 14.8'
Recovery Measurement: ~~4.8'~~ 5.2'
Recovery Percentage: ~~76%~~ ~~100%~~ 104%
Total Length of Core To Process: 5.2

Recovery Measurements (prior to cuts)



Drive Notes: Long slow drive, refusal @ 5'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Dark grey fine to medium sand, crab (1") near top of core

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Blair waterway
Job No: 240092-83.03
Field Staff: HS, AW, NB
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WWT-SC-22
Attempt No. 1
Date: 10/21/24
Logged By: HS
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 47 15 51.2455 N
Long/Easting: 122 23 29.5361 W

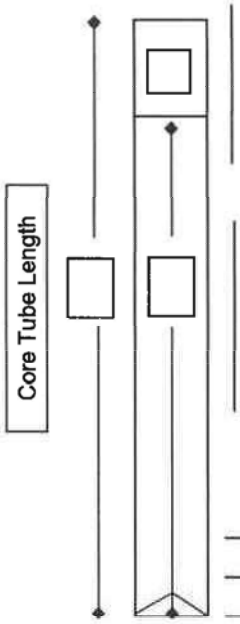
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.7 → 12:02
62.8 → 12:46

B. Water Level Measurements
Time: 12:02
Height: ~~0.0~~ 9.18
Source: NOAA 9446484

C. Mudline Elevation
~~55.7~~ -54.52

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length: 20'
Drive Penetration: 15.2'
Headspace Measurement:
Recovery Measurement: 0
Recovery Percentage: 0%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes: Long, slow drive
Hit refusal @15.2", hard recovery, lost liner, suspected debris + sample

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

AW

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No:
Field Staff: HS, AW, NB
Contractor: Gravity
Vertical Datum: —

Station ID: WWT-SC22
Attempt No. 2
Date: 10/24/24
Logged By: HS/AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 47 15 51.2567 N
Long/Easting: 122 23 29.4878 W

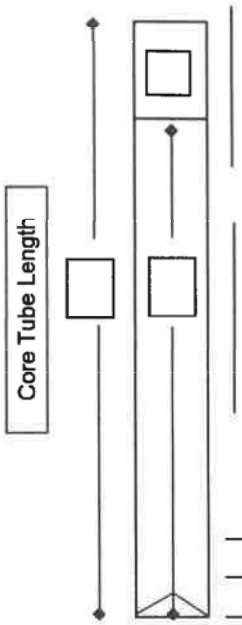
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.3

B. Water Level Measurements
Time: 13:02
Height: 10.98
Source: NOAA9446484

C. Mudline Elevation
-51.32

Core Collection Recovery Details:
Core Accepted: Yes / (No)
Core Tube Length:
Drive Penetration:
Headspace Measurement:
Recovery Measurement:
Recovery Percentage:
Total Length of Core To Process: AW

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes: Vibratory head broke, barrel lost, no sample

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

AW

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW MS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WW-SC22
Attempt No. 3
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
~~Lat/Northing~~: 1170809.84 (X)
~~Long/Easting~~: 709785.75 (Y)

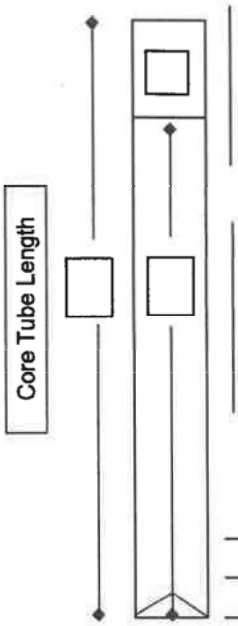
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.0'

B. Water Level Measurements
Time: 1325
Height: 9.9ft MLLW
Source: Noaa 9446484

C. Mudline Elevation
-53.1ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 3.5'
Recovery Measurement: 8.5'
Recovery Percentage: 70.8%
Total Length of Core To Process: 8.5

Recovery Measurements (prior to cuts)



Drive Notes:
relatively smooth drive to ~~7~~ 4', hard layer from ~5'-9'

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sulfide-like odor from core, soft silty top
Dark grey sand in shoe

Notes:
Accepted per new guidance

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: AW, HS
Contractor: Gravity
Vertical Datum: MLLW

Station ID: WWT-SC23
Attempt No. 1
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 1170567.70 (X)
Long/Easting: 709884.43 (Y)

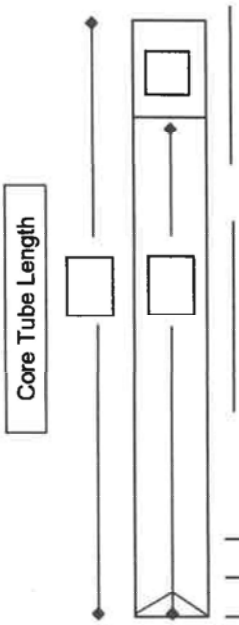
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 63.1

B. Water Level Measurements
Time: 12 18
Height: 11.12 ft
Source: NOAA 9446484

C. Mudline Elevation
-51.98

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 12'
Drive Penetration: 12'
Headspace Measurement: 4.7'
Recovery Measurement: 7.3'
Recovery Percentage: 60.8%
Total Length of Core To Process: 7.3'

Recovery Measurements (prior to cuts)



Drive Notes:
Smooth drive

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Grey silt (sticky texture) on outside of core tube

Notes:
Accepted per new instructions from PMs

ANCHOR QEA

Sediment Core Collection Log

Job: Blair Waterway
Job No: 240092-03.03
Field Staff: HS, AW, NB
Contractor: Gravity
Vertical Datum: — MLLW

Station ID: WWT-SC24
Attempt No. 1
Date: 10/22/24
Logged By: AW
Horizontal Datum: NAD83 WA State Plane South, feet

Field Collection Coordinates:
Lat/Northing: 47 15 53.4105 N
Long/Easting: 122 23 53.2996 W

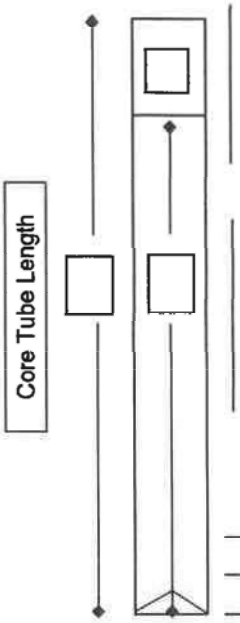
A. Water Depth
DTM Depth Sounder: —
DTM Lead Line: 62.7

B. Water Level Measurements
Time: 9:14
Height: 11.4 ft MLLW
Source: NOAA 9446484

C. Mudline Elevation
-51.3 ft MLLW

Core Collection Recovery Details:
Core Accepted: (Yes) / (No)
Core Tube Length: 20'
Drive Penetration: 12'
Headspace Measurement: ~~6'~~ 12.5'
Recovery Measurement: ~~6'~~ 7.5'
Recovery Percentage: ~~30%~~ 62.5 %
Total Length of Core To Process: — 7.5

Recovery Measurements (prior to cuts)



Sections To Process:
A:
B:
C:
D:

Drive Notes:
Hard slow drive, bent barrel
hit refusal

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Shoe material is dark grey sand, top material very soft

Notes:

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/21/2024
SITE ADDRESS: 1 Sitcum Way, Tacoma
PERSONNEL: Audrey W. Hayley S. Nik B.

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW — SUNNY | (CLOUDY) | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 56. °C [Circle appropriate units]

TIME	COMMENTS
10:30	Audrey, Hayley & Nik board Gravity cove boat (RV Ingalls)
10:40	Gravity & AQ H&S meeting
11:03	Leave dock, Mobilize to DMMU 27
12:15	Begin WOT-SC22 (Attempt 1)
12:50	Attempt 1 failed (lost liner/sample after long, slow drive)
13:02	WOT-SC22 Attempt 2
13:18	Gravity's vibratory head broke during attempt 2, no more coring possible today
13:30	Begin bottom/side sonar scanning for lost tube ↳ couldn't find it
13:57	Begin mobing back to dock
14:13	Arrive back to dock
14:18	Audrey, Hayley & Nik off water
14:25	Audrey, Hayley & Nik leave site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/22/24

SITE ADDRESS: 1 Sitcum Way, Tacoma **PERSONNEL:** A. White, H. Shanley, NB

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | LIGHT | MEDIUM | HEAVY

SUNNY | CLOUDY | RAIN | ?

TEMPERATURE: (°F) 50. °C [Circle appropriate units]

TIME	COMMENTS
8:00	Hayley & Audrey arrive on site
8:08	Hayley & Audrey board vessel
8:22	Nik boards vessel
8:25	H&S meeting
8:30	Mobilize to WUT-SC24
9 14	Begin attempt 1 @ WUT-SC24
9 48	Attempt 1 @ WUT-SC24 failed, hit refusal and bent barrel
10 20	Decided to try a different location, mobilized to WUT-SC21
10 44	Begin attempt 1 @ WUT-SC21
11 30	Call with PMs about changing plan due to driving troubles (Dan & Christine)
	-New goal is 20 min drive with >4 ft recovery in DMMU 23/27
	* Attempt 1 @ WUT-SC24 and Attempt 1 @ WUT-SC21 are accepted
11 51	NB leaves on Uber boat bound for processing site with 2 cores
11 55	Mobilize to WUT-SC23
1220	Begin attempt 1 @ WUT-SC23
12 45	WUT-SC23 attempt 1 accepted per new instructions
12 55	Mobilize to WUT-SC22
13 20	Begin attempt 3 (2 yesterday failed) @ WUT-SC22
13 55	WUT-SC22 attempt 3 accepted per new instructions
1407	Mobilize to WUT-SC19
1452	Begin attempt 1 @ WUT-SC19
1510	WUT-SC19 accepted (attempt 1)
1520	Mobilize to WUT-SC20
1544	Begin attempt 1 @ WUT-SC20
1605	WUT-SC20 attempt 1 rejected

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/22/24

SITE ADDRESS: 1 Sitcum Way, Tacoma **PERSONNEL:** AW, HS, NB

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F . °C

[Circle appropriate units]

TIME	COMMENTS
1615	Mobilize back to dock
1632	Arrive back at dock
1640	AW & HS disembark vessel
1645	AW leaves site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/23/24
SITE ADDRESS: 1 Sitcum Way, Tacoma, WA
PERSONNEL: AW, HS

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50 . °C
[Circle appropriate units]

TIME	COMMENTS
8:00	AW & HS arrive on site and board vessel
8:15	H&S meeting, discussion of goals for the day and work going forward, ~~tasks~~
8:30	Mobilize to WUT-SC20 (leave dock)
9:20	Begin attempt #2 @ WUT-SC20
9:35	Full drive completed
9:45	WUT-SC20 attempt #2 accepted
9:46	HS leaves core vessel in uber boat (with accepted core)
9:50	Mobilize to WUT-SC18
10:13	Begin attempt #1 @ WUT-SC18
10:24	Finish attempt #1 @ WUT-SC18 → Port started training involving cranes moving containers directly above station WUT-SC18 so we had to move coring vessel (Health & Safety issue) → core accepted by PMs
10:38	Waiting for PM input regarding acceptance of WUT-SC18 attempt 1 (confirmed)
10:40	Mobilize to WUT-SC17
11:13	Begin attempt #1 @ WUT-SC17
11:34	Full drive completed, WUT-SC17 attempt #1 accepted!
11:55	Mobilize to WUT-SC16
12:30	Begin attempt #1 @ WUT-SC16
12:50	Finish attempt #1 @ WUT-SC16, rejected
13:05	Begin attempt #2 @ WUT-SC16
13:25	Finish attempt #2 @ WUT-SC16
13:42	Mobilize to WUT-SC15
1354	Begin attempt #1 @ WUT-SC15
1414	Finish attempt #1 @ WUT-SC15, accepted
1440	NB & Shawn (Gravity) board core vessel to search for lost core barrel w/ROV

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/23/24

SITE ADDRESS: 1 Sitcum Way, Tacoma, WA **PERSONNEL:** AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | LIGHT | MEDIUM | HEAVY

SUNNY | CLOUDY | RAIN | ?

TEMPERATURE: °F . °C [Circle appropriate units]

TIME	COMMENTS
15:50	Mobilize back to dock
16:04	Arrive back at dock
16:05	AW & NB off vessel, NB leaves site
16:25	AW leaves site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/24/2024
SITE ADDRESS: 1 Sitcum Way, Tacoma, WA
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50 . °C
[Circle appropriate units]

TIME	COMMENTS
800	AW arrives on site and boards core vessel
820	H&S meeting
825	Mobilize to WUT-SC14
917	Begin attempt #1 @ WUT-SC14
936	Finish attempt #1 @ WUT-SC14, refusal at 5.5' → rejected
954	Begin attempt #2 @ WUT-SC14
1015	Finish attempt #2 @ WUT-SC14 → accepted
1024	Mobilize to WUT-SC13
1053	Begin attempt #1 @ WUT-SC13
1123	Finish attempt #1 @ WUT-SC13 → accepted
1130	Mobilize to HT-SC04
1145	Mobilize to HT-SC30 instead, ship in the way
1226	Begin attempt #1 @ HT-SC30
1254	Finish attempt #1 → rejected
1333	Begin attempt #2 @ HT-SC30 → accept (1353)
1410	Mobilize to HT-SC28
1448	Begin attempt #1 @ HT-SC28
1506	Finish attempt #1 @ HT-SC28 → reject
1513	Begin attempt #2 @ HT-SC28
1533	Finish attempt #2 @ HT-SC28 → accept
1550	Recon TRU-Grit under pier location
1617	Mobilize back to dock
1627	Arrive back at dock, AW off boat
1637	AW off site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/25/24
SITE ADDRESS: 1 Sitcum Way, Tacoma, WA
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (F) 43. °C
[Circle appropriate units]

TIME	COMMENTS
800	AW arrives on site
810	AW boards convey vessel
820	H&S Meeting
825	Mobilize to HT-SC29
904	Begin attempt #1 @ HT-SC29
918	Finish attempt #1 @ HT-SC29 (refusal) → reject
929	Begin attempt #2 @ HT-SC29
951	Finish attempt #2 @ HT-SC29 → accept
1005	Mobilize to HT-SC27
1030	Call with PMs about Tru-Grit under pier location
1105	Begin attempt #1 @ HT-SC27
1124	Finish attempt #1 @ HT-SC27 (full drive) → accept!
1134	Mobilize to HT-SC26, avoiding shipping vessel entering waterway
1217	Begin attempt #1 @ HT-SC26
1236	Finish attempt #1 @ HT-SC26 (full drive) → accept!
1246	Mobilize to HT-SC25
1301	Begin attempt #1 @ HT-SC25
1319	Finish attempt #1 @ HT-SC25 → tentatively rejected ✓
1333	Begin attempt #2 @ HT-SC25
1352	Finish attempt #2 @ HT-SC25 → accept!
1405	Mobilize to HT-SC24
1430	Change in plans, mobilize to TG-SC24
1505	Begin attempt #1 @ TG-SC24
1525	Finish attempt #1 @ TG-SC24 → accept!
1555	Mobilize back to dock
1604	Arrive @ dock, AW off vessel
1620	AW off site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/28/24
SITE ADDRESS: 1 Sitcum Way
PERSONNEL: AW, CS

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 50 . °C
[Circle appropriate units]

TIME	COMMENTS
930	AW & CS board coring vessel
935	H&S meeting
945	Mobilize to Tru-Grit (TG-SC04)
1155	Begin attempt #1 @ TG-SC04 (under pier) → reject
1222	Begin attempt #2 @ TG-SC04 → accept
	↳ core barrel stuck in muck below pier, took about
	1 hour + to retrieve
1350	Taking coordinates from TG-SC04
1410	Mobilize back to dock, done with coring for the day
1430	Arrive back at dock
1437	AW & CS off boat
1500	AW off site

Signature: AW Ulm

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/29/24
SITE ADDRESS: 1 Sitcum Way
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 45 . °C
[Circle appropriate units]

TIME	COMMENTS
8:00	AW on site, boards core vessel
8:20	H&S meeting
8:25	Mobilize to TG
8:50	Change plan, mobilize to HT-SC06
9:37	Begin attempt #1 @ HT-SC06
9:57	Finish attempt #1 @ HT-SC06 → accept
10 15	Mobilize to HT-SC05
1044	Begin attempt #1 @ HT-SC05
1104	Finish attempt #1 @ HT-SC05 → accept
1115	Mobilize to HT-SC04
1141	Begin attempt #1 @ HT-SC04
1202	Finish attempt #1 @ HT-SC04 → accept!
1230	working lunch, mobilize to TG
1316	Begin attempt #1 @TG-SC18
1333	restart attempt #1 @ TG-SC18 (Tech difficulties)
1355	Finish attempt #1 @ TG-SC18
	↳ Lost core barrel
1425	Gravity doing side/top scans to look for lost barrel
	& reconning Tru-Grit high tide locations and using splash
	camera to look for lost barrel
1605	Mobilize back to dock
1615	Arrive back at dock
1622	AW off boat

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/30/24
SITE ADDRESS: 1 Sitcum Way, Tacoma
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 45 . °C
[Circle appropriate units]

TIME	COMMENTS
800	AW boards corvus vessel
815	HSS meeting
8:20	Mobilize to HT-SC07/08
9:19	Begin attempt #1 @ HT-SC08
936	Finish attempt #1 @ HT-SC08 → accept
945	Mobilize to HT-SC07
951	Begin attempt #1 @ HT-SC07
1014	Finish attempt #1 @ HT-SC07 → accept
1026	Mobilize to HT-SC09/10
1049	Begin attempt #1 @ HT-SC10
1108	Finish attempt #1 @ HT-SC10 → accept
1120	Mobilize to HT-SC09
1130	Begin attempt #1 @ HT-SC09 → reject
1218	Begin attempt #2 @ HT-SC09
1232	Finish attempt #2 @ HT-SC09 → accept
1250	Mobilize to HT-SC11
1318	Begin attempt #1 @ HT-SC11 → accept
1343	Mobilize to HT-SC13
1405	Begin attempt #1 @ HT-SC13 → accept
1440	Mobilize to HT-SC12
1456	Begin attempt #1 @ HT-SC12 → accept
1524	Done with collection for the day
1530	Mobilize back to dock
1550	Arrive at dock, AW off boat
1600	AW off site

Signature: [signature]

Daily Log

ANCHOR QEA

PROJECT NAME: Black Waterway **DATE:** 10/31/24

SITE ADDRESS: 1 Sitcum Way, Tacoma **PERSONNEL:** AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 44 . °C

[Circle appropriate units]

TIME	COMMENTS
800	AW arrives on site & boards coring vessel
815	H&S, Mobilize to HT-SC14
358	Begin attempt #1 @ HT-SC14
816	Finish attempt #1 @ HT-SC14 → accept
924	Mobilize to HT-SC15
948	Begin attempt #1 @ HT-SC15
1006	Finish attempt #1 @ HT-SC15 → accept
1016	Mobilize to HT-SC16
1040	Begin attempt #1 @ HT-SC16
1055	Finish attempt #1 @ HT-SC16 → accept
1110	Boat crew extracts HT-SC16 on board
1220	Mobilize to TG-SC18
1250	Shawn (Gravity) arrives on board with ROV
1320	Recovered lost core barrel from TG-SC18
1344	Begin attempt #2 @ TG-SC18 → accept
1407	Mobilize to HT-SC13
1445	Begin attempt #2 @ HT-SC13 → reject
1518	Begin attempt #3 @ HT-SC13 → accept
1541	Mobilize back to dock
1600	Arrive at dock AW off boat

Signature: [signature]

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/1/24

SITE ADDRESS: **PERSONNEL:** HS + Gravity

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50s . °C

[Circle appropriate units]

TIME	COMMENTS
0800	Arrive on Site ; on boat
0810	Health + Safety meeting
0830	mobing to HT - 1 → benefactor blocking area
0840	mobing to WUT-SC07/08
0845	anchoring @ WUT-SC08
0915	Vibe on @ WUT-SC08
0936	Vibe off → 94.9% recovery after new leadline [ACCEPT]
0955	anchoring @ WUT-SC07
1000	Vibe on @ WUT-SC07
1014	Vibe off → 58% ; no recovery for "B" Sample interval
1025	Trying 8' barrel due to refusal @ 7'
1029	Vibe on @ WUT-SC07
1046	Vibe off → 93% recovery [ACCEPTED]
1110	anchoring for WUT-SC09/10
~~1120~~ 1125	Vibe on @ WUT-SC09
1150	Vibe off @ WUT-SC09 → 97.5% recovery [ACCEPTED]
1155	lost rivets → working on removing liner
1320	Anchoring @ WUT-SC10
1330	Vibe on @ WUT-SC10
1348	Vibe off @ WUT-SC10 → 92% recovery [ACCEPTED]
1400	anchoring @ WUT-SC12
1420	Vibe on @ WUT-SC12
1440	Vibe off @ WUT-SC12 → 44% recovery
1456	Vibe on @ WUT-SC12 Attempt 2
1510	vibe off @ WUT-SC12 Attempt 2 → 59% recovery [ACCEPTED]
1535	Vibe on @ WUT-SC12 Attempt 3
1555	vibe off @ WUT-SC12 Attempt 3 → 32% recovery
1600	un-anchoring, mobbing back to dock
16	off water + off site

Signature:

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/2/24
SITE ADDRESS:
PERSONNEL: RP + Gravity (E)

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F 50.8 °C
[Circle appropriate units]

TIME	COMMENTS
07:45	Arrive on site ; H+S on boat
08:00	Prepping boat
08:36	mobing to WUT-SC01
09:00	anchoring @ WUT-SC01 → 1.5' from loc. on a1
09:30	vibe on @ WUT-SC01
09:50	vibe off @ WUT-SC01 → 47.3% recovery - switching to 8' barrel
10:06	vibe on @ WUT-SC01 → 0' from loc. on X2
10:30	vibe off @ WUT-SC01 → 95.0% recovery Accepted
11:18	mobing to WUT-~~SC02~~ SC11
11:40	anchored @ WUT-SC11 → >1' from loc. ~5' from pier
12:00	vibe on @ WUT-SC11
12:16	vibe off @ WUT-SC11 → 0% recovery - lost liner * left in place switching to 8' barrel
12:55	vibe on @ WUT-SC11 → ~2' from pier
13:25	vibe off @ WUT-SC11 → 60.7% recovery
13:35	vibe on @ WUT-SC11 → ~2' from pier
14:16	anchoring @ WUT-SC02 → 3.5' from loc.
14:25	vibe on @ WUT-SC02
14:55	vibe off @ WUT-SC02 → 53.0% recovery - switching to 8' barrel
15:10	vibe on @ WUT-SC02
15:34	vibe off @ WUT-SC02 → 98.0% recovery Accepted
15:52	mobing to shore.
16:21	cores put in fridge, truck, RP leaving site

Signature:

Note: WUT-SC11 & WUT-SC01-SC06

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/4/24

SITE ADDRESS: 1 Sitcum Way, Tacoma **PERSONNEL:** AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50 . °C

[Circle appropriate units]

TIME	COMMENTS
740	AW arrives on site and boards coring vessel
	- Dealing with lab break-in drama
830	Mobilize to WUT-SC03, HSS meeting
901	Begin attempt #1 @ WUT-SC03
925	Finish attempt #1 @ WUT-SC03 → reject
939	Begin attempt #2 @ WUT-SC03
957	Finish attempt #2 @ WUT-SC03 → reject
1009	Begin attempt #3 @ WUT-SC03
	→ vibracore head comes unplugged, attempt aborted
1025	Restart attempt #3 @ WUT-SC03
1039	Finish attempt #3 @ WUT-SC03 → accept
1048	Mobilize to WUT-SC05
1121	Begin attempt #1 @ WUT-SC05
1135	Finish attempt #1 @ WUT-SC05 → accept
1142	Mobilize to WUT-SC04
1200	Begin attempt #1 @ WUT-SC04
1218	Finish attempt #1 @ WUT-SC04 → tentatively rejected
1230	Gravity calls coring for the day, winds are too
1250	strong to continue safely, mobilize back to dock
↓	AW off boat
1336	AW off site (to Home Depot)

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/5/24
SITE ADDRESS: 1 Sitcum Way, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

(SUNNY) | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 43 . °C [Circle appropriate units]

TIME	COMMENTS
7:20	AW arrives on site, boards coring vessel
7:40	H&S meeting, mobilize to WUT-SC04
8:25	Begin attempt #2 @ WUT-SC04
843	Finish attempt #2 @ WUT-SC04 → accept
850	Mobilize back to dock, vibracore ~~head~~ chuck cracked, Grav driving a new one down from Snoqualmie
915	Mobilize to fuel station
1000	Mobilize back to dock
1015	AW off boat (temp)
1134	AW back on boat, mobilize to WUT-SC06
1211	Begin Attempt #1 @ WUT-SC06
1230	Finish attempt #1 @ WUT-SC06 (refusal at 5') → reject
1238	Begin attempt #2 @ WUT-SC06
1259	Finish attempt #2 @ WUT-SC06 → reject (refusal at 4')
1313	Begin attempt #3 @ WUT-SC06
1320	[redacted] Finish attempt #3, no penetration, no recovery → reject, accept attempt #2
1350	Mobilize to Tru-Grit
1434	Begin attempt #1 @ TG-SC02
1448	Finish attempt #1 @ TG-SC02
1455	Begin attempt #2 @ TG-SC02
1508	Finish attempt #2 @ TG-SC02 → reject
	↳ vibracore plug shorted out, unusable for rest of day
1515	Mobilize back to dock
1535	Arrive back at dock, AW off boat

Signature: [signature]

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/6/24
SITE ADDRESS: 1 Sitcum Ave, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N ~~NE~~ E SE S SW W NW | LIGHT | MEDIUM | HEAVY

(SUNNY) | CLOUDY | RAIN | ?

TEMPERATURE: °F 50 . °C [Circle appropriate units]

TIME	COMMENTS
7:20	AW arrives on site → vibracore hasn't arrived,
7:30	AW leaves site, will return at 9
850	AW arrives on site, boards coring vessel
1000	Vibracore head returned to boat
1010	Mobilize to HT-SC17
1024	There was a ship in the way (Eleftheria) Mobilizing to TG-SC02
1050	Begin attempt #3 @ TG-SC02
1055	Finish attempt #3 @ TG-SC02 (refusal @ 3') → reject, accept attempt #2 from 11/5
1102	Mobilize to TG-SC03
1138	Begin attempt #1 @ TG-SC03
1146	Finish attempt #1 @ TG-SC03
	↳ lost core barrel, working to retrieve it
1158	Retrieved barrel
1225	Begin attempt #2 @ TG-SC03
1233	Finish attempt #2 @ TG-SC03 → lost core barrel, retrieving it (1250)
1303	Begin attempt #3 @ TG-SC03
1310	Finish attempt #3 @ TG-SC03 → accept
1317	Mobilize to TG-SC06
1343	Begin attempt #1 @ TG-SC06
1353	Finish attempt #1 @ TG-SC06 → reject
1416	Begin attempt #2 @ TG-SC06
1424	Finish attempt #2 @ TG-SC06 → accept
1430	Mobilize to TG-SC12
1446	Begin attempt #1 @ TG-SC12
1457	Finish attempt #1 @ TG-SC12 → accept
1505	Mobilize to TG-SC11

Signature: AW

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/6/24
SITE ADDRESS: 1 Sitcum Ave, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F . °C
[Circle appropriate units]

TIME	COMMENTS
1525	Begin 1st attempt @ TG-SC11
1533	Finish attempt #1 @TG-SC11 → accept
1550	Start mobilizing back to dock
1610	Arrive back at dock, AW off boat

Signature: [signature]

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/7/24
SITE ADDRESS: 1 Sitcum Way, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ? — (SUNNY) (CLOUDY) RAIN

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 38 . °C [Circle appropriate units]

TIME	COMMENTS
730	AW arrives on site and boards coring vessel
740	Mobilize to HT, HAS meeting
824	Begin attempt #1 @ HT-SC17
836	Finish attempt #1 @ HT-SC17 → refusal @6', reject
840	Begin attempt #2 @ HT-SC17
855	Finish attempt #2 @ HT-SC17 → refusal @4', reject
905	Begin attempt #3 @ HT-SC17
919	Finish attempt #3 @ HT-SC17 → accept
925	Mobilize to HT-SC18
1005	Begin attempt #1 @ HT-SC18
1020	Finish attempt #1 @ HT-SC18 → accept
1026	Mobilize to HT-SC20
1105	Begin attempt #1 @ HT-SC20
1117	Finish attempt #1 @ HT-SC20 → accept!
1128	Mobilize to HT-SC19
1140	Begin attempt #1 @ HT-SC19
1150	Finish attempt #1 @ HT-SC19 → reject, refusal @4'
1205	Begin attempt #2 @ HT-SC19
1214	Finish attempt #2 @ HT-SC19 → reject
1242	Begin attempt #3 @ HT-SC19
1252	Finish attempt #3 @ HT-SC19
1259	Mobilize to HT-SC22
1340	Begin attempt #1 @ HT-SC22
1353	Finish attempt #1 @ HT-SC22 → reject
1313	Begin attempt #2 @ HT-SC22 — accepted as best of 3
1322	Finish attempt #2 @ HT-SC22
1435	Begin attempt #3 @ HT-SC22
14416	Finish attempt #3 @ HT-SC22 → reject
1452	Mobilize to HT-SC21

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/7/24

SITE ADDRESS: 1 Sitcum Way, Tac **PERSONNEL:** AW

WEATHER: **WIND FROM:**

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
(SUNNY)		CLOUDY		RAIN			?			

TEMPERATURE: °F . °C [Circle appropriate units]

TIME	COMMENTS
1503	Begin attempt #1 @ HT-SC21
1517	Finish attempt #1 @ HT-SC21 → [redacted]
1542	Begin attempt #2 @ HT-SC21
	↳ lost core barrel
1640	Mobilize back to dock
1655	Back at dock, AW off boat

Signature: [signature]

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/8/24
SITE ADDRESS: 1 Sitcum Way, Tac
PERSONNEL: AW, NB

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW
(SUNNY) | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F . °C
[Circle appropriate units]

TIME	COMMENTS
7:20	AW arrives on site, boards boat
7:30	NB boards boat
7:40	Mobilize to HT, HBS meeting
750	ROV exploration
926	NB off boat, back to dock
1030	Retrieved lost core barrel!
1054	Begin attempt #3 @ HT-SC21
111	Finish attempt #3 @ HT-SC21 → reject, accept attempt #1
1120	Mobilize to WUT-SC11 to find lost core liner
	↳ Stop on top of location
1200	Mobilize to HT-SC24/23
1243	Begin attempt #1 @ HT-SC23
1253	Finish attempt #1 @ HT-SC23 → refusal @5', reject
1300	Begin attempt #2 @ HT-SC23
1313	Finish attempt #2 @ HT-SC23 → reject → accept as best of 3
1326	Begin attempt #3 @ HT-SC23
1337	Finish attempt #3 @ HT-SC23 → reject
1340	Mobilize to HT-SC24
1347	Begin attempt #1 @ HT-SC24 → refusal at 2.6', reject
1407	Begin attempt #2 @ HT-SC24
1414	Finish attempt #2 @ HT-SC24 → accept
1417	Mobilize to give processing crew generator fuel & WUT-SC11
	↳ electric currents on Contessa hull, not safe
1500	Mobilize back to dock
1515	AW off boat arrive at dock

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Flair Waterway
DATE: 11/11/24
SITE ADDRESS: 1 Sitcom Way, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 50 . °C
[Circle appropriate units]

TIME	COMMENTS
7:30	AW arrives on site and boards boat
8:05	H&S meeting, mobilize to WUT-SC11 for liner retrieval
8 30	Confirmed liner is lying down, will leave in place
840	Mobilize to Tru-Grit → long time to anchor due to wind
1000	Begin attempt #1 @ TG-SC19
1014	Finish attempt #1 @ TG-SC19 → accept
1016	Mobilize to TG-SC13
1037	Begin attempt #1 @ TG-SC13
1053	Finish attempt #1 @ TG-SC13 → reject
1105	Begin attempt #2 @ TG-SC13
1120	Finish attempt #2 @ TG-SC13 → reject (refusal at 7.8')
11:26	Begin attempt #3 @ TG-SC13
1136	Finish attempt #3 @ TG-SC13
1142	Mobilize to TG-SC07
1207	Begin attempt #1 @ TG-SC07
1217	Finish attempt #1 @ TG-SC07 → reject
1225	Begin attempt #2 @ TG-SC07
1235	Finish attempt #2 @ TG-SC07
1245	Begin attempt #3 @ TG-SC07
1252	Finish attempt #3 @ TG-SC07
1256	Mobilize to TG-SC01
1319	Begin attempt #1 @ TG-SC01
1323	Finish attempt #1 @ TG-SC01 → refusal at surface, reject
1325	Begin attempt #2 @ TG-SC01
1329	Finish attempt #2 @ TG-SC01 → refusal at surface, reject
1336	Begin attempt #3 @ TG-SC01
1340	Finish attempt #3 @ TG-SC01 → refusal at 1', reject
1400	Mobilize to possible attempt #4
1410	Begin attempt #4 at TG-SC01

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/11/24
SITE ADDRESS: 1 Sitcum Way, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F . °C
[Circle appropriate units]

TIME	COMMENTS
1416	Finish attempt #4 @ TG-SC01 → accept
1430	Mobilize to TG-SC10
1450	Begin attempt #1 @ TG-SC10
1505	Finish attempt #1 @ TG-SC10 → reject
1510	Begin attempt #2 @ TG-SC10
1520	Finish attempt #2 @ TG-SC10 → reject
1528	Begin attempt #3 @ TG-SC10
1537	Finish attempt #3 @ TG-SC10 → accept ✓
1542	Mobilize back to dock
1600	Arrive back at dock, AW off boat

Signature:

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/12/24

SITE ADDRESS: 1 Sitcum Way, Tac **PERSONNEL:** AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 47 . °C [Circle appropriate units]

TIME	COMMENTS
720	AW arrives on site, boards boat
740	HSS meeting
7:50	Mobilize to Tru-Grit (TG-SC21)
8:52	Begin attempt #1 @ TG-SC21
9:05	Finish attempt #1 @ TG-SC21 → reject
9:13	Begin attempt #2 @ TG-SC21
9:23	Finish attempt #2 @ TG-SC21 → reject
9:30	Begin attempt #3 @ TG-SC21
9:44	Finish attempt #3 @ TG-SC21 → accept
9:49	Mobilize to TG-SC15
10:00	Begin attempt #1 @ TG-SC15
1012	Finish attempt #1 @ TG-SC15 → reject
1020	Begin attempt #2 @ TG-SC15
1031	Finish attempt #2 @ TG-SC15 → accept
1037	Mobilize to TG-SC09
1048	Begin attempt #1 @ TG-SC09
1100	Finish attempt #1 @ TG-SC09 → accept
1110	Mobilize to TG-SC05, quick lunch
1211	Begin attempt #1 @ TG-SC05
1215	Finish attempt #1 @ TG-SC05 → reject
1219	Begin attempt #2 @ TG-SC05
1226	Finish attempt #2 @ TG-SC05 → accept
1232	Begin attempt #3 @ TG-SC05
1240	Finish attempt #3 @ TG-SC05 → reject
1250	Mobilize to TG-SC23
1358	Begin attempt #1 @ TG-SC23
1415	Finish attempt #1 @ TG-SC23 → accept
1510	Mobilize to ~~TG-SC~~ Dock
1530	Arrive at dock, AW off boat

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Black waterway
DATE: 11/13/24
SITE ADDRESS: 1 Siteum Way, Tac
PERSONNEL: AW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ? — SUNNY | CLOUDY | RAIN

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 50 . °C [Circle appropriate units]

TIME	COMMENTS
730	AW arrives on site, boards boat
740	H&S meeting
7:50	Mobilize to TG-SC14
834	Begin attempt #1 @TG-SC14
840	Finish attempt #1 @TG-SC14 → accept
850	Mobilize to TG-SC08
913	Begin attempt #1 @TG-SC08
925	Finish attempt #1 @TG-SC08 → accept
932	Mobilize to TG-SC20
946	Begin attempt #1 @TG-SC20
956	Finish attempt #1 @TG-SC20 → reject
1002	Begin attempt #2 @TG-SC20
1011	Finish attempt #2 @TG-SC20 → accept
1025	Mobilize to TG-SC16
1057	Begin attempt #1 @TG-SC16
1110	Finish attempt #1 @TG-SC16 → accept
1128	Mobilize to TG-SC22
1139	Begin attempt #1 @ TG-SC22
1150	Finish attempt #1 @TG-SC22 → accept
1200	Mobilize to TG-SC17, quick lunch
1310	Begin attempt #1 @ TG-SC17
1321	Finish attempt #1 @ TG-SC17 → accept
1335	Reconning grab sample locations for tomorrow
1350	Mobilize back to dock
1400	Arrive back at dock, AW off boat

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/14/24

SITE ADDRESS: 1 Sitcum Way, Tac **PERSONNEL:** AW, CW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 48 . °C

[Circle appropriate units]

TIME	COMMENTS
8:00	AW & CW arrive on site
8:55	AW & CW board corinex vessel, mobilize to HT-SC01
9:20	4 attempts at HT-SC01
9 44	↳ accept #4, sample & process on boat
9 58	Mobilize to HT-SC03
1030	Begin attempts @ HT-SC03
	↳ accept #3 (3 attempts in total) sample & process
	on boat
11 15	Mobilize to HT-SC02, quick lunch
1130	Begin attempts @ HT-SC02
1141	↳ accept attempt #2
1215	Composite samples
1235	Mobilize back to dock
1248	Arrive back at dock
1300	AW & CW off boat, sampling complete!

Signature: _____

Daily Log

ANCHOR QEA

Boat

PROJECT NAME: Tyee-Grit/Husky/WUT DATE: 10/22/2024

SITE ADDRESS: 1 Sitcum Way, Tacoma WA 98421 PERSONNEL: SN, AS, KT, AR, AW, HS

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | (NW)

(SUNNY) | CLOUDY | RAIN | ?

(LIGHT) | MEDIUM | HEAVY

TEMPERATURE: °F 54.0 °C [Circle appropriate units]

TIME	COMMENTS
0800	Gravity Audrey (AW), & Hayley (HS) on site
	Boat departure
0900	Sasha on site
0914	WUT-SC24 attempt no 1 → core barrel broke. not accepted
0940	Amper on site
0948	Arno & Kim on site
	sample equipment set up. Field scribe training & review
1035	Call to Evan Horowitz
1110	H&S meeting
1400	cutting open WUT-SC21
1430	Sampling WUT-SC21 Mudline @ -51.04 MLLW
	A: 0-4ft B: 4-5.2ft C: ∅
	Total core length 5.2ft
1600	Start processing WUT-SC24
1630	Sampling WUT-SC24 Mudline @ -51.3ft MLLW
1700	A: 0-3.7ft B: 3.7ft-6.5ft Core to process: 6.5ft
1715	cleanup
1745	Off site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/23/2024

SITE ADDRESS: 1 Sitcum Way, Tacoma WA **PERSONNEL:** SN, AS, KT, AR

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ?

SUNNY | CLOUDY | RAIN

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 49.0 °C [Circle appropriate units]

TIME	COMMENTS
	AQ on site
	Health and safety meeting
10:49	WUT-SC23 sample start mudline: -51.89
	A: 0'-1.4'
	B 1.4'-5.4'
	Z: 5.4'-7.3'
12:00	WUT-SC19 sample start mudline: -51.18
	A: 0'-3.8'
	B 3.8'-7.8'
	Z: 7.8'-8.5'
13:15	WUT-SC20 sample start mudline: -53.6
	A: 0'-1.4'
	B 1.4'-5.4'
	Z 5.4-7.3'
14:30	WUT-SC22 sample start mudline: -53.1
	A: ~~0'-1.9'~~ as 0'-1.9'
	B ~~1.9'-5.9'~~ as 1.9'-5.9'
	Z: 5.9'-7.9'
15:45	WUT-SC18 sample start mudline -50.74
	A: 0'-4.3'
	B: 4.3'-7'
	NO H2S incidents
1700	AQ off site

Signature: amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway Deepening **DATE:** 10/24/24

SITE ADDRESS: 1 Sitcum Way, Tacoma, WA **PERSONNEL:** SN, AS, AR, ICT

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ? — SUNNY | CLOUDY | RAIN

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F / °C [Circle appropriate units]

TIME	COMMENTS
0830	AS, AR, + ICT arrive on Site & start Setup
0845	SN arrive on Site
0900	H&S meeting
0945	Complete Composite WUT-23CS
1045	Complete Composite WUT-27CS
1215	Process WUT-SC17 mudline -51.96ft MLLW
	A: 0-3ft B: 3-7ft
1335	Process WUT-SC16 mudline -53.01ft MLLW
	A: 0-2ft Atterberg @ 0-0.5ft
	B: 2-4.4ft
1430	Process WUT-SC14 mudline @ -53.8ft MLLW
	A: 0-1.2ft
	B: 1.2-5.2ft
	Z: 5.2-7.2ft
1530	Process WUT-SC13 mudline @ -53.3ft
	A: 0-1.7ft
	B: 1.7-5.7ft
1600	Cleanup
1645	off Site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway Deepening Project
DATE: 10/25/24
SITE ADDRESS: 1 Sitcum Way, Tacoma, WA
PERSONNEL: SN, KT, AS, AR

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F 46. °C
[Circle appropriate units]

TIME	COMMENTS
0630	Arrive to site
0900	HaS meeting and start QA check of cores against COC's
1015	Processing WUT-SC15 mudline @ -50.64ft MLLW
	A: 0-4.4ft
	B: 4.4ft-8.3ft
	Drive penetration on collection log maybe incorrect. Core length to process was greater than drive penetration on collection log.
1115	Composite WUT-26CS
	Discrete Samples WUT-18SC to WUT-18SC
	Used the chemistry archive and grain size WUT-18SC to complete composite
1230	
~~1415~~ SN	Process HT-SC30 mudline at -52.8ft MLLW
	A: 0-2.2ft
	B: 2.2-6.2
	Z: 6.2-8.2
1415	Process ~~HT-SC28~~ SN HT-28SC mudline at -52.0ft MLLW
	A: 0-3ft
	B: 3-4.6ft
1545	Process HT-27SC mudline at -52.3ft MLLW
	A: 0-2.7ft
	B: 2.7-6.7ft
	Z: 6.7-8.7ft
1635	Cleanup
1700	Off site

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/28/24

SITE ADDRESS: 1 Sitcum Way, Tacoma WA **PERSONNEL:** AS, AW, AR, KT, JC, CS, SN

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50.0 °C [Circle appropriate units]

TIME	COMMENTS
0830	Amo + Kim on site
0835	Amber on site
0850	Jordan on site
0855	Christine on site
0908	Audrey on site, Sasha on site.
0910	Health + Safety meeting
1030	Process HT-SC29 / mudline @ -52.07' MLLW
	A: 0-2.9ft
	B: 2.9-5.8ft
1145 +2I SN	Process TG-SC24 mudline @ -50.61ft MLLW
	2ft intervals sampled down length of core to 11.2ft
	Collected GS @ 0-2 & 8ft, Atterberg @ 0-2ft
	FD collected at 4-6ft
	MS/MSD collected @ 6-8ft
1530	HT-SC26 → sampled
	Mudline @ -51.2' MLLW
	A: 0-3.8'
	B: 3.8-5.8'
1600	Cleanup
1700	Offsite

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/29/24
SITE ADDRESS: 1 Sitcum Way, Tacoma, WA
PERSONNEL: SN, AS, KT, AN

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 49.0 °C [Circle appropriate units]

TIME	COMMENTS
0830	Arno & Kim on site
0845	Amber on site
0855	Sasha on site, 0930 Jordan on site
0900	Health and safety meeting
0915	HT-05CS-A-241029 sample start
1015	HT-10CS-B-241029 sample start
~~1130~~	~~TG-SC05 sample start~~
1130	Process TG-SC04
	0-2 ft intervals, 6.8 ft to process
	GS @ 2-4 ft and 4-6 ft
	Atterberg @ 5.8-6 ft
1315	HT-SC06 Mudline @ -51.88 ft MLLW
	A: 0-3.1 ft
	B: 3.1-5.4 ft
1405	HT-SC05, Mudline @ -51.4 ft MLLW
	A: 0-3.6 ft
	B: 3.6 ft - 6.7 ft

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 10/30/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AW, AS, KT, AR, SN

WEATHER: **WIND FROM:** N | NE | E | (SE) | S | SW | W | NW

SUNNY | ~~CLOUDY~~ | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 47.0 °C [Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0845	Health and safety meeting
1020	HT-SC04 sample start
	A: 0-4' B 4-4.8' Z none
1205	HT-SC07 sample start
	A 0-2.8' B 2.8'-5.0 Z none
1345	Process HT-SC08 mudline @ -51.0ft MLLW
	A: 0-4ft
	B: 4-5.4ft
1415	Process HT-SC10 mudline @ -51.82'
	A: 0- ~~refusal~~ at 3.2'
	B: 3.2-6.3'
1500	Process HT-02CS-A
1525	Process HT-06CS-B
1555	Process HT-SC09
	A: 0-2.7
	B 2.7-4.6
1645	AQ off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 10/31/24

SITE ADDRESS: 1 Sitcum Way Tacoma WA **PERSONNEL:** AS, KT, SN, AR

WEATHER: **WIND FROM:** N | NE | E | (SE) | S | SW | W | NW

(SUNNY) | (CLOUDY) | (RAIN) | ?

(LIGHT) | MEDIUM | HEAVY

TEMPERATURE: (°F) 48.0 °C [Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0930	sampled HT-SC11 mudline -52.46'
	A 0-2.5' atterberg limit taken
	B 2.5'-6.5'
	Z 6.5'-8.5'
1000	Health and safety
	sampled HT-SC12 mudline -50.98'
	A 0-4'
	B 4'-8'
	Z 8'-8.3'
	sampled HT-SC14 mudline -53.18
	A: 0-1.8
	B 1.8-5.6
1300	Tru-Grit rinse blank
1400	Process HT-SC15 mudline @ -51.46ft
	A: 0-3.5ft
	B 3.5-6.3ft
1515	Process HT-SC16 mudline @ -54.68ft MLLW
	A: 0-0.3ft
	B: 0.3-4.3ft Atterberg @ 1.7-2.7ft
	Z 4.3-6.3

Signature: _____

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/1/24

SITE ADDRESS: 1 Sitcum Way, Tacoma WA **PERSONNEL:** AS, CW, KT, AL, SN

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ?

SUNNY | CLOUDY | RAIN

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50.0 °C [Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0840	Health + safety
0930	sample QC for lab pick-up.
1135	Process TG-SC18
	2 ft intervals to 9.9ft
1330	Process HT-SC13 mudline - 5182
	A 0-3.2
	B 3.2-5.0
1450	Process HT-07CS-B
	Process WUT-SC07
	A: 0-4.6
1533	B: 4.6-6.7
1600	troubleshoot truck fridge issue
~~15~~ 1725	AQ off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/4/24
SITE ADDRESS: 1 Sitcum Way, Tacoma WA
PERSONNEL: AS, RP, MG, CW

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ? | LIGHT | MEDIUM | HEAVY | SUNNY | CLOUDY | RAIN | **TEMPERATURE:** °F / °C [Circle appropriate units]

TIME	COMMENTS
0740	Amber on site.
0800	Matt + Ry on site
0825	Call to POT security about break in/PM contact
0830	Claudia on site
0835	Health and safety meeting
	Claudia off site to purchase tools
	Claudia on site
1045	sampled WUT-SC12 mudline -52.17
	A 0-2.9'
	B 2.9-5.5'
1250	Sampled WUT-SC11 mudline -49'
	A 0'-3.7
1400	Composited WUT-22CS-A
	MS/MSD!
	1320 Filed police report
	Case no 24 309 00983
	POT security report
	number 12305
1600	AQ off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/5/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AS, RP, MG, CW, JC

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F . °C [Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0845	Health and safety, day overview
~~0915~~	~~sample as~~
0910	Jordan on site
0915	WUT-SC01 mudline -49.8'
	A 0-5.2'
	B 5.2-7'
	WUT-SC02 mudline -48.5
1100	A: 0-6.5'
	B 6.5-6.7' no archive, sediment for composite
1200	WUT-SC03 mudline -53.98
	A: 0'-1.0'
	B 1.0'-5.0'
	Z: 5.0'-6.3'
	WUT-SC04 mudline -53.33
1345	A: 0'-1.7'
	B: 1.7'-5.7'
	Z: 5.7'-7.7'
	Two cores labeled SC-05, based on C4 reject length, we suspect it is our exra core. Additionally there is no extra core in the fridge labeled SC-04.
1630	AQ off site.

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/6/24
SITE ADDRESS: 1 Stadium Way, Tacoma, WA
PERSONNEL: AS, CW, RP, MG, JC

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F 52.0 °C
[Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0845	H+S
0915	Jordan on site
	sampled WUT-SC05 mudline -51.79
	A 0-3.2
	B: 3.2-5.9
1020	QC WUT-SC06 sample core - contacted AW + Delaney
1130	sampled WUT-SC06 mudline -51.79
	A: 0-2.4' short core. Full length 24'
	Jordan off site
13:11	Composit WUT-20CS-A (WUT-SC01, 02, 03, 04 05, 06A)
13:20	Composit WUT-24CS-B (WUT-SC01, 02, 03, 04, 05, 06B)
14:40	Process WUT-SC08 Mudline -54.12
	A: 0-0.9
	B: 0.9-4.9
	Z: 4.9-6.3
1535	sampled WUT-SC09 A 0-3.7 mudline -51.33
	B 3.7-7.6
1650	AQ off site

Signature: amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/7/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AS, CW, RP, AR

WEATHER: **WIND FROM:** N | NE | E | (SE) | S | SW | W | NW

(SUNNY) | CLOUDY | RAIN | ?

(LIGHT) | MEDIUM | HEAVY

TEMPERATURE: °F 57. °C
[Circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0840	H+S meeting
0850	Equipment set up
0930	sampled WUT-SC10 mudline 5.15'
	A: 0'-3.9'
	B 3.9'-7.9'
	Z 7.9'-8.3'
1015	Composite WUT-21CS sampled
1030	Composite WUT-25CS sampled
1115	lunch
1200	sampled HT-SC17 mudline 53.34
	A: 0-1.7
	B 1.7-5.6
1230	Discard reject core attempts
1410	sampled HT-SC18 - no A layer mudline 56.36
	B: 0-2.6'
	Z: 2.6'-4.6'
1525	composited HT-03CS A MS/MSD
1605	composited HT-08CS-B
1710	AQ off site

Signature: amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/8/24

SITE ADDRESS: 1 Sitcum Way Tacoma WA **PERSONNEL:** AS, CW, JC, RP, AR

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW | ? | LIGHT | MEDIUM | HEAVY

SUNNY | CLOUDY | RAIN

TEMPERATURE: °F 57. °C [Circle appropriate units]

TIME	COMMENTS
0745	Amber Arno Claudia on site
0750	H+S meeting.
0800	sample QC set up - took a long time
1055	sample start TG-SC06: 7'
1300	sample start TG-SC02: 1.7'
	sample start TG-SC03: 1'
1430	Jordan off site
1450	RY off site
1605	AG off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway Deepening
DATE: ~~10/~~ 11/1/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: SN, CW, AR, JL

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F 49.0 °C
[Circle appropriate units]

TIME	COMMENTS
0830	Processing team on site
0850	H+S meeting and plan of the day
0945	sampled TG-SC11 4' core
1045	sampled TG-SC12 4.5' core
1215	sampled HT-SC20 mudline: 53.1'
	A 0-1.9'
	B 1.9-4.7'
	Z 4.7-7.7'
1400	sampled HT-SC19 mudline: 51.74'
	A: 0-3.3'
	B: 3.3-6.1'
1500	sampled HT-SC21 mudline: 52.11'
	A: 0-2.9'
	B: 2.9'-5.1'

Signature: amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/12/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AS, CW, JL, CR

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW
SUNNY | CLOUDY | RAIN | ?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F 49.0 °C [circle appropriate units]

TIME	COMMENTS
0830	AQ on site
0850	H+S meeting
0915	sampled HT-SC22 mudline -51.73'
	A 0-3.3'
0950	sampled HT-SC23 mudline -51.49'
	A 0-3.0'
1020	sampled HT-SC24 mudline -51.24'
	A 0-3.8'
	B: 3.8'-6.3'
1105	composited HT-SC04
1115	composited HT-SC09
	(22 + 23B were not collected, and ~~as a result of no~~ not inc in composite)
1245	sampled ~~HT~~ TG-SC10 5.2'
1415	sampled TG-SC19 5.4'
	~~sampled TG-SC07 at~~
1635	AQ off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway **DATE:** 11/13/24

SITE ADDRESS: 1 Sitcum Way Tacoma WA **PERSONNEL:** AS, AR, CW,

WEATHER: **WIND FROM:** (N) | NE | E | SE | S | SW | W | NW

SUNNY | (CLOUDY) | (RAIN) | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 53.0 °C

[Circle appropriate units]

TIME	COMMENTS
0745	AQ on site
	H+S meeting
0845	sampled TG-SC09 6.7'
0950	sampled TG-SC05 1.6'
1030	sampled TG-SC01 1.0' -Jordan left 10:40
1045	sampled TG-SC07 5.9'
1145	sampled TG-SC21 6.0'
1305	sampled TG-SC23 5.5'
	MS/MSD: 0-2
	FD 2-4
1405	sampled TG-SC15 3.2'
	appears to have settled ~3'.
1445	sampled TG-SC13 3.3
1555	AQ off site

Signature: Amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/14/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AS, AR, WS, JL

WEATHER: WIND FROM: N | NE | E | SE | S | (SW) | W | NW | ?
SUNNY | (CLOUDY) | RAIN
LIGHT | MEDIUM | HEAVY
TEMPERATURE: (°F) 48.0 °C
[Circle appropriate units]

TIME	COMMENTS
0745	AQ on site
0755	H+S meeting
0820	sampled TG-SC08 6'
0910	sampled TG-SC14 6.1'
1000	sampled TG-SC16 5.4'
1100	sampled TG-SC17 6.2
1220	sampled TG-SC20 4.8'
1250	sampled TG-SC22 6.8'
0944	sampled HT-SC01 24 cm
~~10~~ 1141	sampled HT-SC02 38 cm
1030	sampled HT-SC03 38 cm
1215	~~Seth~~ composited HT-01CS
	IDW samples collected
	IDW-HT-2-241114 1530 IDW-WUT-5-241114 1538
	IDW-TG-1-241114 1532 IDW-WUT-7-241114 1540
	IDW-WUT-4-241114 1534 IDW-TG-9-241114 1542
	IDW-HT-6-241114 1536
	5 gallon buckets from previous sampling event (clean) sediment put into drum #5
	↑ IDW-~~HT~~ WUT-5
1600	AQ off site

Signature: amber Smith

Daily Log

ANCHOR QEA

PROJECT NAME: Blair Waterway
DATE: 11/15/24
SITE ADDRESS: 1 Sitcum Way Tacoma WA
PERSONNEL: AS, AR, CW, JL

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: (°F) 41 . °C [circle appropriate units]

TIME	COMMENTS
0800	AQ on site
0810	H+S meeting day overview
1200	Finished sample QC
1240	Finished cleanup + demobilization
1245	AQ off site
	Audrey drove samples to EcoAnalysts
	Arno drove samples to ARL

Signature: Amber Smith

Sediment Core Log

HT-SC04

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167627.06 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **712656.26 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.7**	Mudline Elevation (feet): **-51.0**
Location: **Tacoma, Washington**	Recovery Length (feet): **4.8**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **71%**	Core Collection Date/Time: **10/20/2024 10:20**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51		5	95	0 to 0.6: SILT (ML), very soft, wet, gray 95% fines, 5% fine sand, fines are nonplastic.			
1	-52				0.6 to 4.8: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and gray sand throughout.			
2	-53						-51 to -55	HT-SC04-A
3	-54		95	5				
4	-55						-55 to -55.8	HT-SC04-B
5	-56				End of core at 4.8 feet.			
6	-57							
7	-58							
8	-59							
9	-60							
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15	-66							

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Notes: x

Sediment Core Log

HT-SC05

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167496.72 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **712651.70 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7.5**	Mudline Elevation (feet): **-51.4**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **89**	Core Collection Date/Time: **10/28/2024 at 14:05**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 6.7	-51.4 to -58.1		95	5	0 to 6.7: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and clear sand throughout. @: 0.0: trace wood flakes. @2.3: one 1/2 inch peice of gravel. @4.7 to 6.7: trace white shell hash.		-51.4 to --55	HT-SC05-A
							-55 to -58.1	HT-SC05-B
6.7	-58.1				End of core at 6.7 feet.			

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Notes: x

Sediment Core Log

HT-SC06

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167422.02 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **712779.18 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.4**	Mudline Elevation (feet): **-51.88**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.4**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **84**	Core Collection Date/Time: **10/29/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		5	95	0 to 0.5 SILT (SM), very soft, wet, gray, 95% fines, 5% fine sand, fines are nonplastic. @0.1: light brown wood chunks.			
1	-53				0.5 to 5.4: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and clear sand throughout.		-51.88 to-54.98	HT-SC06-A
2	-54							
3	-55		95	5	@4.2 to 5.4: trace shell hash.			
4	-56						-54.98 to -57.38	Ht-SC06-B
5	-57							
6	-58				End of core at 5.4 feet.			
7	-59							
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15								

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Notes: x

Sediment Core Log

HT-SC07

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167279.37 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **712858.22 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **5.0**	Mudline Elevation (feet): **-52.23**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.0**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **100**	Core Collection Date/Time: **10/30/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-52.23 to -53		5	95	0 to 0.9: SILT (ML), very soft, wet, gray, 95% fines, 5% fine sand, Fines are nonplastic.			
1 to 5	-53 to -57		95	5	0.9 to 5.0: POORLY GRADED SAND (SP), very dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and clear sand through out. @2.6: one piece of subangular coarse gravel 2 inch diameter.		-52.23 to -55.03	HT-SC07-A
3 to 5	-55.03 to -57.23		95	5			-55.03 to -57.23	HT-SC07-B
5 to 14	-57 to -66				End of core at 5.0 feet.			

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Notes: x

Sediment Core Log

HT-SC08

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167340.51 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **712930.98 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.0**	Mudline Elevation (feet): **-51**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.4**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **90**	Core Collection Date/Time: **10/30/2024 13:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51		5	95	0 to 0.8: SILt (ML), very soft, wet, gray, 95% fines, 5% fine sand, fines are nonplastic.			
1	-52				0.8 to 5.4: POORLY GRADED SAND (SP), very dense, wet, gray, 95% fine sand, 5% fines, trace red, white sand throughout.		-51 to -55	HT-SC08-A
2	-53							
3	-54		95	5	@3.0 to 3.6: trace white shell hash.			
4	-55						-55 to -56.4	HT-SC08-B
5	-56				@5.1: one piece of fine subround gravel.			
6	-57				End of core at 5.4 feet.			
7	-58							
8	-59							
9	-60							
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							

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Notes: x

Sediment Core Log

HT-SC09

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167125.35 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713009.48 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **5.5**	Mudline Elevation (feet): **-52.35**
Location: **Tacoma, Washington**	Recovery Length (feet): **4.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **83**	Core Collection Date/Time: **10/30/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 4.6	-52.35 to -56.95		95	5	0 to 4.6: POORLY GRADED SAND (SP), very loose, wet, gray, 95% fine sand, 5% fines, red, white, and clear sand through out. @0 to 0.4: trace wood fragments. @0.9: root-like fibers. @1.7 to 4.6: grades to dense. @2.8 to 2.9: two pieces of subrounded coarse gravel.		-52.35 to -55.05	HT-SC09-A
							-55.05 to -56.95	HT-SC09-B
					End of core at 4.6 feet.			

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Notes: x

Sediment Core Log

HT-SC10

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167190.44 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713080.08 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **5.9**	Mudline Elevation (feet): **-51.82**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **106**	Core Collection Date/Time: **10/30/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 6.3	-51.82 to -58.12		95	5	0 to 6.3: POORLY GRADED SAND (SP), loose to medium dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and clear sand throughout. @1.5: trace root like fibers. @2.2 to 4.1: grades to dense. @4.1 to 6.3: grades back to loose to medium dense.		-51.82 to -55.02	HT-SC10-A
							-55.02 to -58.12	HT-SC10-B
6.3	-58.12				End of core at 6.3 feet.			

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Notes: x

Sediment Core Log

HT-SC11

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1167045.04 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713143.91 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-52.46**
Location: **Tacoma, Washington**	Recovery Length (feet): **11.5**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **95**	Core Collection Date/Time: **10/31/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 4.2	-52.46 to -56.66		95	5	0 to 4.2: POORLY GRADED SAND (SP), medium dense, wet, gray, 95% fine to medium sand, 5% fines. @0 to 11.5 trace red, white, and clear sand throughout core.		-52.46 to -54.96	HT-SC11-A
4.2 to 9.4	-56.66 to -61.86		10	90	4.2 to 9.4: SILT (ML), dense, wet, gray, 90% fines, 10% fine sand, fines are nonplastic. @6.8: brown wood debris. @7.4 to 7.6: medium sand layer. @7.8: light gray clay lense. @9.2: brown wood debris.		-54.96 to -58.96	HT-SC11-B
							-58.96 to -60.96	HT-SC11-Z
9.4 to 11.5	-61.86 to -63.96		95	5	9.4 to 11.5: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines. @9.6: brown wood debris. @10.1: one piece of fine subrounded gravel. @10.7 to 10.9: light gray silt layer.			
11.5	-63.96				End of core at 11.5 feet.			

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Notes: x

Sediment Core Log

HT-SC12

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1166895.54 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713231.41 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **9.5**	Mudline Elevation (feet): **-50.98**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **87**	Core Collection Date/Time: **10/31/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 8.3	-51 to -59		95	5	0 to 8.3: POORLY GRADED SAND (SP), very dense, wet, gray, 95% fine to medium sand, 5% fines, trace red, white, and clear sand throughout. @0 to 1.8: trace coarse white sand. @6.4 to 6.6: 2 inch dark gray silt pocket. @6.8: 1/2 inch light gray silt pocket.		50.98 to 54.98	HT-SC12-A
							54.98 to 58.98	HT-SC12-B
							58.98 to 60.1	HT-SC12-Z
8.3	-59				End of core @ 8.3 feet.			

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Notes: x

Sediment Core Log

HT-SC13

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1166956.74 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713302.80 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8.0**	Mudline Elevation (feet): **-51.82**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.0**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **62.5**	Core Collection Date/Time: **11/1/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5	-51.82 to -56.82		95	5	0 to 5: POORLY GRADED SAND (SP), medium dense, wet, gray, 95% fine sand, 5% fines, trace red, white, and clear sand throughout. @ 0 to 0.9: trace shell hash. @1.3 to 5: grades to very dense. @3.5: light gray silt lense. @4.6: trace light brown wood debris.		-51.82 to -55.02 -55.02 to 56.82	HT-SC13-A HT-SC13-B
					End of core at 5.0 feet.			

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Notes: x

Sediment Core Log

HT-SC14

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1166773.28 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713475.93 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.3**	Mudline Elevation (feet): **-53.18**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **88**	Core Collection Date/Time: **10/31/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5.6	-53.18 to -58.78		95	5	0 to 5.6: POORLY GRADED SAND (SP), very loose, wet, gray, 95% sand, 5% fines. @2.2 to 5.6: grades to dense, and with trace red, white, and clear sand throughout. @5.3: trace brown wood fragments.		-53.18 to -54.98	HT-SC14-A
							-54.98 to -58.78	Ht-SC14-B
					End of borning at 5.6 feet.			

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Sediment Core Log

Ht-SC15

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1166625.88 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713482.88 NAD83**
Client: **Port of Tacoma**	Drive Length (feet):**9**	Mudline Elevation (feet): **-51.46**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%):**70**	Core Collection Date/Time: **10/31/2024 14:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 6.3	-51.46 to -57.76		95	5	0 to 6.3: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red white and clean grains throughout. @0 to 1.9: grades is loose. @1.9 to 6.3: grades to dense. @ 2.2: gray 2 inch silt pocket. @2.8: gray 3 inch silt pocket. @4.1: gray 2.5 inch silt pocket.		-51.46 to -54.96	HT-SC15-A
							-54.96 to -57.76	HT-SC15-B
					End if core at 6.3 feet.			

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Sediment Core Log

HT-SC16

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1166627.06 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **713617.22 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-54.68**
Location: **Tacoma, Washington**	Recovery Length (feet): **9.4**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **78**	Core Collection Date/Time:

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	54		10	90	0 to 4.9: SILT (ML), soft, wet, gray, 90% fines, 10% fine sand. @2.1 to 2.6: light gray clay layer, medium plasticity. @ 2.7 fine sand lense. @4.4: clay pocket 2 inches. @4.5: 1/2 inch shell fragment. @4.8: brown wood fragment.		-54.68 to -54.71	HT-SC16-A
1	53						-54.71 to -58.71	HT-SC16-B
2	52							
3	51							
4	50							
5	49		95	5	4.9 to 9.4: POORLY GRADED SAND (SP), very dense, wet, dark gray, 95% fine sand, 5% fines, trace red, white, and clear sand throughout. @5.4: brown wood fragment. @8.5: silt pocket. @8.8 brown wood fragment.		-58.71 to -60.71	HT-SC16-Z
6	48							
7	47							
8	46							
9	45							
10	44				End of core at 9.4 feet.			
11	43							
12	42							
13	41							
14								

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Sediment Core Log

HT-SC17

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **713622.59 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1166483.99 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-53.34**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **70**	Core Collection Date/Time: **11/7/2024 12:05**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5.6	-53.34 to -58.94		100		0 to 5.6: POORLY GRADED SAND (SP), loose, moist, dark gray with white and red grains, 100% sand. @0.1: stick @0.4: wood piece. @0.6 grades to medium dense to dense. @0.9: wood piece. @1.3: wood piece. @2.0: wood pieces @3.1: clay pocket. @3.2: to 3.6: wood pieces. @3.7: Clay pocket. @4.7: fine sand lense. @5.0: fibrous wood.		-53.34 ti - 55.04	HT-SC17-A
							-55.04 to -58.94	HT-SC17-B
					End of core at 5.6 feet.			

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Sediment Core Log

HT-SC18

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **X**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **X**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **X**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **70**	Core Collection Date/Time: **11/7/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 15	0 to -15		85	15	0 to 5.6: SAND WITH SILT (SM), loose to medium dense, wet, dark gray, 85% fine to medium sand, 15% fines. @0.2: light gray clay pocket. @ 0.7: light gray silt pocket. @1.0 to 1.2light gray clay with dark gray striations, low plasticity. @1.7: gray fine sand lense. @1.9: grades to fine sand with silt @2.4: grades to trace silt with fine to medium sand. @2.8: gray fine sand lense. @3.2: wood piece. @4.0: grades to dark gray with trace red and with grains. @4.5: gray clay pocket 0.05 feet. @4.6 to 5.0:gray fine sand striations. @5.0: wood piece.			HT-SC18-A HT-SC18-B
					End of core at 5.6 feet.			

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Sediment Core Log

HT-SC19

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **713857.34 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1166226.59 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-51.74**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.1**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **76**	Core Collection Date/Time: **11/11/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-52 to -53		10	90	0 to 1.9: SILT (ML), Very soft, wet, dark gray, 90% fine, 10% fine sand, fines are nonplastic. @0.6 shell 0.5 inches.		-51.74 to -55.04	HT-SC19-A
2 to 6	-54 to -58		95	5	1.9 to 6.1: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace medium sand throughout, trace red and white sand. @4.1: wood chunks. @4.3: light gray 0.5 inch clay pocket. @4.4: wood chunks. @5.1: wood chunk. @5.8 to 6.1: trace white medium sand.		-55.04 to -57.84	HT-SC19-B
6	-58				End of core at 6.1 feet.			

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Sediment Core Log

HT-SC20

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **713945.00 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1166293.99 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-53.1**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.1**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **88**	Core Collection Date/Time: **11/11/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 7.1	-53.1 to -60.2		95	5	0 to 7.1: POORLY GRADED SAND (SP), dense, wet, gray, 95% sand, 5% fines, trace medium sand throughout, trace red and white sand throughout. @1.6: two inch light gray silt with fine sand pocket. @4.0: light gray silt lense. @4.1: wood chunk. @5.0 to 7.1: trace wood debris throughout.		-53.1 to -55	HT-SC20-A
							-55 to -57.8	HT-SC20-B
							-57.8 to -60.2	HT-SC20-Z
7.1	-60.2				End of core at 7.1 feet.			

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Notes:

B- and Z-layer intervals were not collected per SQAPP methods due to a void present in the core and material mixing that occurred in the core from 4.7 to 7.1 feet. The B-layer encompasses the material in the B-layer that was unaffected by this void and material mixing. The Z-layer was collected of the affected material 4.7 to 7.1 feet.

Sediment Core Log

HT-SC21

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **714025.18 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1166065.71 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-52.12**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.1**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): 64	Core Collection Date/Time: **11/11/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1.8	-53 to -54.8		10	90	0 to 1.8: SILT (ML): soft, wet, dark gray, 90% fines, 10% fine sand.		-52.12 to -55.02	HT-SC21-A
1.8 to 5.1	-54.8 to -57.1		95	5	1.8 to 5.1: POORLY GRADED SAND (SP), dense, wet, dark gray, 95% fine to medium sand, 5 % fines, trace red and white sand throughout.		-55.02 to -57.22	HT-SC21-B
5.1	-57.1				End of core at 5.1 feet.			

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

-53 -54 -55 -56 -57 -58 -59 -60 -61 -62 -63 -64 -65 -66 -67

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Sediment Core Log
HT-SC22

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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **714098.28 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1166138.76 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-51.91**
Location: **Tacoma, Washington**	Recovery Length (feet): **3.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **41**	Core Collection Date/Time: **11/12/202**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		95	5	0 to 3.3: POORLY GRADED SAND (SP), medium dense, wet, dark, 95% fine sand, 5% fines, trace red, white, and clear sand throughout. @0.0 to 0.1 light gray silt layer.		-51.91 to -55.21	HT-SC22-A
					End of core at 3.3 feet.			

1 -53 | 2 -54 | 3 -55 | 4 -56 | 5 -57 | 6 -58 | 7 -59 | 8 -60 | 9 -61 | 10 -62 | 11 -63 | 12 -64 | 13 -65 | 14 -66 | 15

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Sediment Core Log

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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **714273.02 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1165951.35 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): 8	Mudline Elevation (feet): **-51.59**
Location: **Tacoma, Washington**	Recovery Length (feet): **3.0**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%):**38**	Core Collection Date/Time: **11/12/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 3	-52 to -54		90	10	0 to 3: POORLY GRADED SAND WITH SILT (SP-SM), loose, wet, gray, 90% fine to medium sand, 10% fines, trace red, white, and clear sand throughout. @0.8 to 3.0: grades to dense. @1.4 to 1.9: scattered gray clay pockets.		51.59 to -54.59	HT-SC23-A
3	-55				End of core at 3.0 feet.			

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Sediment Core Log

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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **714206.23 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1165882.04 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-51.24**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **78**	Core Collection Date/Time: **11/12/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 6.3	-51.24 to -57.54		90	10	0 to 6.3 POORLY GRADED SAND WITH SILT (SP-SM), dense, wet, gray, 90% fine to medium sand, 10% fines, @0.0 to 0.1: one inch silt layer. @0.4 to 0.8: silt pocket with dark gray mottling. @2.1 to 2.5: light gray silt layer, nonplaistic. @2.4: brown wood debris @2.8: silt lense. @3.1silt lense @3.3 light brown wood debris @6.0: light gray silt lense @6.2 wood debris light brown. End of core at 6.3 feet.		-51.24 -55.04 -55.04 to -57.54	HT-SC24-A HT-SC24--B

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Sediment Core Log

HT-SC25

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165750.86 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714334.90 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7.2**	Mudline Elevation (feet): **-51.88**
Location: **Tacoma, Washington**	Recovery Length (feet): **4.4**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **61**	Core Collection Date/Time: **10/28/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 4.4	-51.88 to -56.28		5 95	95 5	0 to 1.8: SILT (ML), soft, wet, gray, 95% fines, 5% fine sand, low polasticity fines. @1.1: light brown wood chunk. 1.8 to 4.4: POORLY GRADED SAND (SP), very dense, wet, dark gray, 95% fine sand, 5% fines, trace red, white, and gray grains throughout. @ 2.6: white shell fragment. End of core @ 4.4 feet.		-51.88 to -54.98 -54.98 to -56.28	HT-SC25-A Ht-SC25-B

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HT-SC26

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165815.36 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714415.90 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-51.2**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.8**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **48**	Core Collection Date/Time: **X**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5.4	-51.2 to -56.6		5 95	95 5	0 to0.5: SILT (ML), very soft, wet, gray, 95% fines, 5% fine sand, fines are nonplastic. 0.5 to 5.4: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace medium sand, trace red, white, and gray sand thoughout. @1.5: one piece of subrounded gravel.		-51.2 to -55	HT-SC26-A
							-55 to -57	HT-SC26-B
					End of core at 5.4 feet.			

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Sediment Core Log

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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165634.32 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714428.05 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-52.29**
Location: **Tacoma, Washington**	Recovery Length (feet): **10.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **86**	Core Collection Date/Time: **10/25/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-53		5	95	0 to 0.9: SILT (ML), very soft, wet, gray, 95% fines, 5% fine grained sand.			
1	-54				0.9 to 7.3: SILTY SAND (SM), Dense, wet, gray, 80% fine grained sand, 20% fines, fine sand with layers of silt throughout, trace red and white sand grains throughout.		-52.29 to -54.99	HT-SC27-A
2	-55				@2.7 to 3.2: gray silt layer with trace fine sand.			
3	-56							
4	-57		80	20	@4.3 to 4.8: gray silt layer. @4.5: light brown wood fragments.		-54.99 to -56.99	HT-SC27-B
5	-58				@5.4 to 5.7: gray silt layer with trace fine sand.			
6	-59				@6.5: light gray silt lense.			
7	-60						-56.99 to -58.99	HT-SC27-Z
8	-61		80	20				
9	-62				@8.9: trace organic root-like fibers.			
10	-63		95	5	9.6 to10.3: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red, and white sand grains throughout.			
11	-64				End of core at 10.3 feet.			
12	-65							
13	-66							
14	-67							
15								

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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165641.85 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714571.46 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-51.95**
Location: **Tacoma, Washington**	Recovery Length (feet): **4.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **57**	Core Collection Date/Time: **10/25/2024 14:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		5	95	0 to 0.7: SILT (SM), very soft, wet, gray, 95% fines, 5% fine sand.			
1	-53				0.7 to 4.6: POORLY GRADED SAND (SP), medium dense to dense, wet, gray, 95% fine sand, 5% fines, trace medium sand, trace red, and white sand throughout.		-51.95 to -54.95	HT-SC26-A
2	-54				@ 2.9 to 4.6: trace white shell hash.			
3	-55		95	5			-54.95 to -56.55	HT-26-B
4	-56							
5	-57				End of core at 4.6 feet.			
6	-58							
7	-59							
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15								

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Sediment Core Log
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Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165466.02 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714605.18 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6**	Mudline Elevation (feet): **-52.07**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.8**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **96**	Core Collection Date/Time: **10/28/2024**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0			5	95	0 to 0.4: SILT (ML), very soft, wet, gray, 95% fines, 5% fine sand, fines are nonplastic.			
1	-53				0.4 to 5.8: POORLY GRADED SAND (SP), very loose, wet, gray, 95% sand, 5% fines, fine to medium sand, trace coarse sand.		-52.07 to -54.97	HT-SC29-A
2	-54							
3	-55		95	5	@3.4 to 5.8 trace fine subrounded gravel.		-54.97 to -57.87	HT-SC29-B
4	-56							
5	-57							
6	-58				End of core at 5.8 feet.			
7	-59							
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15	-67							

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Notes: x

Sediment Core Log

HT-SC30

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1165461.88 NAD83**
Project #: **240092-03.02**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **714751.34 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-52.78**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.8**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **73**	Core Collection Date/Time:

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-52.78 to -53.78		10	90	0 to 2.6: SILT (ML), very soft, wet, gray, 95% finesm 10% fine grained sand.		-52.78 to -54.98	HT-SC30-A
2 to 4	-54.78 to -56.78		90	10	2.6 to 8.8: PORRLY GRADED SAND WITH SILT (SP-SM): very loose, wet, gray, 90% fine grained sand, 10% fines, trace red sand throughout, Slight H 2S-like smell through out. @6.8 to 8.8 trace white shell hash.		-54.98 to -58.98	HT-SC30--B
4 to 5	-56.78 to -57.78						-59.98 to -60.98	HT-SC30-Z
8 to 9	-60.78 to -61.78				End of core at 8.8 feet.			

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Sediment Core Log

WUT-SC01

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **7.8196.45 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172423.30 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-49.8**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.0**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **95**	Core Collection Date/Time: **11/5/2024 09:15**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-50		95	5	0 to 7: POORLY GRADED SAND (SP), loose, moist, dark gray, 95% fine to medium sand, 5% fines, multi colored flecks throughout. @1.1: grades to medium dense to dense. @ 2.0: grades to with silt. @3.7 grades to trace silt. @5.6: grades from loose to medium dense. @6.0: grades from coarse to medium sand.		-49.8 to -55	WUT-SC01-A
1	-51		85	15			-55 to -56.8	WUT-SC01-B
2	-52		95	5				
3	-53							
4	-54							
5	-55							
6	-56							
7	-57				End of core at 7.0 feet.			
8	-58							
9	-59							
10	-60							
11	-61							
12	-62							
13	-63							
14	-64							
15								

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Sediment Core Log

WUT-SC02

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **708179.04 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172328.04 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7**	Mudline Elevation (feet): **-48.5**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **95.7**	Core Collection Date/Time: **11/5/2024 11:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-49 to -50		20 40	80 60	0 to 6.7: SILT WITH SAND (ML), soft, wet, dark gray brown, 80% nonplasic fines, 20% fine to medium sand. @0.4: shell fragment. 0.8 to 2.2: SANDY SILT (ML) grades to higher sand content 60% fines, 40% sand.		-48.5 to -55	WUT-SC02-A
2 to 6	-51 to -55		80	20	2.2 to 6.7: SILTY SAND (SM), grades to medium dense, higher sand content, moist. 80% sand fine to medium sand, 20% fines.			
7	-56				End of core at 6.7 feet.			
8 to 15	-57 to -63							

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Sediment Core Log

WUT-SC03

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **1172238.36 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **708266.40 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-53.98**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **83.8**	Core Collection Date/Time: **11/5/2024 12:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-54		85	15	0 to 6.3: SILTY SAND (SM): loose, wet, dark gray, 85% sand, 15% fines,trace shell fragments throughout, moderate H2S-like oder. @0.3: 1.5 to 2.5 inch shells. @1.0: grades from moist to wet.		-53.98 to -54.98	WUT-SC03-A
1	-55						-54.98 to -59.98	WUT-SC03-B
2	-56							
3	-57							
4	-58							
5	-59						-59.98 to -61.28	WUT-SC03-Z
6	-60				End of core at 6.3 feet.			
7	-61							
8	-62							
9	-63							
10	-64							
11	-65							
12	-66							
13	-67							
14	-68							
15								

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Notes:

Sediment Core Log

WUT-SC04

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **1172241.90 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **708375.78 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-53.33**
Location: **Tacoma, Washington**	Recovery Length (feet): **11.2**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **100**	Core Collection Date/Time: **11/5/2024 13:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	0		95	5	0 to 11.2: POORLY GRADED SAND (SP), loose to medium dense, wet, gray black, 95% medium to coarse sand, 5% fines, trace shell hash throughout. @4.3: grades to trace silt. @7 to 8.9: well graded sand.		-53.33 to -55.0	WUT-SC04-A
							-55.03 to -59.03	WUT-SC04-B
							-59.03 to -60.43	WUT-SC04-Z
11.2	-11.2				End of core at 11.2 feet.			

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Notes: @3.0 to 3.8: Void in core from partial sloughing. Following depths have been adjusted.

Sediment Core Log

WUT-SC05

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **708455.48 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172053.61 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.8**	Mudline Elevation (feet): **-50.42**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.9**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **86.7**	Core Collection Date/Time: **11/6/2024 09:15**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-51 to -52		20	80	0 to 1.6: SILT WITH SAND (ML), very soft, wet, brown, 80% nonplastic fines, 20% fine to medium sand, grading sandier downward.			
1 to 4	-52 to -55		60	40	1.6 to 4.6: SILTY SAND (SM), gray brown, 60% sand, 40% fines. @2.4 grades to loose. @4.0 grades to medium dense.		-50.42 to -55.02	WUT-SC05-A
4 to 6	-55 to -57		90	10	4.6 to 5.9: POORLY GRADED SAND WITH SILT (SP-SM), 90% sand, 10 % silt @5.3 grades to dense.		-55.02 to -56.32	WUT-SC05-B
					End of core @5.9 feet.			

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Sediment Core Log

WUT-SC06

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **708547.83 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1177043.65 NAD83**
Client: **Port of Tacoma**	Drive Length (feet):**4**	Mudline Elevation (feet):**-51.7**
Location: **Tacoma, Washington**	Recovery Length (feet): **2.4**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%):**60**	Core Collection Date/Time: **11/6/2024 11:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		10	90	0 to 0.2: SILT (ML), very soft, wet, dark brown gray, 90 % fines, 10% sand.			
1	-53		95	5	0.2 to 2.4: SAND (SP), medium dense to dense, moist, dark gray with multi colored flecks, 95% sand, 5% fines, trace shall hash, trace silt.		-51.7 to -54.1	WUT-SC06-A
2	-54				End of core at 2.4 feet.			
3	-55							
4	-56							
5	-57							
6	-58							
7	-59							
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15								

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Notes:

Sediment Core Log

WUT-SC07

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **708638.83 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171839.59 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7.5**	Mudline Elevation (feet): **-50.4**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **89**	Core Collection Date/Time: **11/1/2024**

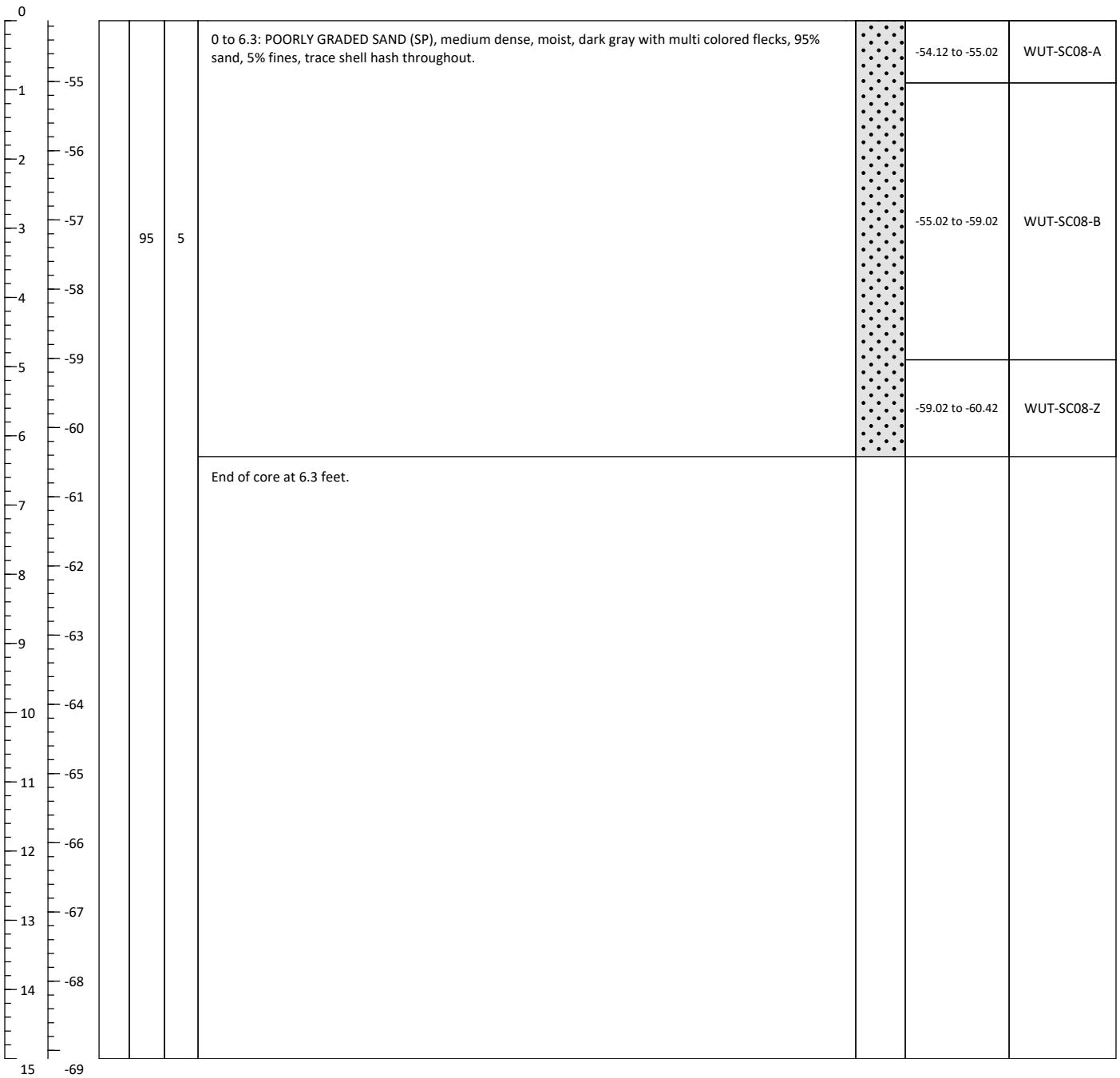
In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 7	-51 to -58		95	5	0 to 6.7: POORLY GRADED SAND (SP) medium dense, wet, gray, 95% fine sand, 5% fines, trace medium sand, trace red white and clear sand. @ 0 to 1.1: trace white shell hash. @ 0.9: one subround piece of gravel. @ 4.3: trace shell hash.		-50.4 to -55	WUT-SC07-A
							-55 to -57.1	HUT-SC07-B
7 to 15	-58 to -65				End of core at 6.7 feet.			

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Sediment Core Log
WUT-SC08

Project: **Blair Waterway Deepening Program**	Logged By: **RP**	Latitude: **7086996.36**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171904.71**
Client: **Port of Tacoma**	Drive Length (feet): **7.9**	Mudline Elevation (feet): **-54.12**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **79.7**	Core Collection Date/Time: **11/6/2024 14:40**



In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 6.3	-54.12 to -60.42		95	5	0 to 6.3: POORLY GRADED SAND (SP), medium dense, moist, dark gray with multi colored flecks, 95% sand, 5% fines, trace shell hash throughout.		-54.12 to -55.02	WUT-SC08-A
							-55.02 to -59.02	WUT-SC08-B
							-59.02 to -60.42	WUT-SC08-Z
6.3	-60.42				End of core at 6.3 feet.			

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Notes:

Sediment Core Log
WUT-SC09

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Person**	Latitude: **708854.53 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171742.21 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-51.33**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **63.3**	Core Collection Date/Time: **11/6/2024 15:35**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 15	-52 to -66		95	5	0 to 7.6: POORLY GRADED SAND (SP), Medium dense to dense, moist, dark gray with multi colored flecks, 95% sand, 5% fines, trace silt, trace shell hash through out.		-51.33 to -55.03	WUT-SC09-A
							-55.03 to -58.93	WUT-SC09-B
					End of core at 7.6 feet.			

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Sediment Core Log

WUT-SC10

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **RY Pearson**	Latitude: **708800.88 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171683.98 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8.4**	Mudline Elevation (feet): **-51.15**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **98**	Core Collection Date/Time: **11/7/2024 9:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0			20	80	0 to 0.3: SILT WITH SAND (ML), soft, wet, dark brown gray , 80% fines, 20% fine to medium sand.			
1	-52		80	20	0.3 to 2.0: SILTY SAND (SM), dense, dark gray with trace white, gray, and red grains throughout, 80% sand, 20% fines.		-51.15 to -55.8	WUT-SC10-A
2	-53				2.0 to 8.3: POORLY GRADED SAND (SP), grades to trace silt, 95% sand, 5% fines.			
3	-54				@2.4: shell fragment.			
4	-55				@2.5: clay pocket 0.5 inch.			
5	-56		95	5	@3.9: density transitions to medium dense to dense.		-55.8 to -59.8	WUT-SC10-B
6	-57				@4.9: shell fragment.			
7	-58							
8	-59						-59.8 to 60.2	WUT-SC10-Z
9	-60				End of core at 8.3 feet.			
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15	-66							

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Sediment Core Log

WUT-SC11

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **708946.85 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171450.77 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **5.3**	Mudline Elevation (feet): **-49.0**
Location: **Tacoma, Washington**	Recovery Length (feet): **3.7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **69**	Core Collection Date/Time: **11/4/2024 12:50**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-49		75	25	0 to 3.7: SILTY SAND (SM), very loose, wet, gray black, 75% medium sand, 25% fines. @0.5: shell.			
1	-50		90	10	0.6 to 1.3: POORLY GRADED SAND WITH SILT (SM - SP), grades to loose, 90% sand, 10% fines.			
2	-51				1.3 to 3.7: POORLY GRADED SAND (SP), grades to dense, 95% sand, 5% fines.		-49.0 to -52.7	WUT-SC11-A
3	-52		95	5	@2.3 to 2.8: trace shell hash.			
4	-53				End of core at 3.7 feet.			
5	-54							
6	-55							
7	-56							
8	-57							
9	-58							
10	-59							
11	-60							
12	-61							
13	-62							
14	-63							
15	-64							

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Notes:

Sediment Core Log

WUT-SC12

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Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **709095.59 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171534.40 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7**	Mudline Elevation (feet): **-52.27**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.5**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **78.5%**	Core Collection Date/Time: **11/4/2024 10:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5.5	-52.27 to -57.77		95	5	0 to 5.5: POORLY GRADED SAND (SP), medium dense to dense, Moist to wet, gray black, 95% medium to coarse sand, 5% fines, trace silt. @0 to 0.15: Silt wiith fine sand, soft, moist, tan brown. @3.9 shell and twig		-52.27 to -55.17	WUT-SC12-A
							-55.17 to -57.77	WUT-SC12-B
					End of core @ 5.5 feet.			

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Sediment Core Log

WUT-SC13

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1171354.76 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **709130.30 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.4**	Mudline Elevation (feet): **-53.3**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **89**	Core Collection Date/Time: **10/24/2024 15:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-53.3 to -54		5	95	0 to 1.4: SILT (ML), soft, wet, gray, 95% fines, 5% fine sand.		-53.3 to -55	WUT-SC13-A
1 to 6	-54 to -59		95	5	1.4 to 5.7 POORLY GRADED SAND (SP), dense wet, gray, 95% fine sand, 5% fines, trace shell hash throughout, trace red, white sand throughout. @ 2.0: one 0.5 inch white shell. @ 2.4: one 1.5 inch piece of of coarse gravel. @3.1 one peice of fine gravel. @3.3 gray silt lens.		-55 to -59	WUT-SC13-B
6 to 15	-59 to -68				End of core at 5.7 feet.			

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Sediment Core Log

WUT-SC14

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1171368.32 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **709256.59 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-53.8**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.6**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **95**	Core Collection Date/Time: **10/24/2024 14:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 15	-54 to -68		95	5	0 to 7.6: POORLY GRADED SAND (SP), very dense, wet, dark gray, 95% fine to medium sand, 5% fines, trace shell hash throughout, trace red white and clear sand throughout. @0.3: one inch gray clay pocket. @2.1 to 2.9: trace coarse sand. @3.0: brown wood debris.		-53.8 to -55	WUT-SC14-A
							-55 to -59	WUT-SC14-B
							-59 to -61	WUT-SC14-Z
					End of core at 7.6 feet.			

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Sediment Core Log

WUT-SC15

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1171155.49 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **709315.05 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **7.5**	Mudline Elevation (feet): **-50.64**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **110**	Core Collection Date/Time: **10/25/2024 10:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51		5	95	0 to 0.7: SILT (ML),very soft, wet, gray, 95% fines, 5% fine sand, trace organic root-like fibers.			
1	-52				0.7 to 8.3: POORLY GRADED SAND (SP), dense, wet, gray, 95% fine sand, 5% fines, trace red and clear sand throughout, trace shell hash throughout.		-50.64 to -55.04	WUT-SC15-A
2	-53							
3	-54							
4	-55		95	5				
5	-56						-55.04 to -58.94	WUT-SC15-B
6	-57				@5.7: dark gray silt pocket 0.5 inch.			
7	-58				@6.7: one 0.5 inch white shell.			
8	-59							
9	-60				end of core at 8.32 feet.			
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15								

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Notes: Drive length was miss recorded on collection log.

Sediment Core Log

WUT-SC16

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1171217.30 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **709379.93 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **6.5**	Mudline Elevation (feet): **-53.01**
Location: **Tacoma, Washington**	Recovery Length (feet): **4.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **66.1**	Core Collection Date/Time: **10/24/2024 13:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0			5	95	0 to 0.5: SILT (ML) very soft, wet, gray 95% fines, 5% fine sand.		-53.01 to -53.51	WUT-SC16-ATT
1	-54				0.5 to 4.3: POORLY GRADED SAND (SP), very dense, wet, gray, 95% fines sand, 5% fines, trace medium sand, and trace shell hash throuroughout. @ 1.2: white shell 0.5 inch. @1.5: white shell 1inch.		-53.01 to -55.01	WUT-SC16-A
2	-55		95	5				
3	-56				@3.3: light brown 1 inch stick.		-55.01 to -57.31	WUT-SC16-B
4	-57							
5	-58				End of core at 4.3 feet.			
6	-59							
7	-60							
8	-61							
9	-62							
10	-63							
11	-64							
12	-65							
13	-66							
14	-67							
15	-68							

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Notes: x

Sediment Core Log

WUT-SC17

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709462.70 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1171133.18 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-51.96**
Location: **Tacoma, Washington**	Recovery Length (feet): **7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **58**	Core Collection Date/Time: 10/24/2024 12:15

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		5	95	0 to 0.9: SILT (SM), very soft, wet, gray, 95% fines, 5% fine sand.			
1	-53				0.9 to 7.0 POORLY GRADED SAND (SP), dense, wet, gray with red white and clear sand throughout, 95% fine to medium sand, 5% fines, trace shell hash throughout.		-51.96 to -54.96	WUT-SC17-A
2	-54							
3	-55							
4	-56		95	5			-54.96 to -58.96	WUT-SC17-B
5	-57							
6	-58							
7	-59				End of core at 7.0 feet.			
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15								

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Sediment Core Log

WUT-SC18

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709407.48 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1170979.53 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **10.5**	Mudline Elevation (feet): **-50.74**
Location: **Tacoma, Washington**	Recovery Length (feet): **7**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **66**	Core Collection Date/Time: **10/23/2024 15:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-51 to -52		5	95	0 to 1.9: SILT (ML): very soft, wet, gray, 95% fines, 5% fine sand. @0.6 trace organic root-like fibers.			
1 to 7	-52 to -58		75	25	1.9 to 7.0: POORLY GRADED SAND (SP), loose to medium dense, wet, gray, 75% fine sand, 25% fines, trace shell hash.		-50.74 to -55.04	WUT-SC18-A
							-55.04 to -57.74	WUT-SC-B
7	-58				End of core at 7.0 feet.			

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Notes: x

Sediment Core Log

WUT-SC19

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709607.31 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1170836.42 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **10.5**	Mudline Elevation (feet): **-51.18**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.5**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **80**	Core Collection Date/Time: **10/23/2024 12:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51.18		5	95	0 to 1.2: SILT (ML), very soft, wet, gray, 95% fines, 5% fine sand. @ 0 to 0.5: wood fragments.			
1	-52							
2	-53				1.2 to 8.5: POORLY GRADED SAND (SP), medium dense, wet, gray with red and white sand throughout, 95% fine sand, 5% fines, trace shell hash.		-51.18 to -54.98	WUT-SC19-A
3	-54				@ 2.9: white root like fibers.			
4	-55							
5	-56		95	5	@ 4.6 to 8.8: density grades from medium dense to dense.		-54.98 to -58.98	WUT-SC19-B
6	-57							
7	-58							
8	-59				@ 7.6: brown wood fragments			
9	-60				End of core at 8.5 feet.			
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15	-66							

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Notes: x

Sediment Core Log
WUT-SC20

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709676.75 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1170876.64 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-53.6**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.3**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **60**	Core Collection Date/Time: **10/23/2024 13:15**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-54 to -55		5	95	0 to 1.4: SILT (ML), very soft, wet, gray, 95% fines, 5% fine sand @ 0.4: trace silver floret sheen.		-53.6 to-55	WUT-SC20-A
1 to 3	-55 to -57		70	30	1.4 to 3.4: SILTY SAND (SM), very loose, wet, gray with trace red sand, 70% fine sand, 30% fines,		-55 to-59	WUT-SC20-B
3 to 7.3	-57 to -61		95	5	3.4 to 7.3: POORLY GRADED SAND (SP), loose, wet, gray with trace red sand throughout, 95% fine to medium sand, 5% fines, trace shell hash.			
7.3	-61				End of core at 7.3 feet.			

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Notes:

Sediment Core Log
WUT-SC21

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **471550.366 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1222331.3641 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **5.2**	Mudline Elevation (feet): **-51.04**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.2**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **100**	Core Collection Date/Time: **10/22/2024 14:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-51 to -52		10	90	0 to 1.2: SILT (ML), soft, wet, gray, 90% fines, 10 % fine sand, fines are nonplastic. @ 0.0 to 0.4: organic root like fibers. @ 0.5: shell 1 inch.			
1 to 5	-52 to -56		95	5	1.2 to 5.2: POORLY GRADED SAND (SP), dense, wet, gray with red and white sand throughout, 95% fine to medium sand, 5% fines, trace shell hash. @ 2.1: shell 1 inch.		-51.04 to -55.04	WUT-SC21-A
							-55.04 to -56.24	WUT-SC21-B
5 to 5.2	-56 to -56.2				End of core at 5.2 feet.			

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Notes:

Sediment Core Log
WUT-SC22

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709785.75 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1170809.84 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-53.1**
Location: **Tacoma, Washington**	Recovery Length (feet): **9.1**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **75**	Core Collection Date/Time: **10/23/2024 14:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-53.1		5	95	0 to 0.6: SILT (SM), very soft, wet, gray, 95% fines, 5% fine sand. @0.0 to 9.1: strong H2S-like oder.			
1	-54				0.6 to 9.1: POORLY GRADED SAND (SP), loose, wet, gray with trace red grains throughout, 95% fine sand, 5% fines, trace shell hash.		-53.1 to -55	WUT-SC22-A
2	-55							
3	-56				@3.4 to 3.7: shells 0.25 inch.		-55 to -59	WUT-SC22-B
4	-57							
5	-58		95	5	@ 5.0 to 6.8: grades to higher silt content 80% fine sand, 20% fines.			
6	-59							
7	-60				@7.1 to 9.0: density trasitions to very dense.		-59 to -61	WUT-SC22-Z
8	-61				@7.8: barnacle covered rock.			
9	-62				@8.3 to 8.7: brown wood chunck.			
10	-63				End of core at 9.1 feet.			
11	-64							
12	-65							
13	-66							
14	-67							
15	-68							

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Notes: x

Sediment Core Log

WUT-SC23

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **709884.43 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1170567.70 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-51.98**
Location: **Tacoma, Washington**	Recovery Length (feet): **8.5**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **70**	Core Collection Date/Time: **10/23/2024 10:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-52 to -53		5	95	0 to 2: SILT (ML), very soft, wet, gray 95% fines, 5% fine sand. @ 0.0 to 0.7: stick 7 inches long.		-51.98 to -54.98	WUT-SC23-A
2 to 3	-54 to -55		75	25	2 to 4.5: POORLY GRADED SAND (SP), soft, wet, gray, 75% fine to medium sand, 25% fines, trace shell hash. @ 2.8: shell covered in barnacles 1.5 inches.		-54.98 to -59.08	WUT-SC23-B
4 to 7	-56 to -59		95	5	4.5 to 8.5: POORLY GRADED SAND (SP), medium dense, moist, gray, 95% sand, 5% fines, trace 0.5 inch shells throughout. @ 5.8: gray shell 1.5 inches. @6.0 to 8.5: transitions to dense sand. @6.2: full 1 inch white shell.		-59.087 to -60.68	WUT-SC23-Z
8 to 15	-60 to -66				End of core at 8.5 feet.			

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Sediment Core Log
WUT-SC24

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **471553.4105 NAD83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1222333.2996 NAD83**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet): **-51.3**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.5**	Vertical Datum: **MLLW**
Contractor: **Gravity**	Percent Recovery (%): **54**	Core Collection Date/Time: **10/22/2024 16:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51.3		5	95	0 to 0.8: SILT (ML), very soft, wet, gray 95% fines, 5% fine sand.			
1	-52				0.8 to 6.5: POORLY GRADED SAND (SP), dense, wet, gray with red gray and clear grains throughout, 95% fine to medium sand, 5% fines, trace shell hash through out.		-51.3 to -55	WUT-SC24-A
2	-53							
3	-54				@2.8: white shell 0.5 inch.			
4	-55		95	5	@3.5: one piece of coarse gravel 2 inches.			
5	-56				@4.2: one piece of coarse gravel 2 inches.			
6	-57				@4.8 to 4.8: white shells 0.5 inch shells.		-55 to -57.8	WUT-SC24-B
7	-58				@5.3: one subround fine gravel.			
8	-59				@6.2: shell 1 inch.			
9	-60				End of core at 6.5 feet.			
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15	-66							

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Notes:

Appendix C
Photograph Logs

Photograph Log: Husky Terminal

Photograph 1
HT-SC01 0 to 0.79 Feet



Photograph 2
HT-SC02 0 to 1.25 Feet



Photograph 3
HT-SC03 0 to 1.25 Feet



Photograph 4
HT-SC04 0-1.3 Feet



Photograph 5
HT-SC04 1.4 to 3.2 Feet



Photograph 6
HT-SC04 2.4 to 4.2 Feet



Photograph 7
HT-SC04 3.3 to 4.8 Feet



Photograph 8
HT-SC05 0 to 1.3 Feet



Photograph 9
HT-SC05 1.5 to 3.3 Feet



Photograph 10
HT-SC05 3.6 to 5.3 Feet



Photograph 11
HT-SC05 4.4 to 6.2 Feet



Photograph 12
HT-SC05 5.3 to 6.7 Feet



Photograph 13
HT-SC06 0 to 1.4 Feet



Photograph 14
HT-SC06 1.5 to 3.3 Feet



Photograph 15
HT-SC06 3.5 to 5.3 Feet



Photograph 16
HT-SC06 4.2 to 5.4 Feet



Photograph 17
HT-SC07 0 to 1.5 Feet



Photograph 18
HT-SC07 0.5 to 2.5 Feet



Photograph 19
HT-SC07 2.5 to 4.5 Feet



Photograph 20
HT-SC07 3.4 to 5.0 Feet



Photograph 21
HT-SC08 0 to 1.4 Feet



Photograph 22
HT-SC08 1.3 to 3.2 Feet



Photograph 23
HT-SC08 2.3 to 4.2 Feet



Photograph 24
HT-SC08 3.4 to 5.3 Feet



Photograph 25
HT-SC08 4.3 to 5.4 Feet



Photograph 26
HT-SC09 0 to 1.4 Feet



Photograph 27
HT-SC09 0.5 to 2.4 Feet



Photograph 28
HT-SC09 2.4 to 4.3 Feet



Photograph 29
HT-SC09 3.1 to 4.6 Feet



Photograph 30
HT-SC10 0 to 1.3 Feet



Photograph 31
HT-SC10 0.5 to 2.3 Feet



Photograph 32
HT-SC10 1.6 to 3.3 Feet



Photograph 33
HT-SC10 2.5 to 4.4 Feet



Photograph 34
HT-SC10 4.4 to 6.2 Feet



Photograph 35
HT-SC10 5.2 to 6.3 Feet



Photograph 36
HT-SC11 0 to 1.3 Feet



Photograph 37
HT-SC11 0.5 to 2.4 Feet



Photograph 38
HT-SC11 2.4 to 4.2 Feet



Photograph 39
HT-SC11 3.4 to 5.3 Feet



Photograph 40
HT-SC11 5.3 to 7.2 Feet



Photograph 41
HT-SC11 7.3 to 9.2 Feet



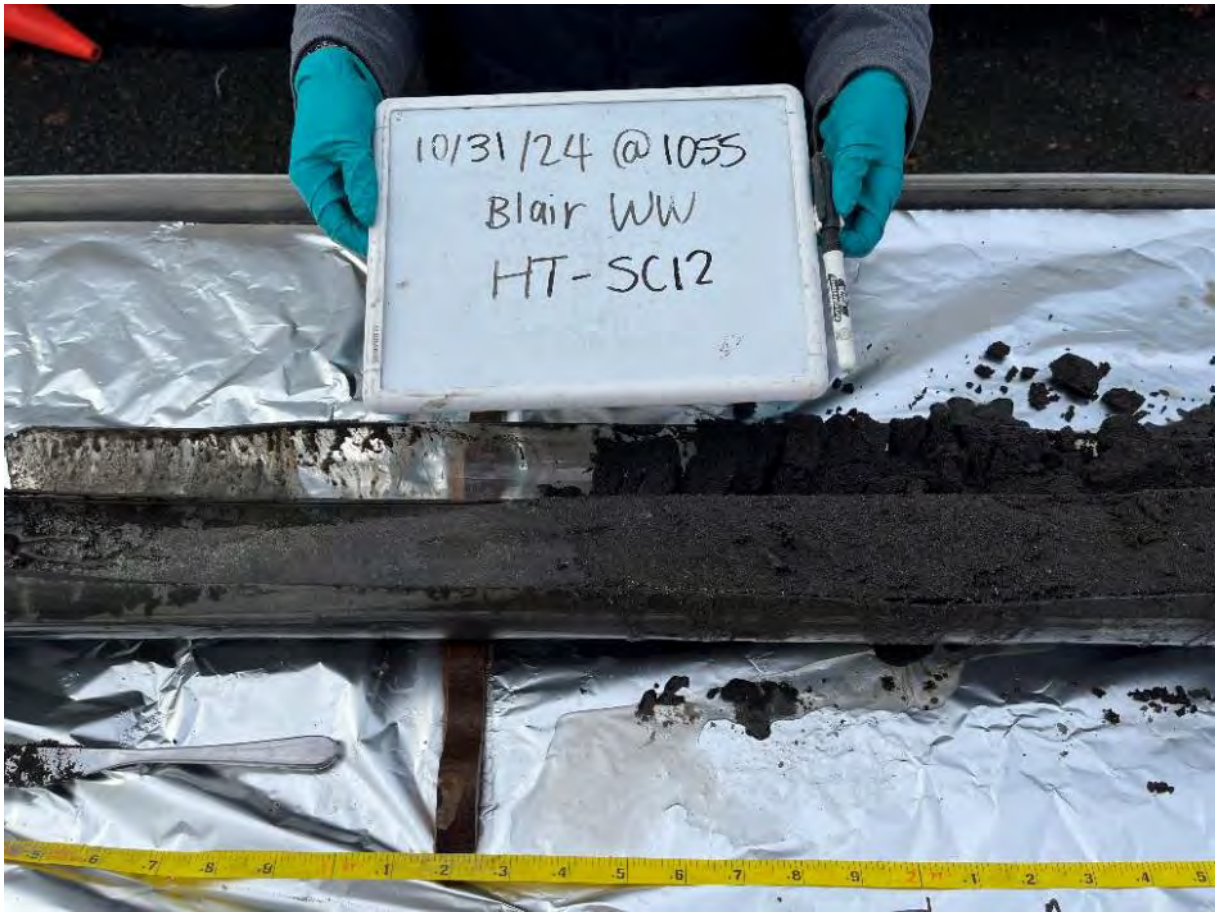
Photograph 42
HT-SC11 8.5 to 10.4 Feet



Photograph 43
HT-SC11 10.3 to 11.7 Feet



Photograph 44
HT-SC12 0.5 to 2.5 Feet



Photograph 45
HT-SC12 1.4 to 3.4 Feet



Photograph 46
HT-SC12 3.4 to 5.4 Feet



Photograph 47
HT-SC12 4.3 to 6.3 Feet



Photograph 48
HT-SC12 5.4 to 7.3 Feet



Photograph 49
HT-SC12 6.5 to 8.3 Feet



Photograph 50
HT-SC13 0 to 1.4 Feet



Photograph 51
HT-SC13 1.5 to 3.4 Feet



Photograph 52
HT-SC13 2.5 to 4.4 Feet



Photograph 53
HT-SC13 3.5 to 5.0 Feet



Photograph 54
HT-SC14 0 to 1.5 Feet



Photograph 55
HT-SC14 1.5 to 3.3 Feet



Photograph 56
HT-SC14 2.5 to 4.3 Feet



Photograph 57
HT-SC14 3.6 to 5.4 Feet



Photograph 58
HT-SC14 4.4 to 5.6 Feet



Photograph 59
HT-SC15 0.6 to 2.4 Feet



Photograph 60
HT-SC15 1.5 to 3.3 Feet



Photograph 61
HT-SC15 2.5 to 4.3 Feet



Photograph 62
HT-SC15 4.4 to 6.1 Feet



Photograph 63
HT-SC15 5.1 to 6.3 Feet



Photograph 64
HT-SC16 0 to 1.3 Feet



Photograph 65
HT-SC16 0.4 to 2.3 Feet



Photograph 66
HT-SC16 1.4 to 3.3 Feet



Photograph 67
HT-SC16 2.5 to 4.4 Feet



Photograph 68
HT-SC16 3.5 to 5.5 Feet



Photograph 69
HT-SC16 5.4 to 7.4 Feet



Photograph 70
HT-SC16 7.4 to 9.2 Feet



Photograph 71
HT-SC16 8.2 to 9.5 Feet



Photograph 72
HT-SC17 0 to 1.3 Feet



Photograph 73
HT-SC17 0.6 to 2.5 Feet



Photograph 74
HT-SC17 1.9 to 3.5 Feet



Photograph 75
HT-SC17 2.9 to 4.5 Feet



Photograph 76
HT-SC17 3.8 to 5.3 Feet



Photograph 77
HT-SC17 4.5 to 5.6 Feet



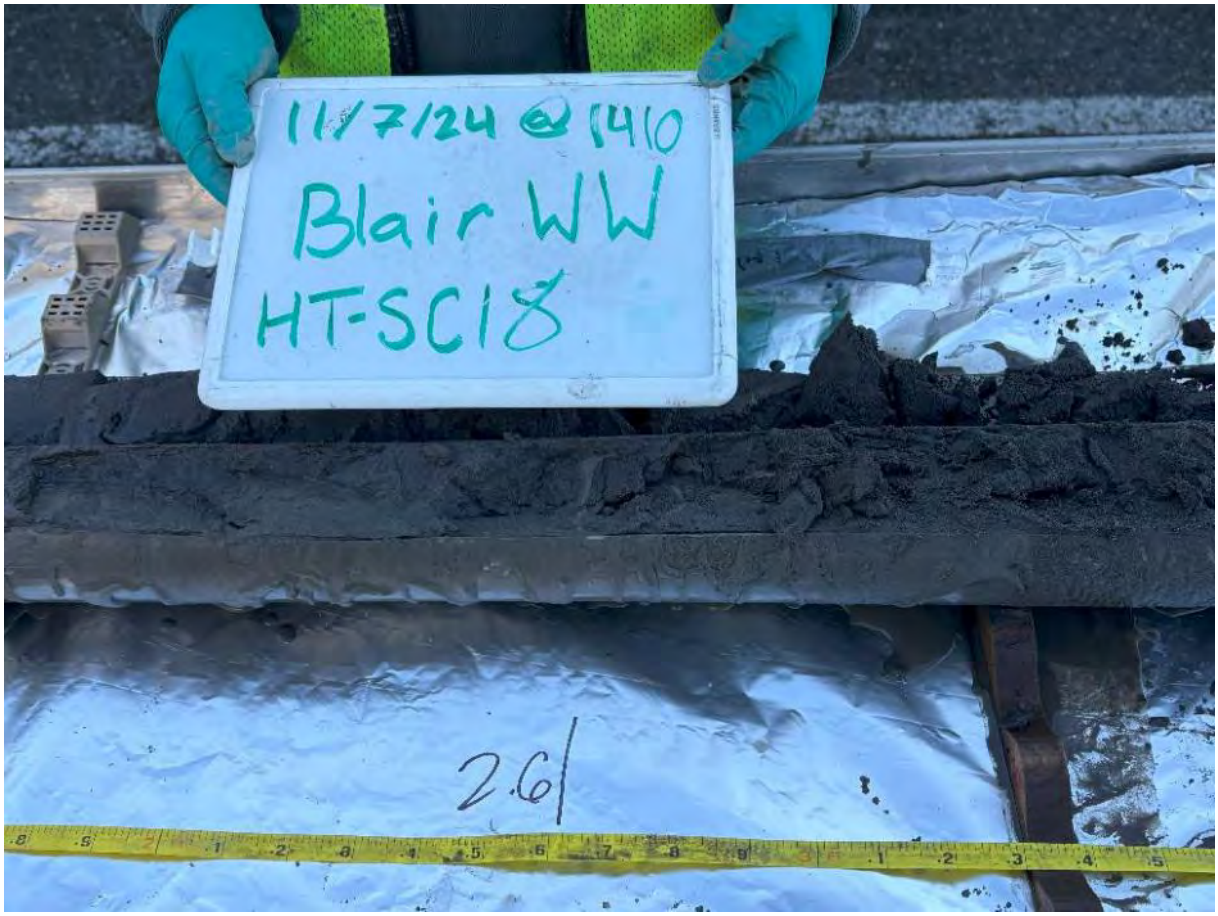
Photograph 78
HT-SC18 0 to 1.3 Feet



Photograph 79
HT-SC18 0.9 to 2.6 Feet



Photograph 80
HT-SC18 1.8 to 3.5 Feet



Photograph 81
HT-SC18 2.6 to 4.6 Feet



Photograph 82
HT-SC18 3.6 to 5.6 Feet



Photograph 83
HT-SC19 0 to 1.6 Feet



Photograph 84
HT-SC19 0.4 to 2.5 Feet



Photograph 85
HT-SC19 2.5 to 4.5 Feet



Photograph 86
HT-SC19 4.5 to 6.1 Feet



Photograph 87
HT-SC20 0 to 1.6 Feet



Photograph 88
HT-SC20 0.5 to 2.5 Feet



Photograph 89
HT-SC20 1.4 to 3.4 Feet



Photograph 90
HT-SC20 3.4 to 5.3 Feet



Photograph 91
HT-SC20 4.5 to 6.4 Feet



Photograph 92
HT-SC20 5.7 to 7.1 Feet



Photograph 93
HT-SC21 0.5 to 2.4 Feet



Photograph 94
HT-SC21 1.6 to 3.5 Feet



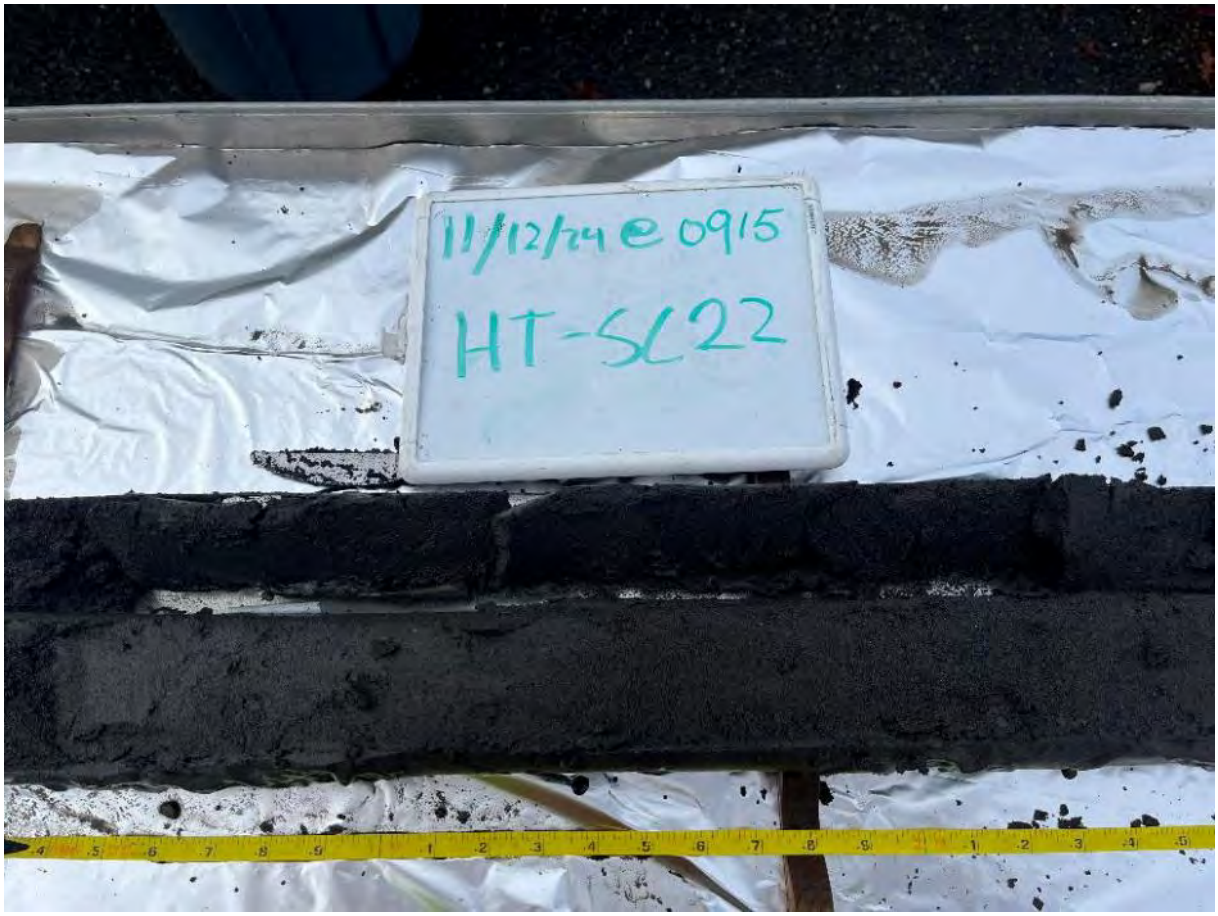
Photograph 95
HT-SC21 3.6 to 5.1 Feet



Photograph 96
HT-SC22 0 to 1.4 Feet



Photograph 97
HT-SC22 0.4 to 2.5 Feet



Photograph 98
HT-SC23 0.5 to 2.3 Feet



Photograph 99
HT-SC23 1.5 to 3.0 Feet



Photograph 100
HT-SC24 0 to 1.6 Feet



Photograph 101
HT-SC24 1.5 to 3.5 Feet



Photograph 102
HT-SC24 3.5 to 5.4 Feet



Photograph 103
HT-SC24 4.4 to 6.3 Feet



Photograph 104
HT-SC25 0 to 1.5 Feet



Photograph 105
HT-SC25 1.6 to 3.4 Feet



Photograph 106
HT-SC25 3.0 to 4.4 Feet



Photograph 107
HT-SC26 0 to 1.3 Feet



Photograph 108
HT-SC26 0.4 to 2.4 Feet



Photograph 109
HT-SC26 2.5 to 4.3 Feet



Photograph 110
HT-SC26 4.4 to 5.8 Feet



Photograph 111
HT-SC27 0 to 1.3 Feet



Photograph 112
HT-SC27 1.4 to 3.2 Feet



Photograph 113
HT-SC27 2.5 to 4.3 Feet



Photograph 114
HT-SC27 3.5 to 5.3 Feet



Photograph 115
HT-SC27 4.6 to 6.4 Feet



Photograph 116
HT-SC27 6.4 to 8.2 Feet



Photograph 117
HT-SC27 8.4 to 10.3 Feet



Photograph 118
HT-SC27 9.4 to 11.3 Feet



Photograph 119
HT-SC28 0 to 1.5 Feet



Photograph 120
HT-SC28 0.6 to 2.5 Feet



Photograph 121
HT-SC28 1.7 to 3.4 Feet



Photograph 122
HT-SC28 2.6 to 4.3 Feet



Photograph 123
HT-SC28 3.5 to 4.6 Feet



Photograph 124
HT-SC29 0 to 1.2 Feet



Photograph 125
HT-SC29 1.6 to 3.3 Feet



Photograph 126
HT-SC29 2.6 to 4.3 Feet



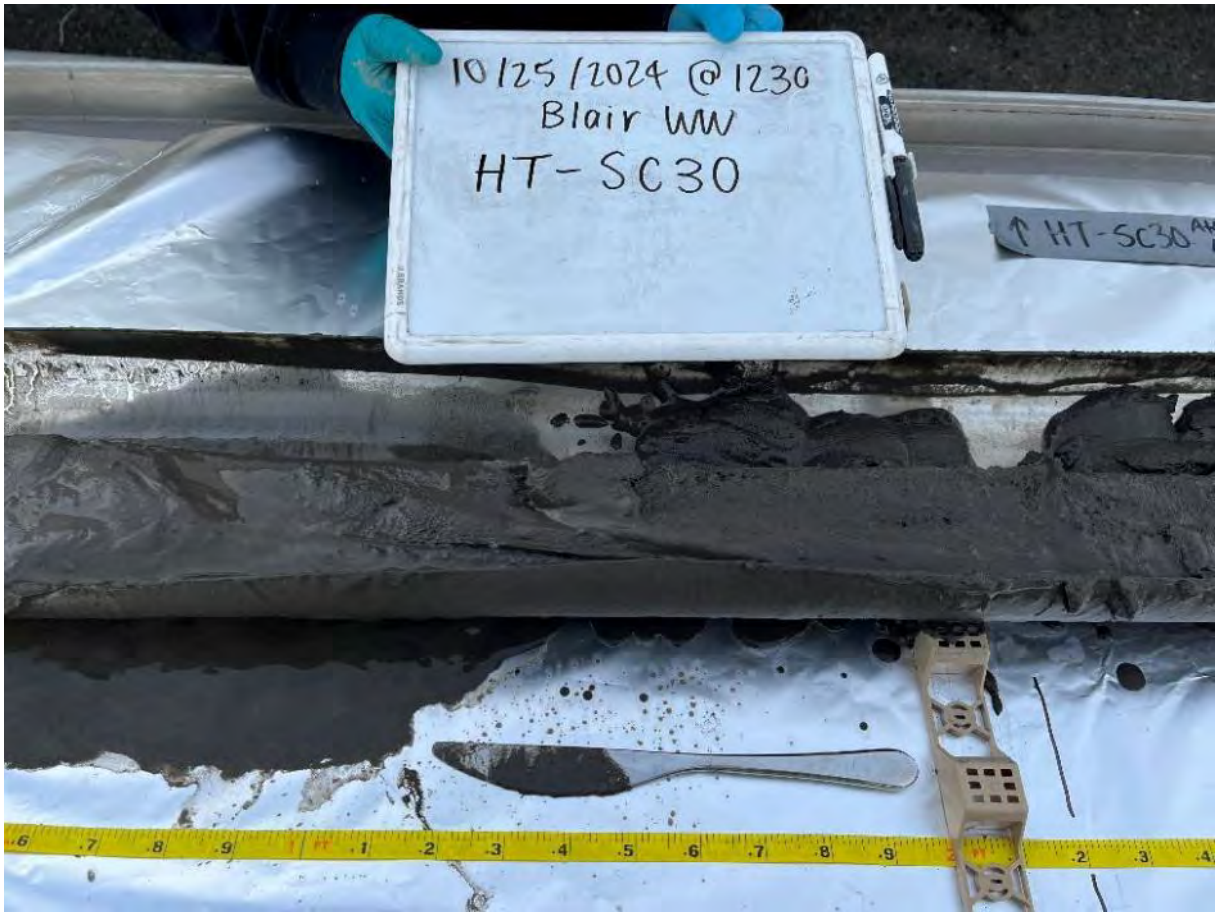
Photograph 127
HT-SC29 3.5 to 5.1 Feet



Photograph 128
HT-SC29 4.4 to 5.8 Feet



Photograph 129
HT-SC30 0.6 to 2.4 Feet



Photograph 130
HT-SC30 1.6 to 3.4 Feet



Photograph 131
HT-SC30 2.5 to 4.4 Feet



Photograph 132
HT-SC30 4.4 to 6.3 Feet



Photograph 133
HT-SC30 5.5 to 7.3 Feet



Photograph 134
HT-SC30 7.3 to 8.8 Feet



Photograph Log: Washington United Terminals

Photograph 1
WUT-SC01 0 to 1.5 Feet



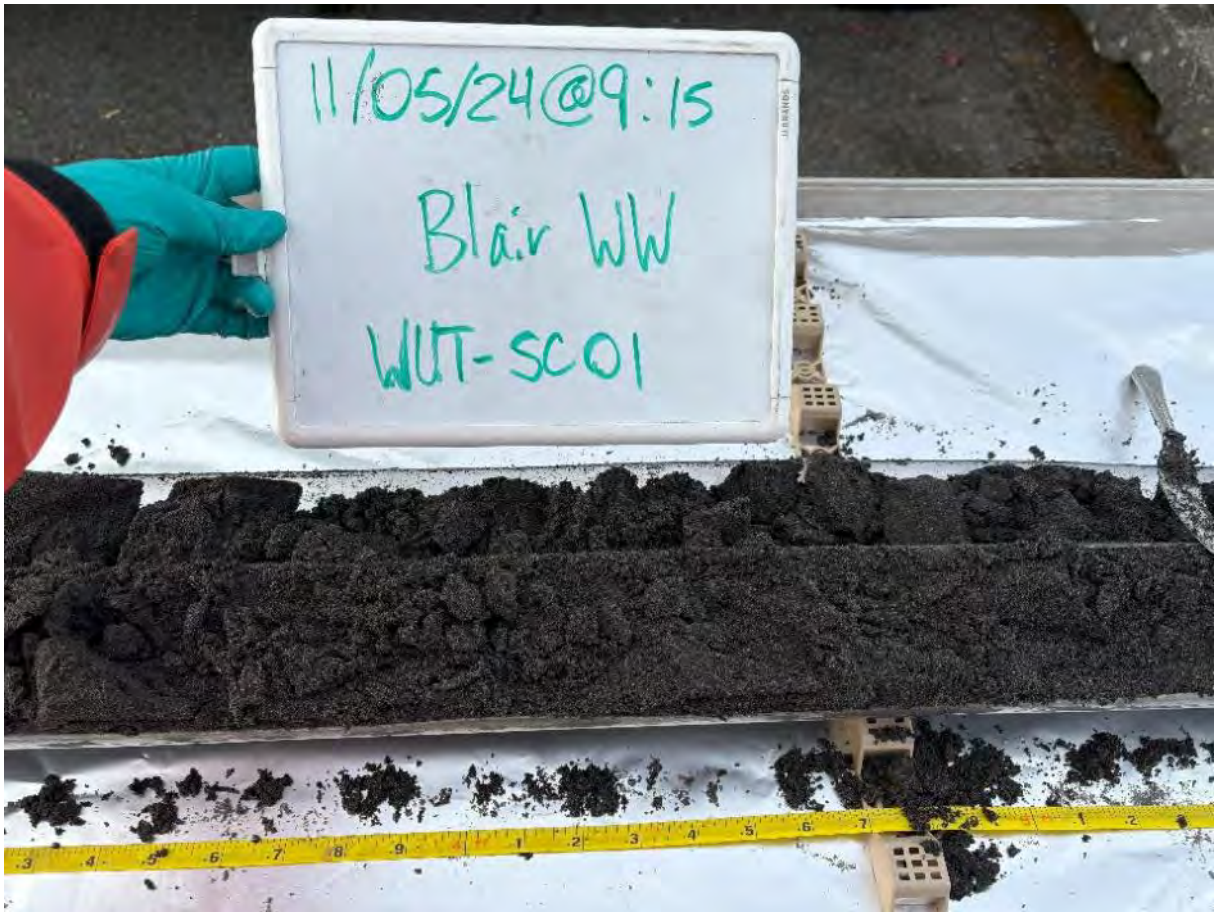
Photograph 2
WUT-SC01 0.8 to 2.7 Feet



Photograph 3
WUT-SC01 2 to 4 Feet



Photograph 4
WUT-SC01 3.3 to 5.3 Feet



Photograph 5
WUT-SC01 4.9 to 6.8 Feet



Photograph 6
WUT-SC01 5.9 to 7.1 Feet



Photograph 7
WUT-SC02



Note: Photographs of 1-foot intervals were not taken. Photograph shown was taken during archaeological monitoring and has no tape measure to denote the 1-foot intervals.

Photograph 8
WUT-SC03 0 to 1.5 Feet



Photograph 9
WUT-SC03 1 to 3.2 Feet



Photograph 10
WUT-SC03 2.8 to 4.8 Feet



Photograph 11
WUT-SC03 4.3 to 6.3 Feet



Photograph 12
WUT-SC03 5 to 6.3 Feet



Photograph 13
WUT-SC04 0 to 2.3 Feet



Photograph 14
WUT-SC04 1.9 to 4.3 Feet



Photograph 15
WUT-SC04 3.9 to 6.1 Feet



Photograph 16
WUT-SC04 5.9 to 8.1 Feet



Photograph 17
WUT-SC04 7.6 to 9.8 Feet



Photograph 18
WUT-SC04 9.5 to 11.5 Feet



Photograph 19
WUT-SC05 0 to 1.4 Feet



Photograph 20
WUT-SC05 0.9 to 2.8 Feet



Photograph 21
WUT-SC05 2.2 to 4.1 Feet



Photograph 22
WUT-SC05 3.5 to 5.4 Feet



Photograph 23
WUT-SC05 4.5 to 5.9 Feet



Photograph 24
WUT-SC06 0 to 2.4 Feet



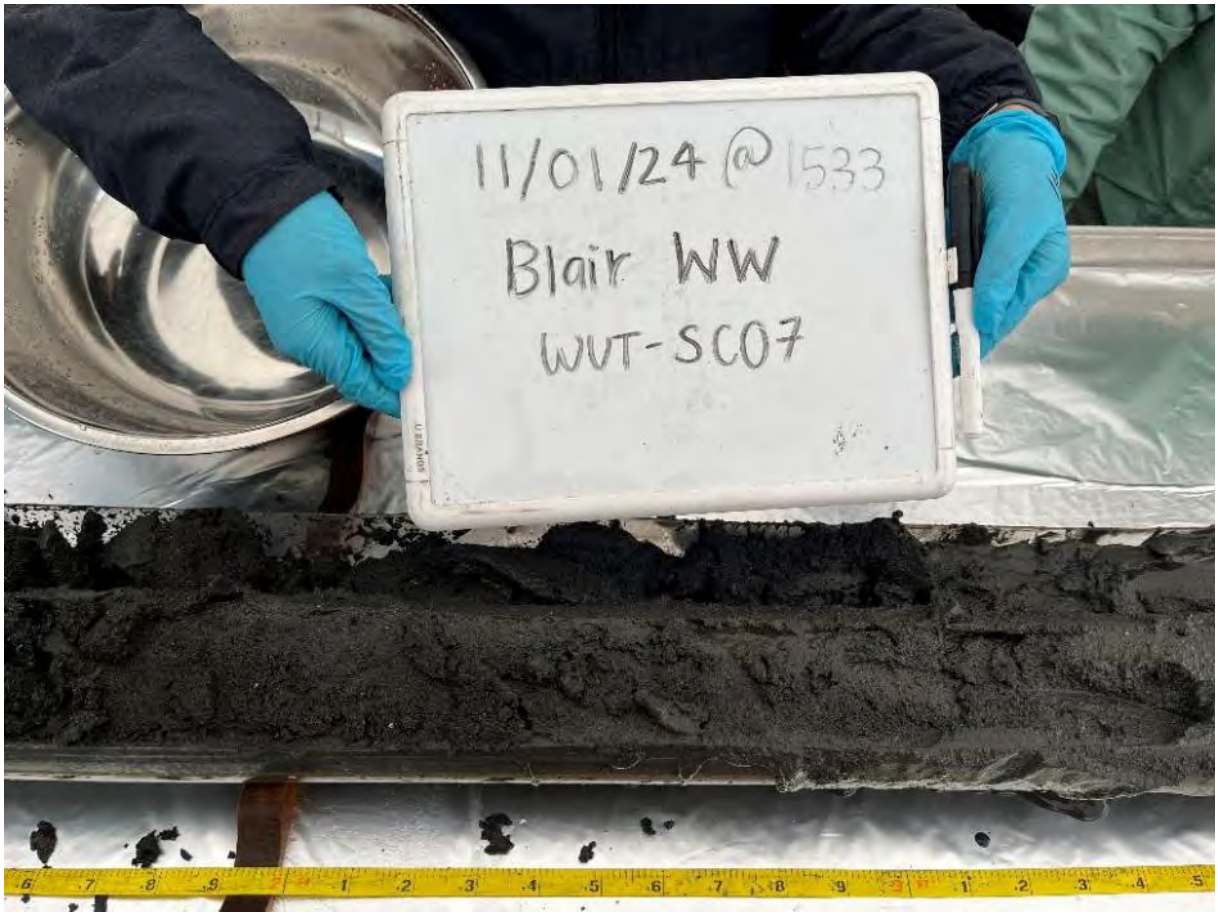
Photograph 25
WUT-SC07 0 to 1.5 Feet



Photograph 26
WUT-SC07 0.7 to 2.5 Feet



Photograph 27
WUT-SC07 1.6 to 3.5 Feet



Photograph 28
WUT-SC07 2.5 to 4.4 Feet



Photograph 29
WUT-SC07 3.5 to 5.4 Feet



Photograph 30
WUT-SC07 4.5 to 6.4 Feet



Photograph 31
WUT-SC07 5.5 to 6.7 Feet



Photograph 32
WUT-SC08 0 to 2.5 Feet



Photograph 33
WUT-SC08 1.0 to 3.2 Feet



Photograph 34
WUT-SC08 2.7 to 4.9 Feet



Photograph 35
WUT-SC08 3.9 to 6.3 Feet



Photograph 36
WUT-SC09 0 to 2.6 Feet



Photograph 37
WUT-SC09 2.7 to 5.2 Feet



Photograph 38
WUT-SC09 5.1 to 7.6 Feet



Photograph 39
WUT-SC09 6 to 7.6 Feet



Photograph 40
WUT-SC10 0 to 1.4 Feet



Photograph 41
WUT-SC10 0.7 to 2.7 Feet



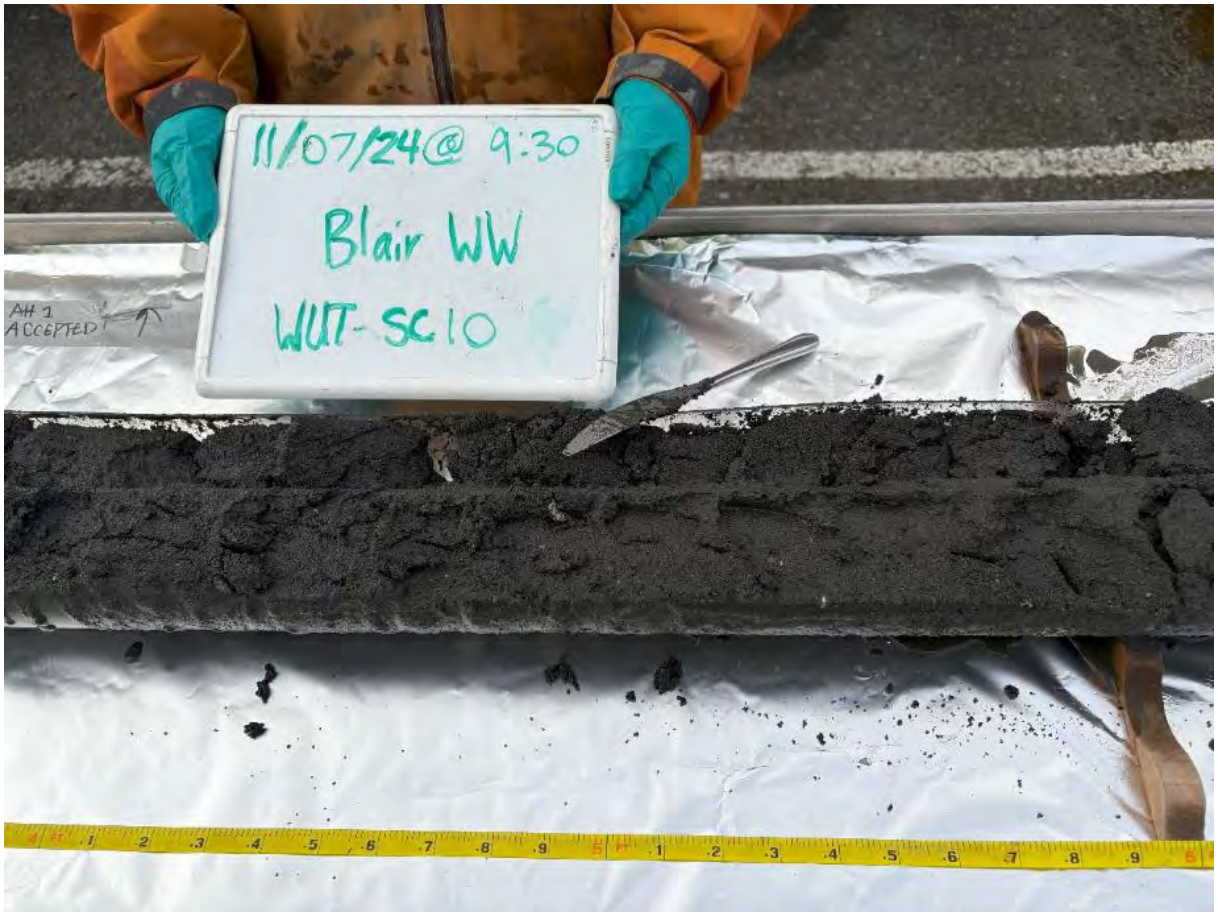
Photograph 42
WUT-SC10 1.9 to 3.9 Feet



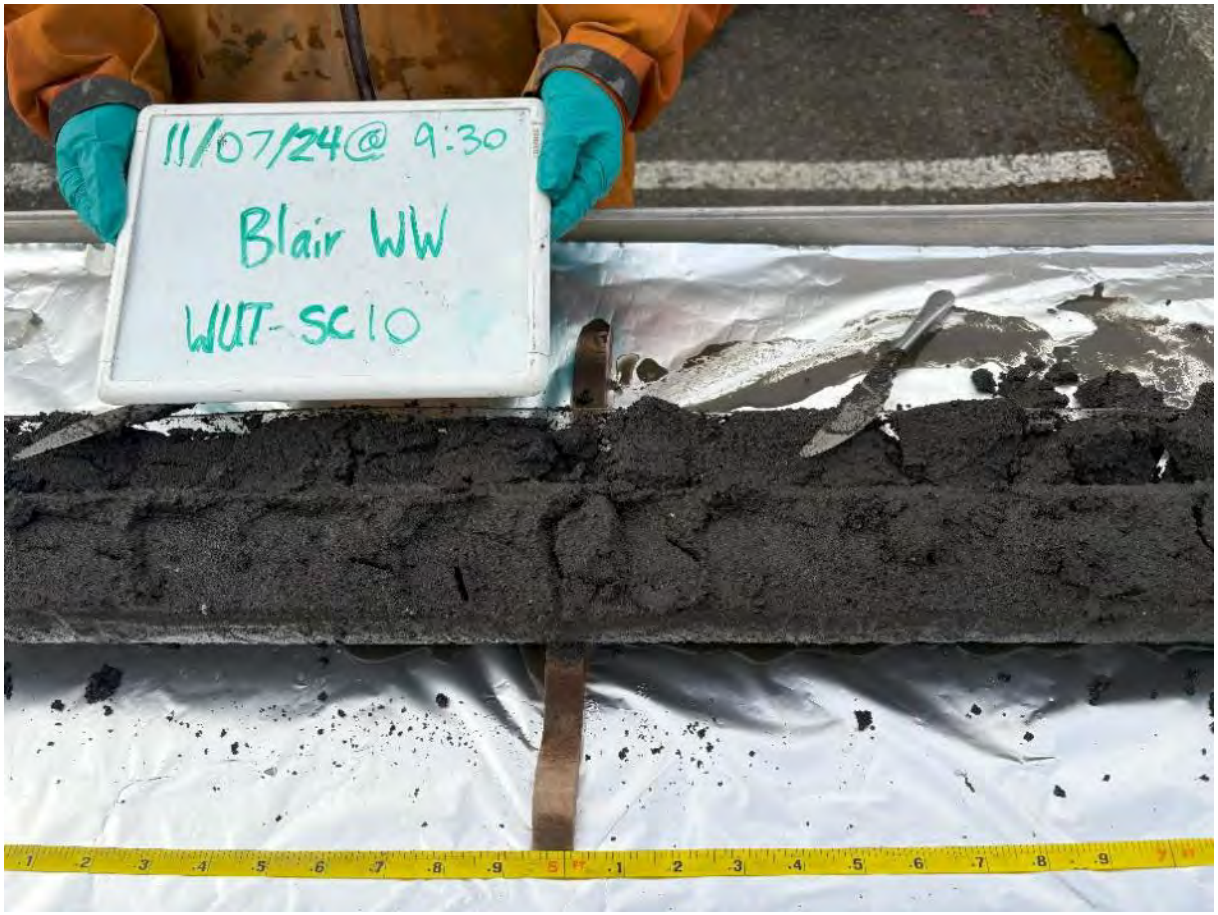
Photograph 43
WUT-SC10 3.1 to 5.0 Feet



Photograph 44
WUT-SC10 3.9 to 6 Feet



Photograph 45
WUT-SC10 5.1 to 7 Feet



Photograph 46
WUT-SC10 5.9 to 7.9 Feet



Photograph 47
WUT-SC10 6.8 to 8.3 Feet



Photograph 48
WUT-SC11 0 to 1.7 Feet



Photograph 49
WUT-SC11 1.2 to 3.1 Feet



Photograph 50
WUT-SC11 2.1 to 3.7 Feet



Photograph 51
WUT-SC12 0 to 1.6 Feet



Photograph 52
WUT-SC12 0.9 to 2.8 Feet



Photograph 53
WUT-SC12 2.1 to 4.1 Feet



Photograph 54
WUT-SC12 3.4 to 5.7 Feet



Photograph 55
WUT-SC12 4 to 6.3 Feet



Photograph 56
WUT-SC13 0 to 1.4 Feet



Photograph 57
WUT-SC13 1.6 to 3.3 Feet



Photograph 58
WUT-SC13 2.5 to 4.3 Feet



Photograph 59
WUT-SC13 3.6 to 5.3 Feet



Photograph 60
WUT-SC13 4.3 to 5.7 Feet



Photograph 61
WUT-SC14 0 to 1.3 Feet



Photograph 62
WUT-SC14 0.7 to 2.5 Feet



Photograph 63
WUT-SC14 1.6 to 3.3 Feet



Photograph 64
WUT-SC14 3.5 to 5.3 Feet



Photograph 65
WUT-SC14 4.6 to 6.3 Feet



Photograph 66
WUT-SC14 6.3 to 7.5 Feet



Photograph 67
WUT-SC15 0 to 1.3 Feet



Photograph 68
WUT-SC15 1.6 to 3.2 Feet



Photograph 69
WUT-SC15 2.5 to 4.2 Feet



Photograph 70
WUT-SC15 3.6 to 5.3 Feet



Photograph 71
WUT-SC15 4.6 to 6.3 Feet



Photograph 72
WUT-SC15 5.7 to 7.4 Feet



Photograph 73
WUT-SC15 6.6 to 8.3 Feet



Photograph 74
WUT-SC16 0 to 1.4 Feet



Photograph 75
WUT-SC16 0.5 to 2.3 Feet



Photograph 76
WUT-SC16 2.5 to 4.2 Feet



Photograph 77
WUT-SC16 3.2 to 4.4 Feet



Photograph 78
WUT-SC17 0 to 1.4 Feet



Photograph 79
WUT-SC17 0.6 to 2.3 Feet



Photograph 80
WUT-SC17 1.5 to 3.2 Feet



Photograph 81
WUT-SC17 2.5 to 4.4 Feet



Photograph 82
WUT-SC17 3.5 to 5.2 Feet



Photograph 83
WUT-SC17 5.4 to 7 Feet



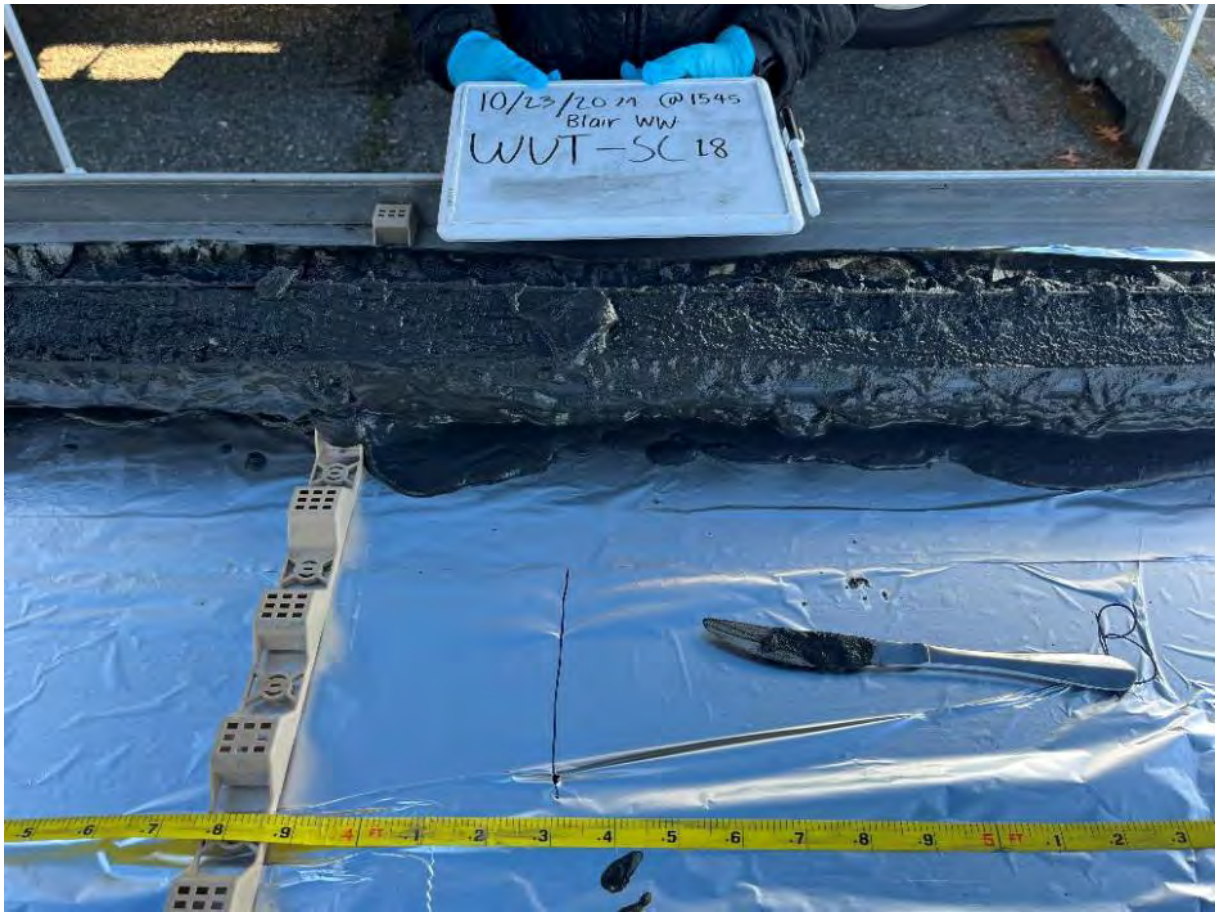
Photograph 84
WUT-SC18 0 to 1.5 Feet



Photograph 85
WUT-SC18 1.5 to 3.4 Feet



Photograph 86
WUT-SC18 3.5 to 5.3 Feet



Photograph 87
WUT-SC18 4.5 to 6.2 Feet



Photograph 88
WUT-SC18 5.3 to 7 Feet



Photograph 89
WUT-SC19 0 to 1.2 Feet



Photograph 90
WUT-SC19 0.7 to 2.2 Feet



Photograph 91
WUT-SC19 1.6 to 3.2 Feet



Photograph 92
WUT-SC19 3.7 to 5.3 Feet



Photograph 93
WUT-SC19 4.7 to 6.2 Feet



Photograph 94
WUT-SC19 5.6 to 7.2 Feet



Photograph 95
WUT-SC19 7.3 to 8.5 Feet



Photograph 96
WUT-SC20 0.5 to 2.2 Feet



Photograph 97
WUT-SC20 1.6 to 3.3 Feet



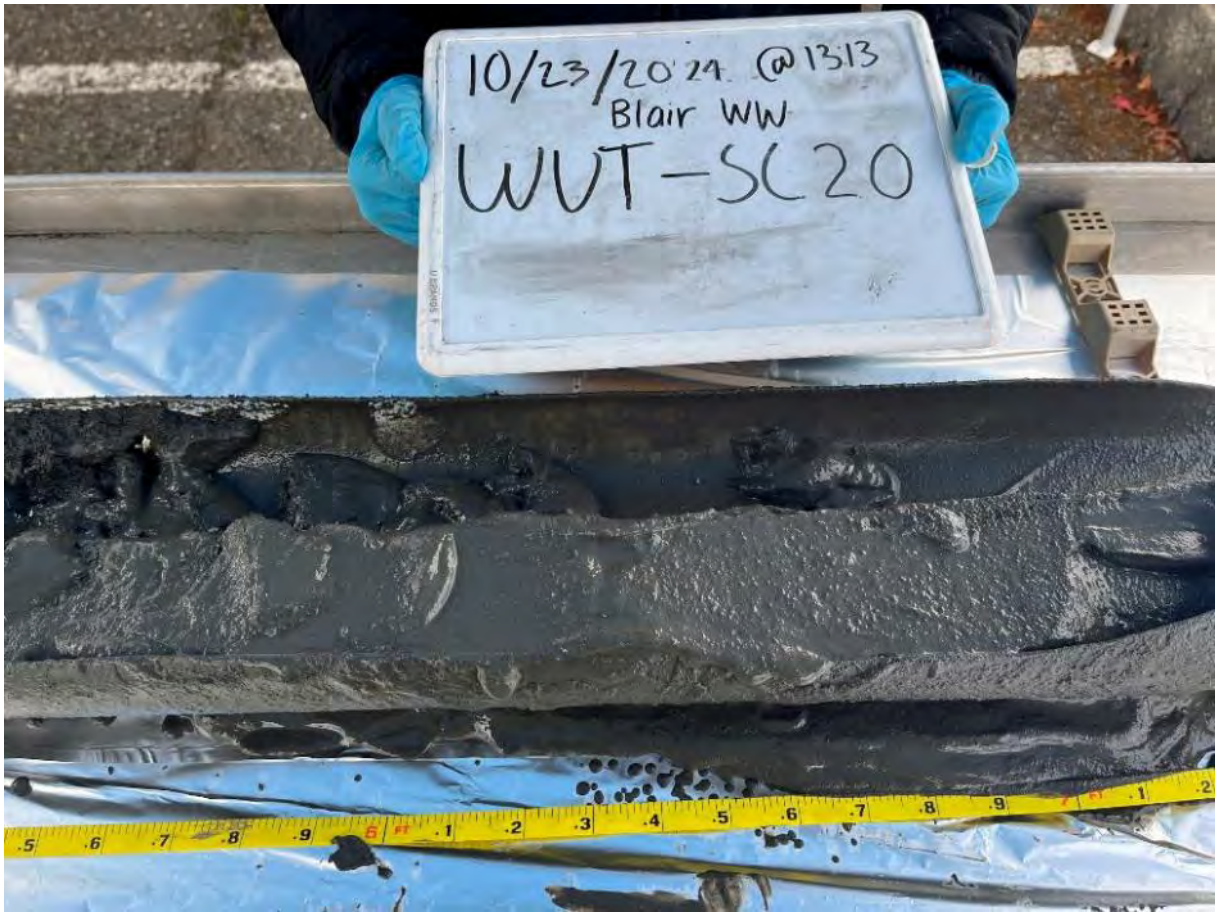
Photograph 98
WUT-SC20 2.6 to 4.3 Feet



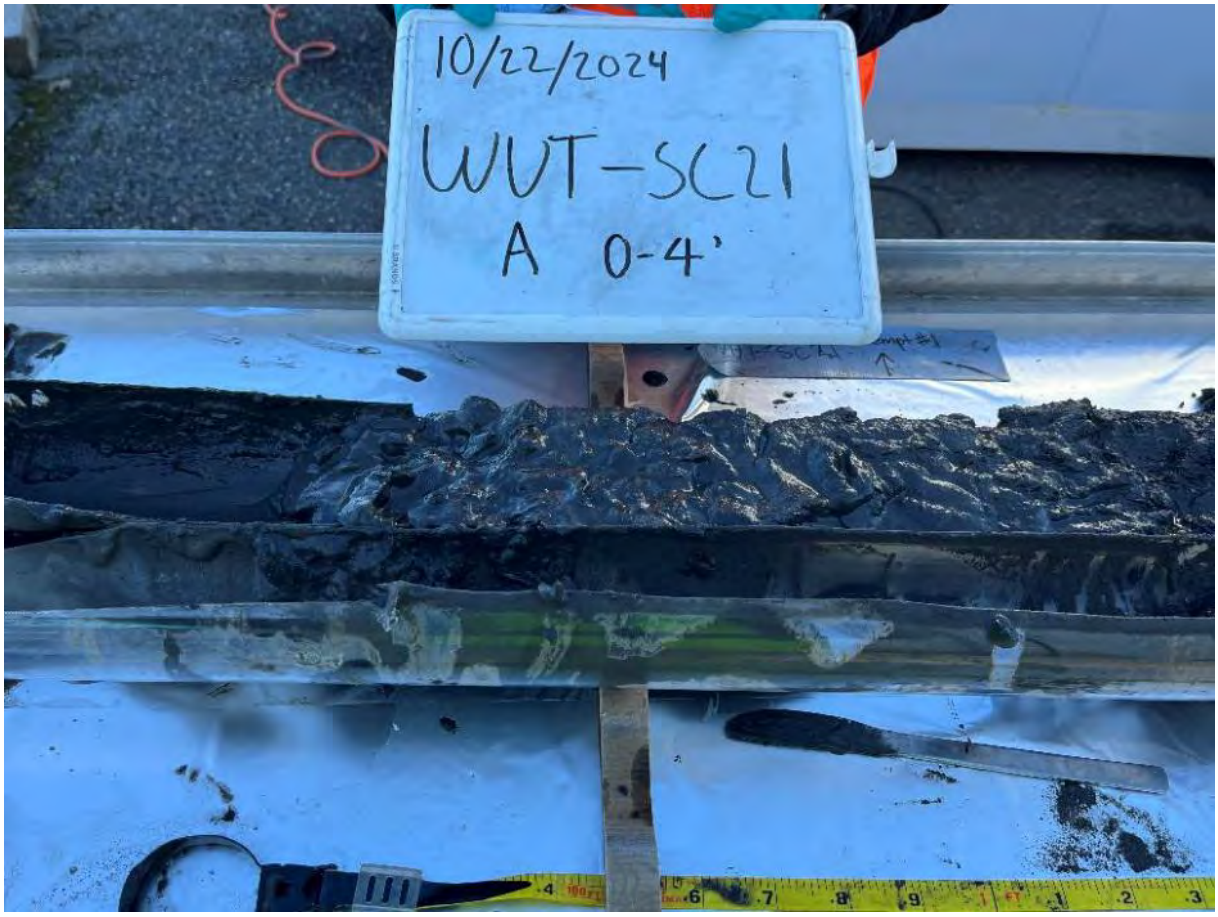
Photograph 99
WUT-SC20 4.5 to 6.2 Feet



Photograph 100
WUT-SC20 5.5 to 7.3 Feet



Photograph 101
WUT-SC21 0 to 1.3 Feet



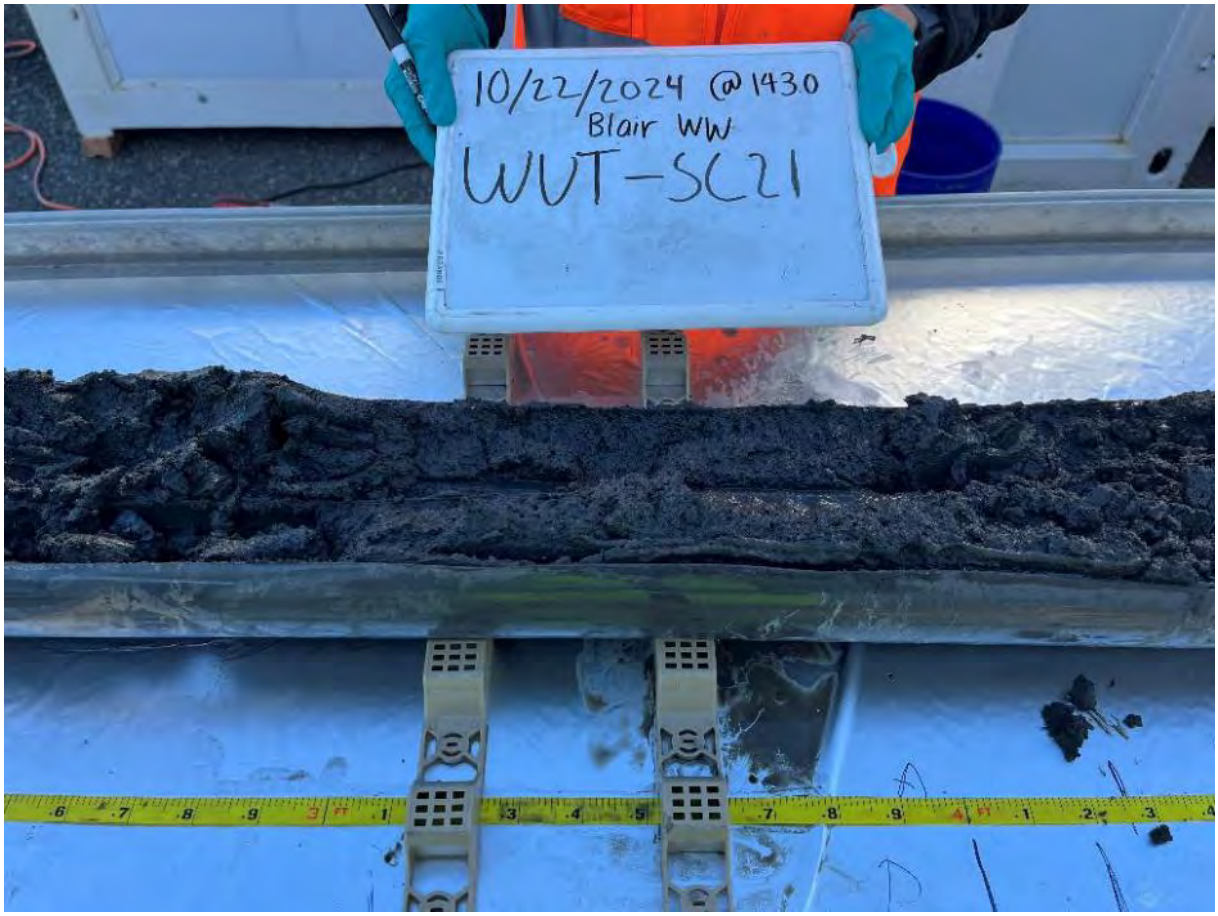
Photograph 102
WUT-SC21 0.6 to 2.3 Feet



Photograph 103
WUT-SC21 1.5 to 3.1 Feet



Photograph 104
WUT-SC21 2.6 to 4.4 Feet



Photograph 105
WUT-SC21 3.7 to 5.2 Feet



Photograph 106
WUT-SC22 0 to 1.6 Feet



Photograph 107
WUT-SC22 1.5 to 3.5 Feet



Photograph 108
WUT-SC22 2.4 to 4.4 Feet



Photograph 109
WUT-SC22 4.5 to 6.6 Feet



Photograph 110
WUT-SC22 6.4 to 8.5 Feet



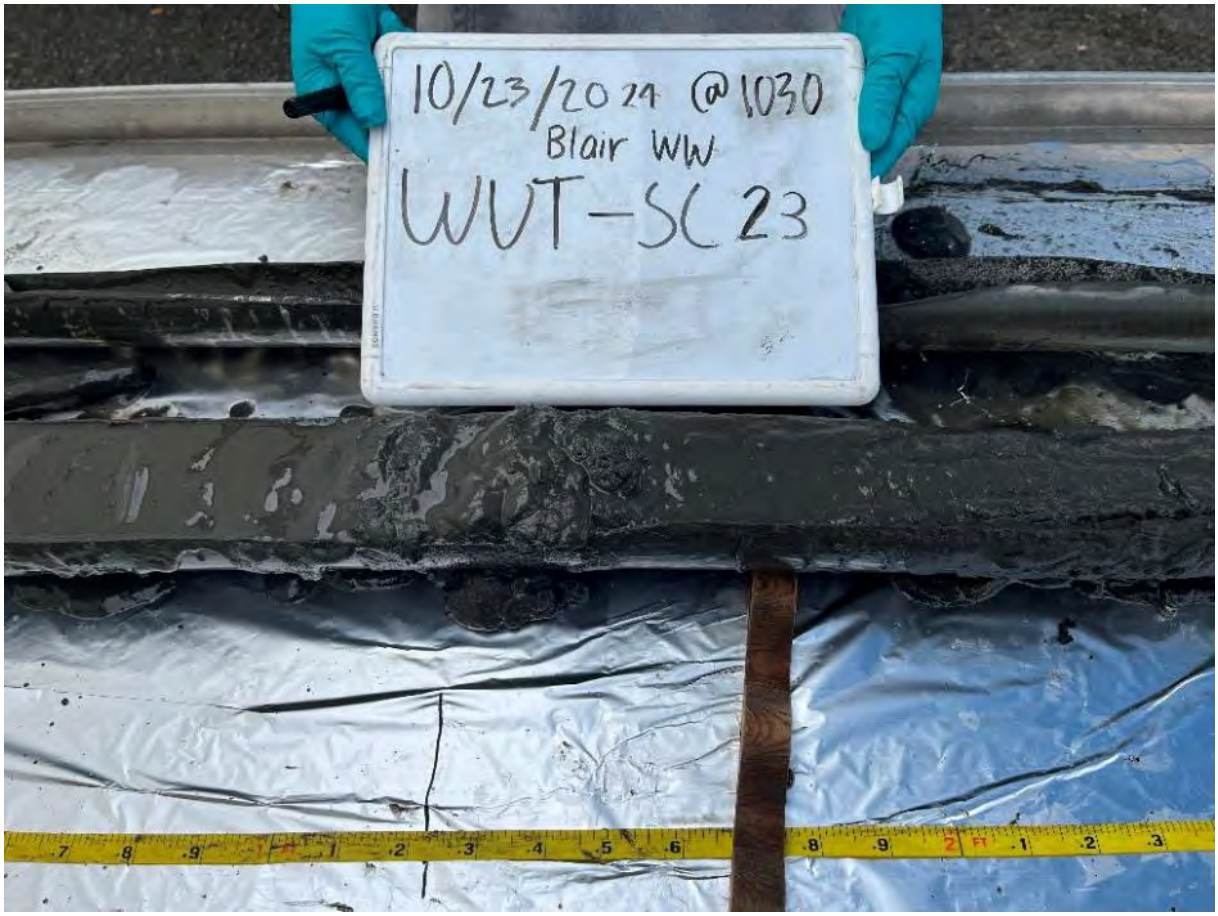
Photograph 111
WUT-SC22 7.4 to 9.1 Feet



Photograph 112
WUT-SC23 0 to 1.2 Feet



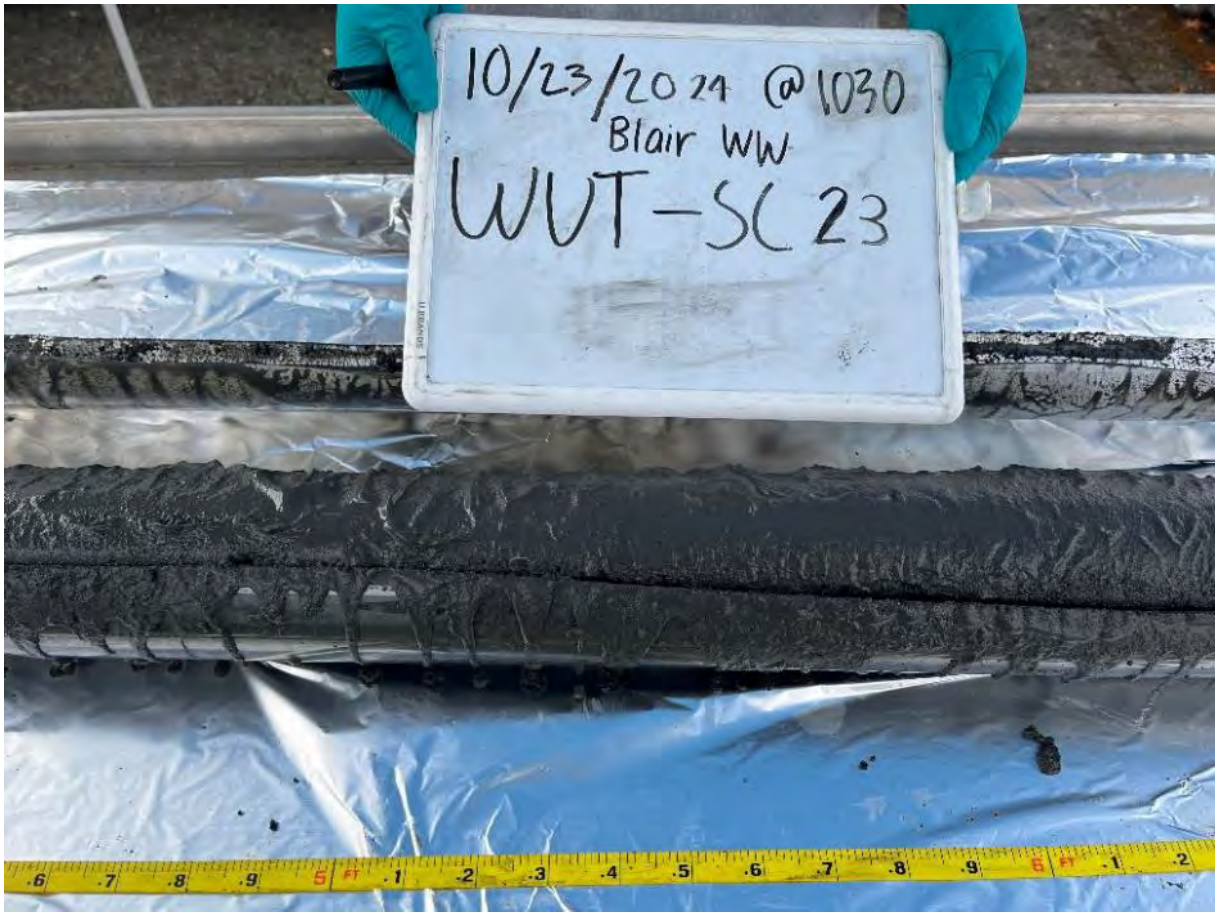
Photograph 113
WUT-SC23 0.7 to 2.3 Feet



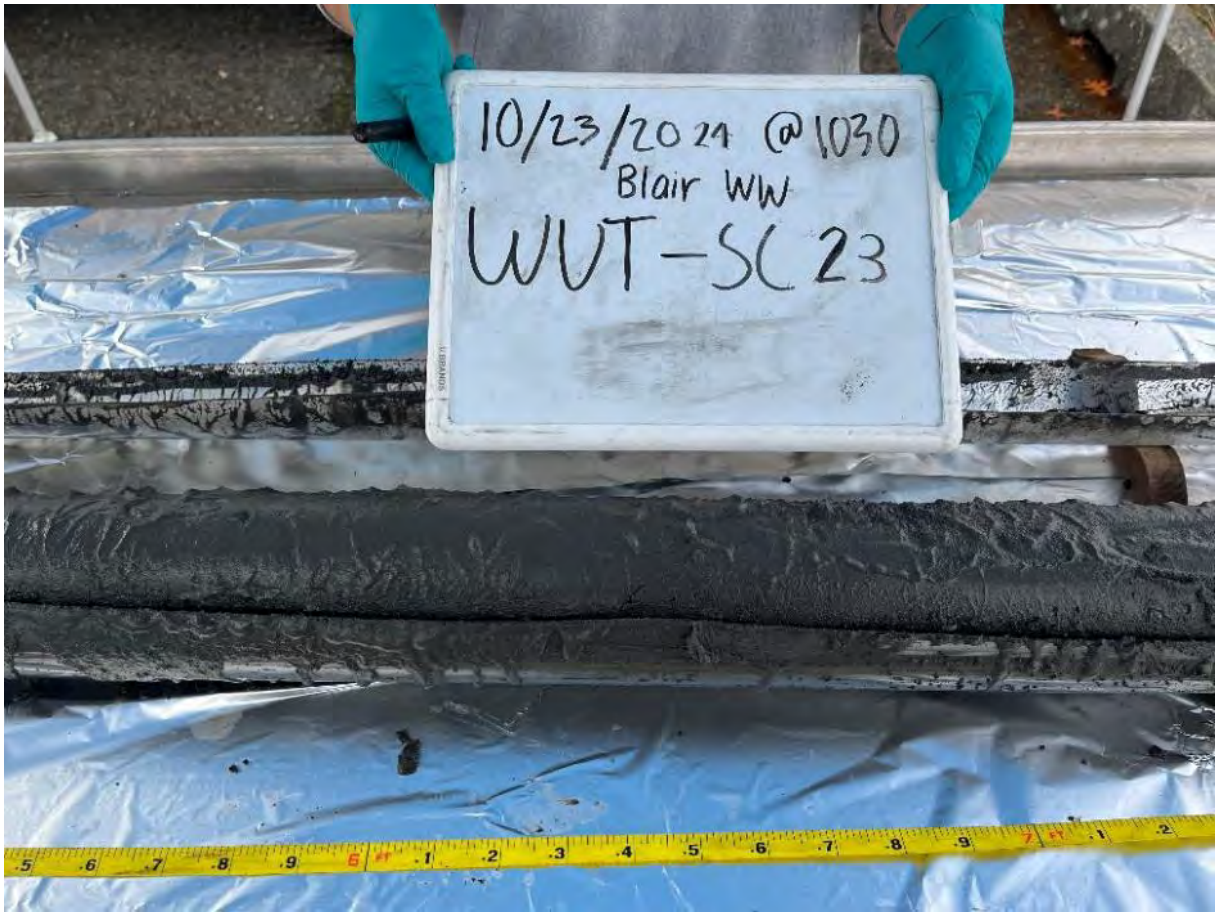
Photograph 114
WUT-SC23 2.6 to 4.2 Feet



Photograph 115
WUT-SC23 4.6 to 6.2 Feet



Photograph 116
WUT-SC23 5.5 to 7.2 Feet



Photograph 117
WUT-SC23 7.3 to 8.5 Feet



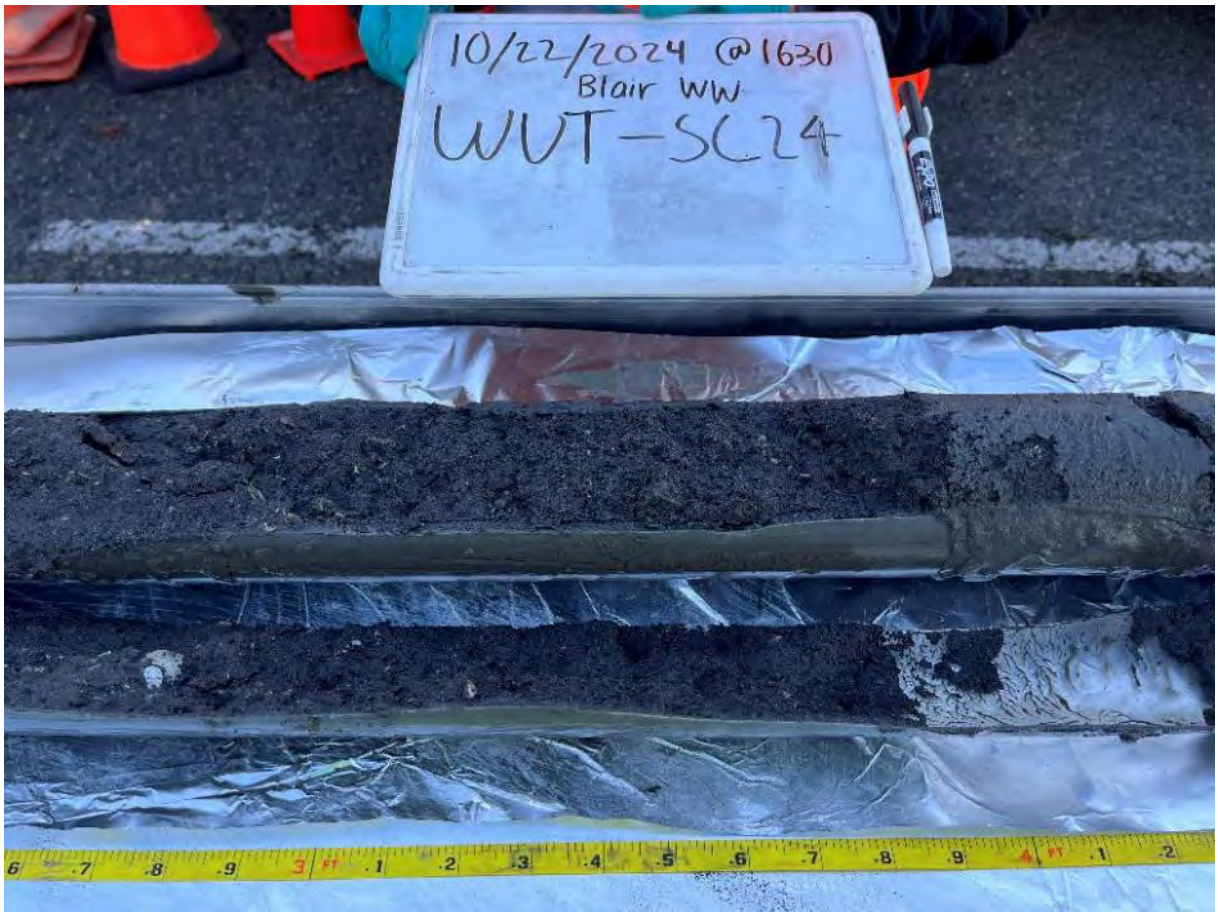
Photograph 118
WUT-SC24 0 to 1.2 Feet



Photograph 119
WUT-SC24 1.6 to 3.2 Feet



Photograph 120
WUT-SC24 2.6 to 4.2 Feet



Photograph 121
WUT-SC24 4.5 to 6.3 Feet



Photograph 122
WUT-SC24 5.3 to 6.5 Feet



Appendix D
Archaeological Monitoring Results Memorandum

949 Market Street, Suite 700
Tacoma, Washington 98402
206.287.9130

ANCHOR QEA

Memorandum

March 5, 2025

To: Tony Warfield, Port of Tacoma

From: Austin Jenkins and Jordan Cooper, Anchor QEA

cc: Norman Gilbert, Sara Potter, and Rob Healy, Port of Tacoma
Dan Berlin and Christine Simmons, Anchor QEA

Re: Archaeological Monitoring Results Memorandum
Blair Waterway Tacoma Harbor Deepening Program – Berths and Tru-Grit Sediment Sampling

Introduction

The Port of Tacoma (Port) conducted a sediment sampling program within the Blair Waterway to inform future dredging of the Washington United Terminals (WUT), Husky Terminal (Husky), and Tru-Grit Abrasives, Inc. (Tru-Grit) site under the Tacoma Harbor Deepening Program (Project). The Project is in Tacoma, Pierce County, Washington, in Sections 27, 34, and 35 of Township 21 North, Range 3 East and Sections 1 and 2 of Township 20 North, Range 3 East. Ground-disturbing activities took place within three sampling areas, as outlined by the Husky and WUT Berth Deepening Sediment Characterization Sampling and Quality Assurance Project Plan (Anchor QEA 2024a), and the Tru-Grit Site Data Gaps Field Investigation Sampling and Quality Assurance Project Plan (Anchor QEA 2024b). The program consisted of the following sampling activities:

- WUT
  - 24 borings (vibracores)
- Husky
  - 3 grab samples (box cores)
  - 27 borings (vibracores)
- Tru-Grit
  - 12 borings (vibracores) on the Upper Slope
  - 12 borings (vibracores) on the Lower Slope

This memorandum summarizes the results of archaeological monitoring completed pursuant to the Archaeological Monitoring and Inadvertent Discovery Plan (MIDP; Anchor QEA 2024c).

Regulatory Context

The sampling is permitted by the U.S. Army Corps of Engineers (USACE) under Nationwide Permit 6 (NWP 6). As such, it is subject to review by USACE under Section 106 of the National Historic Preservation Act (Section 106). Under Section 106 and its implementing regulations (36 *Code of*

Federal Regulations [CFR] Part 800), USACE must consider the effects of their undertakings on historic properties, which include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (36 CFR 800.16[l][1]). Citing stipulations of NWP 6, USACE has determined that the Port's activities will comply with Section 106, provided that the Port report any post-review discovery of historical or archaeological resources. Continued coordination between the Port and the Puyallup Tribe of Indians Tribal Historic Preservation Office (THPO) determined that monitoring would be required. The MIDP (Anchor QEA 2024c) was developed to comply with NWP 6 stipulations and was submitted to THPO.

Methods

The MIDP (Anchor QEA 2024c) established a threshold for archaeological monitoring for any sampling and ground disturbance above approximately -10 feet mean lower low water (MLLW). Borings maps below -10 feet MLLW were expected to have all Holocene deposits removed prior to sampling and thus were not monitored. The MIDP outlined monitoring that would take place and adopted the Puyallup Tribe's Inadvertent Discovery Plan (IDP) with procedures to follow in the event of an inadvertent discovery of archaeological resources or human remains.

Austin Jenkins oversaw the implementation of field methods, and Jordan Cooper conducted the archaeological monitoring. Jenkins meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology. If cultural resources had been encountered, work stoppage, collection, communication, and documentation procedures outlined by Anchor QEA 2024c would have been implemented. None were encountered; therefore, those steps are not recapitulated here.

Results and Conclusions

Jordan Cooper observed and photographed all required sampling activities and made stratigraphic notes. No cultural resources were observed during these activities. A summary of the monitoring conducted for each site is provided in the following sections. Representative core photographs are included in Attachment 1 and core logs are included in Attachment 2.

Washington United Terminals

Within the WUT sampling program, six cores were mapped to meet the -10 feet MLLW threshold and were monitored November 5 to 6, 2024:

- WUT-SC01
- WUT-SC02
- WUT-SC03
- WUT-SC04
- WUT-SC05
- WUT-SC06

Observed sediments across all six cores remained relatively consistent, with generally dark grey medium to coarse sand (Attachment 1, Figures 1 and 2) and varying levels of silt, gravels, and shell content. In the cores that reached at least 6 feet in length, the sand became noticeably coarser around 6 feet (Attachment 1, Figure 1). Trace shell fragments were generally located in the top 2 feet. Core depths ranged from 2.4 feet (WUT-SC06; Attachment 1, Figure 3) to 11.2 feet (WUT-SC04).

Husky Terminal

Of the 30 cores collected at Husky, none fell within the -10 feet MLLW threshold and, as such, none were monitored for cultural resources. All cores collected and sampled at Husky followed the IDP, and no inadvertent discoveries were reported.

Tru-Grit

Within Tru-Grit, six cores were mapped to meet the -10 feet MLLW threshold and were monitored October 29, November 8, and November 13, 2024:

- TG-SC01
- TG-SC02
- TG-SC03
- TG-SC04
- TG-SC05
- TG-SC06

Observed sediments across all six cores remained relatively consistent, with generally dark grey (Attachment 1, Figure 4) or dark brown (Attachment 1, Figure 5), medium to coarse sand and varying levels of silt, gravels, and shell content. Trace shell fragments were generally concentrated in the top 4 feet. TG-SC02 contained a modern concrete chunk at 2 feet, and TG-SC03 and TG-SC06 (Attachment 1, Figures 5 and 6) both contained woody debris starting at approximately 2 feet and continuing to their final depths of 6.3 feet and 7.0 feet, respectively. Core depths ranged from 1 foot (TG-SC01) to 7 feet (TG-SC06).

References

Anchor QEA, 2024a. *Sampling and Quality Assurance Project Plan*. Husky and Washington United Terminals Berth Deepening Sediment Characterization. Prepared for Port of Tacoma. October 2024.

Anchor QEA, 2024b. *Sampling and Quality Assurance Project Plan*. Tru-Grit Site Data Gaps Field Investigation. Prepared for Port of Tacoma. July 2024.

Jenkins, Austin and Jordan Cooper, 2024. Anchor QEA. *Archaeological Monitoring and Inadvertent Discovery Plan.* Blair Waterway Tacoma Harbor Deepening Program [Berths and Tru-Grit] Sediment Sampling. Prepared for Port of Tacoma. October 2024.

Attachment 1
Core Photographs

Figure 1
Representative photograph of WUT-SC01; reaching a depth of 7.0 feet.



Figure 2
Representative photograph of WUT-SC03; reaching a depth of 6.3 feet.



Figure 3
Representative photograph of WUT-SC06; reaching a depth of 2.4 feet.



Figure 4
Representative photograph of TG-SC01; reaching a depth of 1.0 foot.

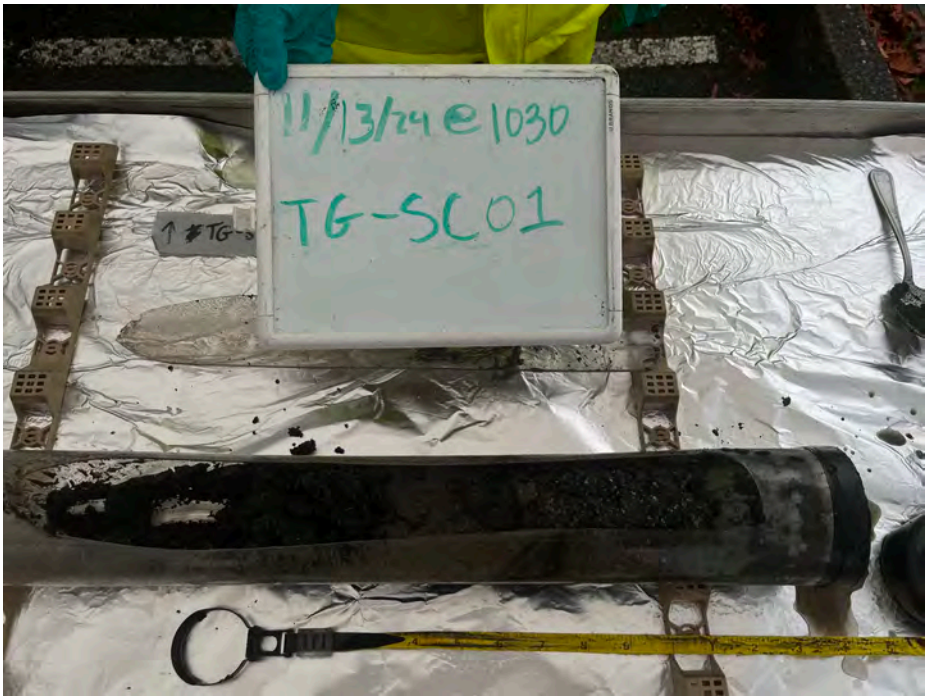


Figure 5
Representative photograph of TG-SC03; reaching a depth of 6.3 feet.



Figure 6
Representative photograph of TG-SC06; reaching a depth of 7.0 feet.



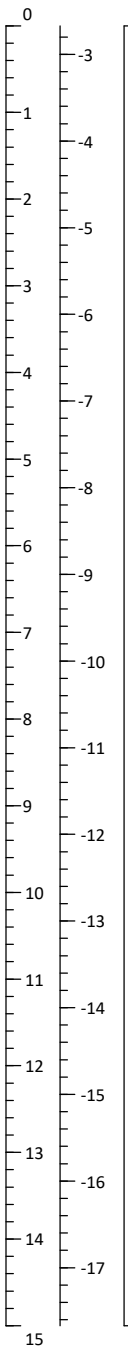
Attachment 2
Core Logs

Sediment Core Log

TG-SC01

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **712752.49**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168428.72**
Client: **Port of Tacoma**	Drive Length (feet): **5.1**	Mudline Elevation (feet): **-2.67 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **1**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **19**	Core Collection Date/Time: **11/13/2024 10:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1	-3 to -4		95	5	0 to 1.0: POORLY GRADED SAND (SP), medium dense, wet, gray, 95% fine to medium sand, 5% fines, trace shell hash throughout. @ 0.3 to 1.0: organic root-like fibers. End of core at 1.0 feet.		-2.67 to -3.67	TG-SC01-A



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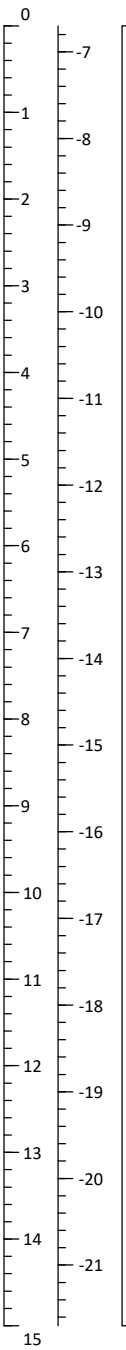
Notes: Archaeological monitoring completed by J. Cooper.
Sample TG-SC01-00-01-241113 (0 to 1 feet) taken and tested for grain size distribution.

Sediment Core Log

TG-SC02

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **712723.21**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168498.06**
Client: **Port of Tacoma**	Drive Length (feet): **3**	Mudline Elevation (feet): **-6.7 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **1.7**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **56**	Core Collection Date/Time: **11/8/2024 13:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 1.7	-6.7 to -8.4	10	80	10	0 to 1.7: POORLY GRADED SAND WITH SILT (SP-SM), medium dense to dense, wet, black gray, 80% fine sand, 10% gravel, 10% fines, trace shell hash throughout. @1.2 to 1.4: concrete chunk.		-6.7 to -8.4	GT-SC02
					End of core at 1.7 feet.			



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Notes: Archaeological monitoring completed by J. Cooper.
Sample TG-SC02-00-1.7-241108 (0 to 1.7 feet) taken and tested for grain size distribution.

Sediment Core Log

TG-SC03

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **712621.92**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168576.22**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-12.09 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.3**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **78**	Core Collection Date/Time: **11/8/24 13:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0			95	5	0 to 0.8: POORLY GRADED SAND (SP), medium dense, wet, black gray with trace red and white grains, 95% fine to medium sand, 5% fines, trace fines. @0.2 to 0.3: white coarse sand pocket.		-12.09 to -14.09	TG-0-2
1	-13				0.8 to 6.3: CLAY (CL), soft to medium stiff, moist, tan, 100% fines, wood chunks throughout, strong H2S-like odor.			
2	-14						-14.09 to -16.09	TG-2-4
3	-15							
4	-16			100			-16.09 to -18.09	TG-4-6
5	-17							
6	-18				End of core at 6.3 feet.			
7	-19							
8	-20							
9	-21							
10	-22							
11	-23							
12	-24							
13	-25							
14	-26							
15	-27							

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Notes: Archaeological monitoring completed by J. Cooper.
Samples TG-SC03-00-0.8-241108 (0 to 0.8 feet) and TG-SC03-0.8-6.3-241108 (0.8 to 6.3 feet) taken and tested for grain size distribution.

Sediment Core Log

TG-SC04

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **712520.13**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168652.63**
Client: **Port of Tacoma**	Drive Length (feet): **7**	Mudline Elevation (feet): **0.1 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.8**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **97**	Core Collection Date/Time: **10/24/2024 11:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 5.7	0.1 to -5.6		95	5	0 to 5.7: WELL GRADED SAND (SW), very loose, wet, black, 95% fine to coarse sand, 5% fines, trace gravel throughout. @3.8 to 4.5: trace white shell hash.		0.1 to -1.9	TG-0-2
							-1.9 to -3.9	TG-2-4
							-3.9 to -5.9	TG-4-6
5.7 to 6.8	-5.6 to -6.7		95	5	5.7 to 6.8: POORLY GRADED SAND (SP), medium dense, wet, gray with trace red and white sand throughout, 95% sand, 5% fines. @5.8 to 6.0: gray silt layer. @5.9: brown wood piece, 0.5 inches.			
6.8	-6.7				End of core at 6.8 feet.			

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Notes: Archaeological monitoring completed by J. Cooper.
Samples TG-SC04-02-04-241029 (2 to 4 feet) and TG-SC04-04-06-241029 (4 to 6 feet) taken and tested for grain size distribution.
Sample TG-SC04-5.8-06-241029 (5.8 to 6 feet) taken and tested for Atterberg limits.

Sediment Core Log

TG-SC05

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **1168779.18**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168779.18**
Client: **Port of Tacoma**	Drive Length (feet): **1.3**	Mudline Elevation (feet): **-0.47**
Location: **Tacoma, Washington**	Recovery Length (feet): **1.6**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **123**	Core Collection Date/Time: **11/13/2024 09:50**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 15	-0.47 to -15.47		90	10	0 to 1.6: POORLY GRADED SAND WITH SILT (SP-SM), loose, wet, dark gray with trace red sand throughout, 90% sand, 10% fines, @0.0: wood debris, 0 to 2 inches in size. @0.7: wood debris, 0.5 inches. @1.2: piece of plastic. End of core at 1.6 feet.		-0.47 to -2.07	TG-SC05

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Notes: Archaeological monitoring completed by J. Cooper.
Sample TG-SC05-00-1.6-241113 (0 to 1.6 feet) taken and tested for grain size distribution.

Sediment Core Log

TG-SC06

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **712371.62**
Project #: **240092-03.06**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1168845.29**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-11.24 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **7**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **87**	Core Collection Date/Time: **11/8/2024 10:55**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 7	-11.24 to -18.24	15	15	70	0 to 1.2: SANDY SILT WITH GRAVEL (ML), soft, wet, black gray, 70% fines, 15, fine to medium sand, 15% fine gravel sized metal shavings. @0.6: grades from soft to medium stiff. @1: rainbow sheen bleb.		-11.24 to -13.24	TG-0-2
1 to 2.7	-12.24 to -13.94		100		1.2 to 2.7: POORLY GRADED SAND (SP), medium dense, moist, dark gray, 100% fine sand, trace fines, faint H2S-like oder.			
2.7 to 7	-13.94 to -18.24			100	2.7 to 7: CLAY (CL), soft, moist, tan, 100% fines, trace wood fibers throughout, moderate to strong H2S-like odor. @2.7: shell fragment. @6: grades to moderate wood fibers.		-13.24 to -15.24 -15.24 to -17.24 -17.24 to -18.24	TG-2-4 TG-4-6 TG-6-7
7	-18.24				End of core at 7.0 feet.			

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Notes: Archaeological monitoring completed by J. Cooper.
Samples TG-SC06-1.5-2.7-241108 (1.5 to 2,7 feet) and TG-SC06-3.1-06-241108 (3.1 to 6 feet) taken and tested for grain size distribution.
Samples TG-SC06-3.1-06-241108 (3.1 to 6 feet) taken and tested for Atterberg limits.

Sediment Core Log

WUT-SC01

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **7.8196.45**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172423.30**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-49.8 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **7.6**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **95**	Core Collection Date/Time: **11/5/2024 09:15**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-50		95	5	0 to 7: POORLY GRADED SAND (SP), loose, moist, dark gray, 95% fine to medium sand, 5% fines, multicolored flecks throughout. @1.1: grades to medium dense to dense.			
1	-51							
2	-52		85	15	@ 2.0: grades to with silt.		-49.8 to -55	WUT-SC01-A
3	-53							
4	-54		95	5	@3.7 grades to trace silt.			
5	-55							
6	-56				@5.6: grades from loose to loose to medium dense. @6.0: grades from fine to medium sand to medium to coarse sand.		-55 to -56.8	WUT-SC01-B
7	-57				End of core at 7.0 feet.			
8	-58							
9	-59							
10	-60							
11	-61							
12	-62							
13	-63							
14	-64							
15								

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Notes: Archaeological monitoring completed by J. Cooper.
Samples WUT-SC01-00-5.2-241105 (0 to 5.2 feet) and WUT-SC01-5.2-07-241105 (5.2 to 7 feet) taken and tested for grain size distribution.

Sediment Core Log

WUT-SC02

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **708179.04**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172328.04**
Client: **Port of Tacoma**	Drive Length (feet): **7**	Mudline Elevation (feet): **-48.5 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.7**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **95.7**	Core Collection Date/Time: **11/5/2024 11:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-49		20	80	0 to 0.8: SILT WITH SAND (ML), soft, wet, dark gray brown, 80% nonplasic fines, 20% fine to medium sand.			
			40	60	@0.4: shell fragment.			
1	-50				0.8 to 2.2: SANDY SILT (ML) grades to higher sand content 60% fines, 40% sand.			
2	-51		80	20	2.2 to 6.7: SILTY SAND (SM), grades to medium dense, higher sand content, moist. 80% sand fine to medium sand, 20% fines.		-48.5 to -55	WUT-SC02-A
3	-52							
4	-53							
5	-54							
6	-55							
7	-56				End of core at 6.7 feet.			
8	-57							
9	-58							
10	-59							
11	-60							
12	-61							
13	-62							
14	-63							
15								

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Notes: Archaeological monitoring completed by J. Cooper.

Sediment Core Log

WUT-SC03

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **1172238.36**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **708266.40**
Client: **Port of Tacoma**	Drive Length (feet): **8**	Mudline Elevation (feet): **-53.98 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **6.7**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **83.8**	Core Collection Date/Time: **11/5/2024 12:00**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-54		85	15	0 to 6.3: SILTY SAND (SM): loose, wet, dark gray, 85% sand, 15% fines, trace shell fragments throughout, moderate H2S-like oder. @0.3: 1.5 to 2.5 inch shells. @1.0: grades from moist to wet.		-53.98 to -54.98	WUT-SC03-A
1	-55						-54.98 to -59.98	WUT-SC03-B
2	-56							
3	-57							
4	-58							
5	-59						-59.98 to -61.28	WUT-SC03-Z
6	-60				End of core at 6.3 feet.			
7	-61							
8	-62							
9	-63							
10	-64							
11	-65							
12	-66							
13	-67							
14	-68							
15								

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Notes: Archaeological monitoring completed by J. Cooper.

Sediment Core Log

WUT-SC04

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **1172241.90**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **708375.78**
Client: **Port of Tacoma**	Drive Length (feet): **12**	Mudline Elevation (feet):**-53.33 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **12**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%):**100**	Core Collection Date/Time: **11/5/2024 13:45**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0 to 15	0 to -15		95	5	0 to 11.2: POORLY GRADED SAND (SP), loose to medium dense, wet, gray black, 95% medium to coarse sand, 5% fines, trace shell hash throughout. @4.3: grades to trace silt. @7 to 8.9: well graded sand.		-53.33 to -55.0	WUT-SC04-A
							-55.03 to -59.03	WUT-SC04-B
							-59.03 to -60.43	WUT-SC04-Z
					End of core at 11.2 feet.			

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Notes: Archaeological monitoring completed by J. Cooper.
Samples WUT-SC04-00-1.7-241105 (0 to 1.7 feet), WUT-SC04-1.7-5.7-241105 (1.7 to 5.7 feet), and WUT-SC04-5.7-7.7-241105 (5.7 to 7.7 feet) taken and tested for grain size distribution.
@3.0 to 3.8: Void in core from partial sloughing. Following depths have been adjusted.

Sediment Core Log

WUT-SC05

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Arno Riolo**	Latitude: **708455.48**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1172053.61**
Client: **Port of Tacoma**	Drive Length (feet): **6.8**	Mudline Elevation (feet):**-50.42 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **5.9**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%):**86.7**	Core Collection Date/Time: **11/06/2024 10:20**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-51		20	80	0 to 1.6: SILT WITH SAND (ML), very soft, wet, brown, 80% nonplastic fines, 20% fine to medium sand, grading sandier downward.			
1	-52				1.6 to 4.6: SILTY SAND (SM), grades from previous unit, gray brown, 60% sand, 40% fines.			
2	-53				@2.4 grades to loose.		-50.42 to -55.02	WUT-SC05-A
3	-54		60	40				
4	-55				@4.0 grades to medium dense.			
5	-56		90	10	4.6 to 5.9: POORLY GRADED SAND WITH SILT (SP-SM), grades from previous unit, 90% sand, 10 % silt		-55.02 to -56.32	WUT-SC05-B
6	-57				@5.3 grades to dense.			
7	-58				End of core @5.9 feet.			
8	-59							
9	-60							
10	-61							
11	-62							
12	-63							
13	-64							
14	-65							
15								

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Notes: Samples WUT-SC05-00-4.6-241106 (0 to 4.6 feet) and WUT-SC05-4.6-5.9-241106 (4.6 to 5.9 feet) taken and tested for grain size distribution. Archaeological monitoring completed by J. Cooper.

Sediment Core Log

WUT-SC06

Sheet 1 of 1

Project: **Blair Waterway Deepening Program**	Logged By: **Ry Pearson**	Latitude: **708547.83**
Project #: **240092-03.03**	Method/Core Diameter: **Vibracore / 4 inches**	Longitude: **1177043.65**
Client: **Port of Tacoma**	Drive Length (feet): **4**	Mudline Elevation (feet): **-51.7 MLLW**
Location: **Tacoma, Washington**	Recovery Length (feet): **2.4**	Horizontal Datum: **NAD83 WA State Plane South (feet)**
Contractor: **Gravity**	Percent Recovery (%): **60**	Core Collection Date/Time: **11/6/2024 11:30**

In-situ Depth (feet)	Elevation (feet MLLW)	% Gravel	% Sand	% Fines	Sediment Description (Density, Moisture, Color, Minor Consttuent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Lithology	Sample Depth (feet)	Sample ID
0	-52		10	90	0 to 0.2: SILT (ML), very soft, wet, dark brown gray, 90% fines, 10% sand.			
1	-53		95	5	0.2 to 2.4: POORLY GRADED SAND (SP), medium dense to dense, moist, dark gray with multicolored flecks, 95% sand, 5% fines, trace shall hash, trace silt.		-51.7 to -54.1	WUT-SC06-A
2	-54				End of core at 2.4 feet.			
3	-55							
4	-56							
5	-57							
6	-58							
7	-59							
8	-60							
9	-61							
10	-62							
11	-63							
12	-64							
13	-65							
14	-66							
15								

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Notes: Archaeological monitoring completed by J. Cooper.

Appendix E
Laboratory Analytical Reports

File included as separate attachment

Appendix F
Data Validation Reports

File included as separate attachment