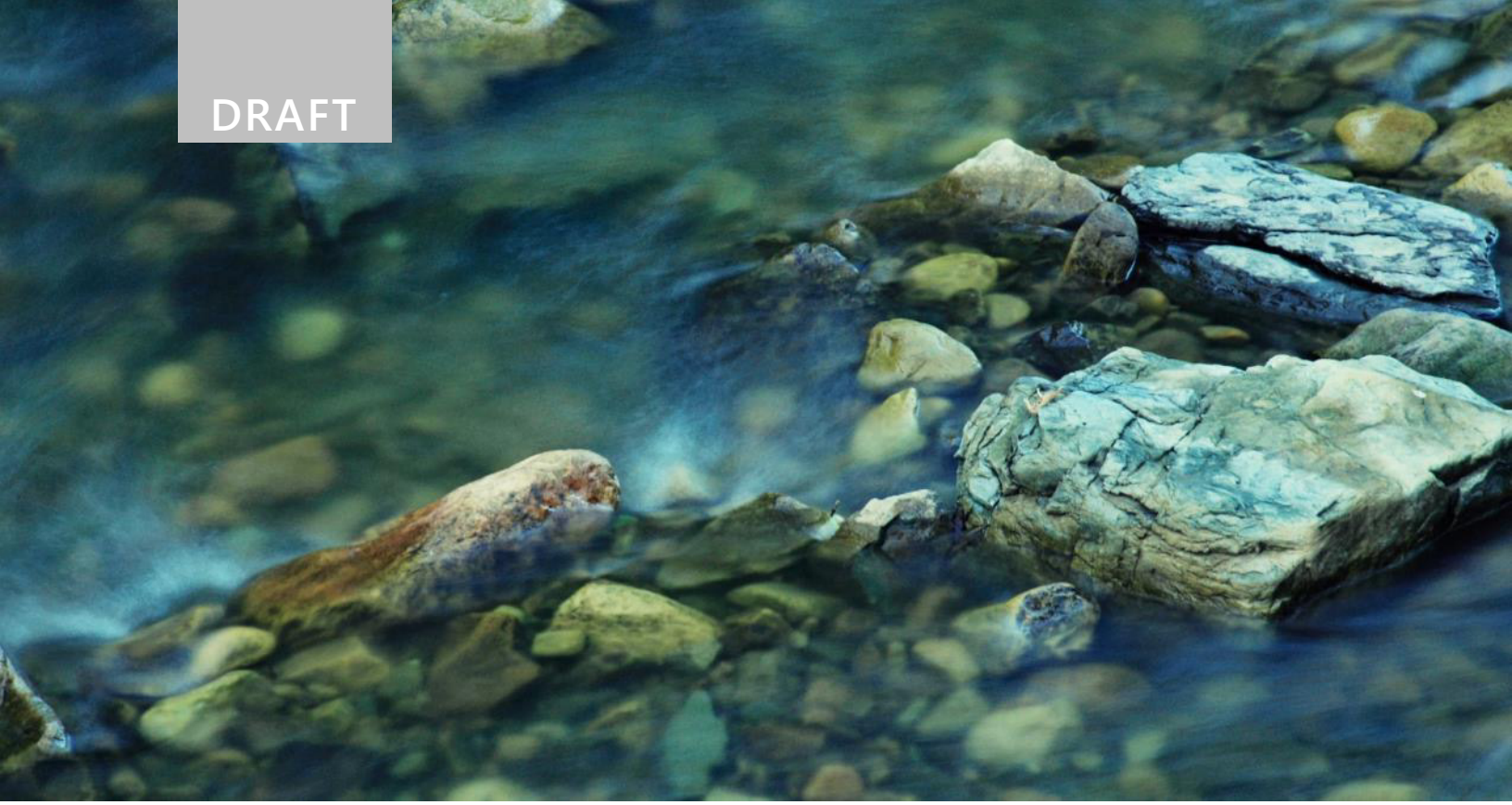
DRAFT



May 2026
Terminal 91 West Cruise Maintenance Dredging Project

ANCHOR QEA

Interim Action Work Plan
Draft Final

Prepared for Washington State Department of Ecology

DRAFT

May 2026
Terminal 91 West Cruise Maintenance Dredging Project

Interim Action Work Plan

Prepared for
Washington State Department of Ecology
Shoreline, Washington

On behalf of
Port of Seattle
2711 Alaskan Way
Seattle, Washington 98121

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

Project Number: 260003-01.01
https://anchorqea.sharepoint.com/sites/PoSea_T-91-Portal/Port Review/T91 Interim Action WP/Terminal 91_Draft Final IAWP_20260501.docx

DRAFT

TABLE OF CONTENTS

1 Introduction 1

2 Site Background 2

2.1 Current and Historical Operations 2

2.2 Discarded Military Munitions 2

2.3 Cleanup Activities Under MTCA 2

3 Environmental Conditions 3

3.1 Environmental Investigations 3

3.2 Past Dredging in the Western Berth Area 3

3.3 Nature and Extent of Contamination 4

3.3.1 Western Dredge Area 5

3.3.2 Eastern Dredge Area 5

3.3.3 Summary 7

4 Overview of the Interim Action 8

4.1 Description of Interim Action 8

4.2 Cleanup Requirements 9

4.3 Anticipated Permits and Substantive Requirements for the Interim Action 9

4.4 Coordination with Final Cleanup 10

5 Interim Action Activities 12

5.1 Dredging 12

5.2 Water Quality Monitoring 12

5.3 Dewatering 13

5.4 Offloading and Disposal 13

5.5 Post-Dredge Sampling 13

5.6 Clean Sand Placement 13

6 Compliance Monitoring 15

7 Quality Assurance/Quality Control 16

7.1 Contractor Quality Control 16

7.2 Construction Monitoring and Field Documentation 16

8 Schedule and Reporting 18

9 References 19

TABLES

Table 3-1 Summary of Benthic SCO Exceedances in the Western Dredge Area 5

Table 3-2 Summary of Benthic SCO Exceedances in the Eastern Dredge Area 7

Table 4-1 Summary of Interim Action Areas 8

FIGURES

Figure 1-1 Overview of Terminal 91 Site and Project Area

Figure 1-2 West Cruise Maintenance Dredging Project

Figure 3-1 Historical Dredge Areas in the Terminal 91 Western Berth Area

Figure 3-2 Surface and Subsurface Sediment Sample Locations

Figure 3-3 Benthic SMS Exceedances in Surface Sediment

Figure 3-4 Benthic SMS Exceedances in Subsurface Sediment

Figure 3-5 Surface Sediment Interpolation of cPAH TEQ

Figure 3-6 Surface Sediment Interpolation of Total PCB Aroclors (dry weight)

Figure 3-7 Surface Sediment Interpolation of Total PCB Aroclors (OC-normalized)

Figure 3-8 Surface Sediment Interpolation of Mercury Concentrations

Figure 3-9 Surface Sediment Interpolation of Dioxin/Furan TEQ

Figure 3-10 Surface Sediment Interpolation of Total Organic Carbon

Figure 5-1 T91 Dredge Areas

Figure 5-2 T91 East Dredge Area Cross Section

Figure 5-3 T91 West Dredge Area Cross Sections

Figure 5-4 Post-Dredge Sediment Sampling Locations

APPENDICES

Appendix A Sediment Data from Project Area

Appendix B Water Quality Monitoring Plan

Appendix C Post-Dredge Sampling Details

ABBREVIATIONS

µg/kg	microgram per kilogram
CAP	Cleanup Action Plan
City	City of Seattle
cm	centimeter
COC	chemical of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CWA	Clean Water Act
cy	cubic yard
DAHP	Department of Archaeology and Historic Preservation
DMM	discarded military munition
DMMP	Dredged Material Management Program
DMMU	dredged material management unit
dw	dry weight
Ecology	Washington State Department of Ecology
FS	Feasibility Study
FUDS	Formerly Used Defense Site
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
IAWP	Interim Action Work Plan
ML	maximum level
MLLW	mean lower low water
MTCA	Model Toxics Control Act
NHPA	National Historic Preservation Act
NWP	Nationwide Permit
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Port	Port of Seattle
PSDDA	Puget Sound Dredge Disposal Analysis
RCW	Revised Code of Washington
RI	Remedial Investigation
SCO	sediment cleanup objective
SCU	sediment cleanup unit
SCUM	Sediment Cleanup User's Manual
SEPA	State Environmental Policy Act
Site	Terminal 91 cleanup site
SL	screening level
SMA	Shoreline Management Act
SMS	Washington State Sediment Management Standards

SVOC	semivolatile organic compound
TEQ	toxic equivalence
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
USC	*United State Code*
VOC	volatile organic compound
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WP	Work Plan
WQC	Water Quality Certification

1 Introduction

This document presents the Interim Action Work Plan (IAWP) for the West Cruise Maintenance Dredging Project, which is located within the Port of Seattle's (Port) Terminal 91 (T91) cleanup site (Site) shown in Figure 1-1. The west cruise berth is located within the approximately 85-acre sediment cleanup unit (SCU) of the Site, which includes both an upland area and the submerged land area (i.e., the SCU). In addition to the west berth, the SCU also includes the central and eastern berths; these areas will not be impacted by the proposed maintenance dredging. Per direction to the Port from the Washington State Department of Ecology (Ecology) in September 2025, the proposed maintenance dredging in the west berth is considered an Interim Action under Model Toxics Control Act (MTCA) Agreed Order No. DE24768 (Ecology 2020). This IAWP is being prepared to address that requirement. The draft Remedial Investigation (RI) for the Site has been developed, but a final RI has not yet been issued. Activities associated with the draft Feasibility Study (FS) were initiated in 2025 and are ongoing; these activities will follow the approach described in the FS Work Plan (WP; Anchor QEA and Windward 2025). This IAWP has been developed to present and characterize the proposed West Cruise Maintenance Dredging Project for review by Ecology under MTCA for the Site.

The proposed West Cruise Maintenance Dredging Project will restore the required berthing depths at Terminal 91 to -35 feet mean lower low water (MLLW), which is needed to allow cruise ships the necessary maneuverability to utilize shore power. This project is being done to comply with the Port Commission's Order No. 2024-08 ("shore power mandate"), which set an accelerated timeline for all cruise ships to utilize shore power at all Port facilities by the 2027 cruise season (Port of Seattle 2024). This mandate will uphold the Port's commitment to operating in an environmentally responsible manner by reducing air pollution and greenhouse gas emissions.

Under Ecology's oversight, the Port proposes to dredge two areas of the west berth to achieve a final elevation of -35 feet MLLW (Figure 1-2). The majority of the dredging will occur along the western edge of the west berth (i.e., the western dredge area). A second smaller dredge area is located along the eastern edge of the west berth adjacent to Pier 91 (i.e., the eastern dredge area).

The Interim Action will be implemented prior to selecting the final cleanup action for the Site and will not prevent the selection or implementation of other reasonable alternatives for the final cleanup action (see Washington Administrative Code [WAC] 173-340-430(3)(b)). Prior to implementation of the Interim Action, construction plans will be presented to Ecology for review and approval.

2 Site Background

The west cruise berth is located within the approximately 85-acre SCU of the Site, which includes both an upland area and the submerged land area (i.e., the SCU; Figure 1-1). In addition to the west berth, the SCU also includes the central and eastern berths; these areas will not be impacted by the proposed maintenance dredging.

2.1 Current and Historical Operations

As described in the FS WP (Anchor QEA and Windward 2025), Pier 90 was constructed in 1913, and Pier 91 was constructed in 1919. From 1913 to 1942, Terminal 91 was owned by the Port, and was used for the loading and unloading of materials (e.g., lumber and coal) and for storing vegetable oil. The U.S. Navy owned Terminal 91 from 1942 to 1976 (making the Site a Formerly Used Defense Site [FUDS]) and used the Site for vessel mooring and repairs (e.g., sandblasting and hull maintenance). Ownership of Terminal 91 was transferred back to the Port in approximately 1976. Recent Port tenants have used the Site for cold storage and maritime services, including commercial fishing vessel berthing/offloading and cruise ship berthing.

2.2 Discarded Military Munitions

Discarded military munitions (DMMs) have been found and removed in the southern portion of central and western berths, leading the Site to be identified by the U.S. Army Corps of Engineers (USACE) as a FUDS, identifier #F10WA012501. The FUDS RI was intended to evaluate the nature and extent of DMMs (USACE 2013) and included a time-critical removal action (conducted in 2011) to identify and remove DMMs. No DMMs or munitions debris were found outside of the Former Seattle Naval Supply Depot area, which was defined in the FUDS RI to include the southern portion of the western and central berths.

2.3 Cleanup Activities Under MTCA

The Port is conducting cleanup studies under oversight by the Washington State Department of Ecology (Ecology) under MTCA Agreed Order No. DE24768 and has completed a draft RI that describes the nature and extent of contaminated sediments in this area. Under the Agreed Order, the Port is currently conducting additional field investigations to inform the FS. The FS (which will evaluate cleanup alternatives) and Cleanup Action Plan (CAP) will lead to a final cleanup action in accordance with the MTCA regulations.

3 Environmental Conditions

This section provides an overview of environmental investigations conducted to date and the results of those investigations in the project area covered by this IAWP.

3.1 Environmental Investigations

Numerous in-water environmental investigations have been conducted at the Site, which have been summarized in the draft RI report (Windward 2023)[1]. Additional investigations are in the process of being conducted as part of the FS WP (Anchor QEA and Windward 2025).

As summarized in the draft RI and in the FS WP, studies to date have confirmed that historical activities resulted in sediment contamination at the Site, particularly in the vicinity of the piers. Polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and mercury are the primary chemicals of concern (COCs) in sediment in the project area.

3.2 Past Dredging in the Western Berth Area

Two focused dredging events have been conducted in the western berth area to increase depth for navigation purposes. Figure 3-1 shows the location of these historical dredge areas along with the current project area.

In 1992, approximately 10,000 cubic yards (cy) of sediment was dredged along the western face of the pier to support expansion of the concrete apron. Three dredged material management units (DMMUs) were established for sediment characterization and one core was collected from each unit along the pier face. The cores were analyzed for metals, PAHs, semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), and pesticides. With the exception of VOCs, detected concentrations in all cores exceeded the Puget Sound Dredge Disposal Analysis (PSDDA) screening levels (SLs), maximum levels (MLs), or bioaccumulation triggers for all chemical groups. Bioassay testing of samples from DMMUs S1 and S3 failed PSDDA guidelines for open-water disposal. The team did not conduct biological testing for DMMU S2; however, because this unit exceeded two MLs, it was also deemed unsuitable for open-water disposal (DMMO 1992).

In 2007 and 2008, the Port dredged 10,768 cy to achieve sufficient navigational depth for cruise ship berthing (-35 feet MLLW, with 1 foot of allowable overdepth to -36 feet MLLW; (DMMP n.d.; Windward 2023). Three DMMUs were developed for sediment characterization. DMMUs 1 and 2 were located in the western berth area and generally overlapped the areas proposed in this IAWP (Figure 3-1), while DMMU 3 was in the central berth area outside of the IAWP area of interest. During the 2006 pre-dredge field investigation, refusal during coring was encountered at almost all locations due to sandy substrate conditions. Only one core from DMMU 1 reached the target depth of -37 feet

[1] Some of these reports can be accessed on the Site's Ecology web page at: https://apps.ecology.wa.gov/cleanupsearch/site/2674.

MLLW (which included a 1-foot Z-layer sample); the second core included in the DMMU 1 composite only reached -30.2 feet MLLW. In DMMU 2, the deepest of the two cores included in the composite reached -34.9 feet MLLW, and a Z-layer sample was not collected. The two cores collected from each DMMU were composited into a single sample per unit.

Core samples were analyzed for conventionals, metals, tributyltin, PCBs, pesticides, PAHs, SVOCs, and VOCs. DMMU 1 did not exceed any Dredged Material Management Program (DMMP) SLs. DMMU 2 exceeded the DMMP SL for dichlorodiphenyltrichloroethane (DDT) but passed bioassay testing. Based on these results, DMMP determined that all material from the western berth area was suitable for open-water disposal (DMMO 2006). All dredged material was placed at the Elliott Bay open-water disposal site (DMMP n.d.).

DMMP required post-dredge sampling and testing because post-dredge bathymetry indicated the Port's contractor dredged deeper than permitted and because the 2006 characterization was not successful in collecting Z-layer samples. In 2008 (after dredging was completed), the project team collected one surface grab sample from DMMU 1 and two surface grab samples from DMMU 2. Surface samples were analyzed for conventionals, metals, organotins, PCBs, pesticides, PAHs, SVOCs, and VOCs. None of the samples exceeded DMMP or Washington State Sediment Management Standards (SMS) criteria, and DMMP concluded that the project met antidegradation standards (DMMO 2008). Appendix A presents the data for these post-dredge surface sediment samples, along with other data discussed in Section 3.3.

3.3 Nature and Extent of Contamination

The draft RI report includes data from 10 surface sediment sample locations and two subsurface sediment sample locations collected within or adjacent to the two dredge areas described in this IAWP. The surface sediment samples were collected as part of four investigations conducted in 2008, 2017, 2021, and 2025. The subsurface sediment samples were collected as part of two investigations conducted in 2021 and 2022. Sample locations are shown in Figure 3-2.

Sample results were screened against the benthic sediment cleanup objectives (SCOs) from the Sediment Cleanup User's Manual (SCUM; Ecology 2025). SCO exceedances are presented in Figures 3-3 and 3-4, for surface and subsurface sediment, respectively. In addition, because no benthic SCO is available for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) or dioxin/furans, these COCs were compared with natural background concentrations of 21 micrograms per kilogram (µg/kg) toxic equivalence (TEQ) and 4 ng/kg TEQ, respectively, as provided in SCUM (Ecology 2025). Figures 3-5 to 3-10 show interpolated chemical concentrations of surface sediments for cPAH TEQs, PCBs (dry-weight and organic carbon (OC)-normalized), mercury, dioxin/furan TEQs, and total organic carbon (TOC). A separate Excel file with the sediment data is provided in Appendix A. The available data for each proposed dredge area are discussed in the following subsections.

3.3.1 Western Dredge Area

Six surface sediment samples have previously been collected within or near the proposed western dredge area (Figure 3-2). Chemical concentrations in this area are generally low; no surface sediment samples exceed the benthic SCO and dioxin/furan TEQs are below natural background (Table 3-1 and Figures 3-3 and 3-9). cPAH TEQs at some locations are higher than the natural background concentration of 21 µg/kg dry weight (dw); no regional background value for Elliott Bay is available for cPAHs at this time. The average cPAH TEQ for samples in this area is 93.6 µg/kg (Figure 3-5), and ranges from 19 to 316 µg/kg.

Table 3-1
Summary of Benthic SCO Exceedances in the Western Dredge Area

Location ID	Sample ID	Sample Depth	Chemicals with Detected Concentrations Greater than the Benthic SCO
DMMP-POS91-AO-0290-S1	T91-PD-01	0-9 cm	None
DMMP-POS91-AO-0290-S2	T91-PD-02	0-9 cm	None
DMMP-POS91-AO-0290-S3	T91-PD-03	0-9 cm	None
T91-FS25-SS101	T91-FS25-SS101	0-10 cm	None
SS-07	T91-2017-SS-07	0-10 cm	None
T91-RI-SS07	T91-RI-SS07	0-10 cm	None

3.3.2 Eastern Dredge Area

Four surface sediment samples and two subsurface sediment cores have previously been collected within or near the proposed eastern dredge area (Figure 3-2). In the eastern dredge area (i.e., along the Terminal 91 west pier face), chemical concentrations in three surface sediment samples exceeded the benthic SCO for individual PAHs, total high-molecular-weight polycyclic aromatic hydrocarbon (HPAHs), total PCB Aroclors, 1,4-dichlorobenzene, and zinc (Table 3-2 and Figure 3-3). cPAH TEQs for all four surface sediment samples were above the natural background concentration. The highest cPAH TEQ was for the sample collected at location SS-06 (1,510 µg/kg), which is located approximately 200 feet north of the eastern dredge area (Figures 3-3 and 3-5). cPAH TEQs for other surface sediment locations near the eastern dredge area range from 84.2 to 307 µg/kg. No samples in this area had dioxin/furan TEQs above natural background (Figure 3-9).

Chemical concentrations in one of the two subsurface sediment locations (T91-RI-SC05) also exceeded the benthic SCO for individual PAHs, total PCB Aroclors, mercury, and 1,4-dichlorobenzene (Table 3-2 and Figure 3-4). These SCO exceedances were limited to the top two intervals, from 0 to 3.8 feet below the mudline (-37.6 to -41.4 feet MLLW). This core was collected approximately 60 feet

away from the pier face so may not be representative of sediment conditions directly adjacent to the pier where dredging is planned. Subsurface concentrations for these chemicals are as follows:

- **PAHs:** The top two intervals of T91-RI-SC05 are associated with the highest subsurface sediment PAH concentrations (both individual PAHs and cPAHs). cPAH TEQs for these intervals range from 944 to 1,110 µg/kg. cPAH TEQs (and concentrations of the individual PAHs) decrease significantly starting at 3.8 feet below the mudline (i.e., -41.4 feet MLLW and below); the range for cPAH TEQs for samples below this elevation is 15.1 to 50.9 µg/kg dw.
- **Total PCB Aroclors:** The total PCB Aroclor concentration in the top interval of T91-RI-SC05 (0 to 2 feet below the mudline) exceeded the benthic SCO (concentration of 63 mg/kg-OC compared to the benthic SCO of 12 mg/kg-OC), but the concentrations in deeper intervals were significantly lower or not detected.
- **Mercury:** Mercury concentrations in the upper two intervals of T91-RI-SC05 ranged from 0.479 to 0.584 mg/kg (i.e., above the benthic SCO of 0.41 mg/kg). These subsurface concentrations were higher than the corresponding surface sediment concentrations. Mercury concentrations in all deeper intervals were below both the benthic SCO and Ecology's natural background concentration of 0.2 mg/kg (Windward 2023).
- **1,4-dichlorobenzene:** The top interval for T91-RI-SC05 (0 to 2 feet below the mudline) also had 1,4-dichlorobenzene concentrations exceeding the SCO, but no exceedances were present in deeper intervals.

Elevated PAH, PCB, and mercury concentrations are present in samples further north along Pier 91 (Figures 3-5 to 3-9), which corresponds to higher levels of TOC as shown in Figure 3-10, but concentrations generally decrease near the south end of the pier (the eastern dredge area). No subsurface intervals were analyzed for dioxins/furans in the eastern dredge area based on relatively low surface sediment dioxin/furan TEQs throughout the western berth (Windward 2023).

Table 3-2
Summary of Benthic SCO Exceedances in the Eastern Dredge Area

Location ID	Sample ID	Sample Depth	Chemicals with Detected Concentrations Greater than the Benthic SCO
Surface sediment samples			
SS-06	T91-2017-SS-06	0-10 cm	**Individual PAHs**, HPAH, total PCB Aroclors, 1,4-DCB
SS-08	T91-2017-SS-08	0-10 cm	None
T91-RI-SS10	T91-RI-SS10	0-10 cm	PCBs
T91-RI-SS13	T91-RI-SS13	0-10 cm	**Zinc**
Subsurface sediment samples			
T91-RI-SC05	T91-RI-SC05A	0-2 feet	Individual PAHs, total PCB Aroclors, Mercury, **1,4-dichlorobenzene**
	T91-RI-SC05B	2-3.8 feet	Individual PAHs, Mercury
	T91-RI-SC05C	3.8-5.8 feet	None
	T91-RI-SC05D	5.8-6.8 feet	None
	T91-RI-SC05E	6.8-8.9 feet	None
T91-RI-SC06	T91-RI-SC06A	0-2 feet	None
	T91-RI-SC06B	2-3.2 feet	None

Note:
Bold: Indicates an exceedance of the cleanup screening level.

3.3.3 Summary

The draft RI (Windward 2023) identifies human health and benthic COCs for the full T91 MTCA site. Compared to the Site as a whole (particularly the central berth area), the western berth area has fewer chemicals that exceed either the benthic SCO or are above natural background for cPAHs and dioxins/furans (Windward 2023). The following provides a summary of the available sediment data for the two proposed dredge areas:

- **Western dredge area:** Concentrations in samples collected in or near this dredge area are generally low; no samples contain concentrations greater than the benthic SCO (Figures 3-3 and 3-4). Concentrations of dioxins/furans are below natural background while cPAHs in some samples are above natural background.
- **Eastern dredge area:** Concentrations in samples collected in or near this dredge area are generally higher than those in the western dredge area; one or more samples in this area have concentrations of PAHs, PCB Aroclors, mercury, zinc, and 1,4-dichlorobenzene above the benthic SCO. Concentrations of dioxins/furans are below natural background while cPAH TEQs are above natural background.

4 Overview of the Interim Action

4.1 Description of Interim Action

Under Ecology's oversight, the Port proposes to dredge up to a maximum volume of 4,740 cy of sediments within a portion of the west berth to achieve a final elevation of -35 feet MLLW (Figure 1-2). Dredging will occur in two areas of the west berth:

- Western dredge area, which is located along the western edge of the west berth (3,980 cy)
- Eastern dredge area, which is located along the eastern edge of the west berth adjacent to the Terminal 91 west terminal (760 cy)

The dredged sediments will be removed, dewatered, and transported for upland disposal. In addition, the Port is coordinating with the USACE FUDS program on the handling of dredged sediments from the eastern dredge area (within the DMM response area). Post-dredge samples will be collected in both areas to provide information for the FS (Section 6).

After dredging and post-dredge sampling are completed, a 9-inch layer of clean sand will be placed in the smaller eastern dredge area where contaminated sediments are known to be located to ensure that the dredge area will meet antidegradation requirements. The approximate volume of clean sand to be placed in the berth area is 100 cy. Clean sand is not planned to be placed in the larger western dredge area, as available data presented in Section 3 indicate that sediment concentrations in the western portion of the berth are below the benthic SCO and thus meet the antidegradation standard for sediment. Although no subsurface sediment data are available in the western dredge area, the post-dredge samples collected after the 2007/2008 recent maintenance dredging (from the post-dredge surface, which had an elevation of approximately -35 feet MLLW) are representative of the expected post-dredge surface. These samples (as described in Section 3.2) were below all relevant criteria.

The required dredge elevation in the western portion of the berth is -35 feet MLLW plus 2 feet of overdredge (-37 feet MLLW). The required dredge elevation in the eastern portion of the berth is -36.5 feet MLLW plus 1.5 feet of overdredge (-38 feet MLLW) to allow for the placement of clean sand after dredging (Table 4-1).

Table 4-1
Summary of Interim Action Areas

Project Area	Target Elevation	Maximum Volume (cy)	Sand Placement
Western dredge area (west portion of the west berth)	-35 feet MLLW plus 2 feet of overdredge (-37 feet MLLW)	3,980	None

Project Area	Target Elevation	Maximum Volume (cy)	Sand Placement
Eastern dredge area (east portion of the west berth along the Terminal 91 pier)	-36.5 feet MLLW plus 1.5 feet of overdredge (-38 feet MLLW)	760	Yes—9 inches nominal thickness (approximate volume of 100 cy)

4.2 Cleanup Requirements

This Interim Action is being conducted to restore the required berthing depths at Terminal 91 to -35 feet MLLW and thus is being driven by maintenance dredging requirements rather than numerical cleanup standards. If post-dredge concentrations indicate the need for further remedial actions, these areas will be addressed as part of the more comprehensive cleanup of the Site. Thus, although this Interim Action does not include actions intended to achieve a final numerical cleanup level for the sediment (which will be developed as part of the FS), the post-dredge surface will be evaluated as part of the FS. Therefore, performance monitoring (which is described in Section 6) will consist primarily of construction quality assurance monitoring to confirm that the Interim Action conforms to Interim Action design drawings and specifications.

4.3 Anticipated Permits and Substantive Requirements for the Interim Action

Interim Action activities associated with dredging, transport, disposal, and placement of antidegradation cover will require federal, state, and local regulatory authorizations. Federally, the Interim Action will be authorized under Section 404 of the Clean Water Act (CWA; 33 *United States Code* [USC] 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) through a USACE Nationwide Permit-38 for Cleanup of Hazardous and Toxic Waste (NWP-38), which applies to remedial actions conducted under a MTCA order.

As part of the federal permitting process, the USACE will conduct required consultation and compliance under Section 7 of the Endangered Species Act (16 USC 1536), Section 106 of the National Historic Preservation Act (NHPA; 54 USC 306108), Coastal Zone Management Act (16 USC 1451–1466), and National Environmental Policy Act (42 USC 4321–4370h). The USACE will also consult with affected treaty Tribes, including the Muckleshoot Indian Tribe and Suquamish Indian Tribe, prior to issuing the permit.

An individual CWA Section 401 Water Quality Certification (WQC; 33 USC 1341) is not required because Ecology has issued a blanket Section 401 WQC for activities authorized under the NWP-38. State water quality conditions and monitoring requirements will be addressed by Ecology through review of the IAWP (Section 5.2), and a separate site-specific water quality monitoring plan (see Appendix B).

The Port will serve as the lead agency to conduct environmental review of the interim action activities under the State Environmental Policy Act (SEPA; Revised Code of Washington [RCW] Chapter 43.21C). The Port will coordinate with Ecology regarding the timing of SEPA public comment for the SEPA threshold determination, taking into consideration the schedule for public comment on the IAWP (WAC 197-11-268).

Because the work will be conducted under a MTCA Interim Action, the project activities are exempt from the procedural requirements of most state and local permits (RCW 70A.305.090). However, MTCA requires that clean up actions comply with the substantive requirements of otherwise applicable state and local regulatory authorizations. Consistent with prior MTCA cleanup actions, the Port will support Ecology in coordinating with state and local agencies to demonstrate substantive compliance. The substantive requirements of the following approvals will be addressed during design and permitting.

- **Hydraulic Project Approval:** The Washington Department of Fish and Wildlife (WDFW) is the lead agency for issuing a Hydraulic Project Approval under the Washington State Hydraulic Code (RCW Chapter 77.55). The Port and Ecology will coordinate with WDFW to ensure substantive compliance of the interim action activities with the Hydraulic Code.
- **Shoreline Permit:** The City of Seattle (City) is the local jurisdiction responsible for shoreline consistency under the Shoreline Management Act (SMA; RCW Chapter 90.58). For cleanup actions conducted under MTCA, shoreline permits are not required, and the SMA regulations defer site-specific review authority to Ecology (WAC 173-27-044). Ecology will consider the substantive provisions of the City's Shoreline Master Program (Seattle Municipal Code 23.60A.020.C.16) during review of the cleanup action.

4.4 Coordination with Final Cleanup

The Port has completed the draft RI report (Windward 2023). Following the approach described in the FS WP (Anchor QEA and Windward 2025), field activities to support the FS began in 2025 and work on the draft FS is anticipated to begin later in 2026. The Agreed Order for the Site allows for an interim remedial action to be completed in coordination with Ecology. The Port is planning to complete the West Cruise Maintenance Dredging Project as an Interim Action because it will occur prior to Ecology issuing a Final CAP for the Site. The Interim Action cleanup area is a subset of the overall preliminary Site cleanup area.

As described in Section 4.2, this Interim Action does not include actions intended to achieve a final numerical cleanup level for the sediment because they have not been developed. The Interim Action is expected to reduce the amount of contaminated sediment present in the western berth, and the cover layer in the eastern dredge area is intended to meet antidegradation requirements and reduce potential threat of Site contaminants to human health and the environment. The Interim Action will

not preclude reasonable alternatives for the final cleanup action (WAC 173-340-430(3)(b)). The FS will identify appropriate alternatives for the final cleanup of the Site and will determine if the Interim Action meets cleanup standards.

5 Interim Action Activities

5.1 Dredging

Berth dredging in the Terminal 91 West Berth will occur for high spot areas within the area delineated in Figure 5-1. The approximate length of the West Berth is 1,200 feet. Areas above -35 feet MLLW in the West Berth (i.e., high spots) will be mechanically dredged to a required dredge elevation of -35 feet MLLW in the western dredge area and -36 feet MLLW in the eastern dredge area. Cross sections for these areas are shown in Figures 5-2 and 5-3. Dredging will be conducted by a crane/excavator mounted on a flatdeck barge. Because of the limitation of this equipment to achieve exact elevations, overdredge tolerances are required. In the berth dredging area, up to 1.5 or 2 feet of overdredge will be allowed. Either a traditional clamshell digging or rehandling bucket or a closed bucket will be utilized to excavate the sediment. The Contractor will select the type of bucket to be used depending upon the site conditions encountered. A closed bucket, which is designed to help reduce resuspended sediment, typically is ineffective at dredging dense material and at removing debris. A traditional digging bucket will be used to dredge areas containing debris or denser substrate.

For berth dredging, the Contractor may use either a barge-mounted crane that uses a bucket on a cable to dredge the sediment, or a barge-mounted hydraulic excavator that uses a bucket on the end of a hydraulic arm to dredge the sediment.

Within the eastern dredge area alongside the pier, the dredge cut thickness ranges between 1 foot and 4 feet, with an average thickness of 2 feet. No dredging is planned under the pier but there will be some limited underpier slough material that will be accounted for in the dredge prism. Within the western dredge area, the dredge cut thickness ranges between 0.5 foot and 3 feet, with an average cut thickness of 1 foot.

5.2 Water Quality Monitoring

Potential water quality impacts during dredging can be minimized by implementing a water quality sampling and reporting program. A tiered turbidity water quality monitoring program includes a higher frequency of sampling early in the project, and less frequent monitoring once the Contractor has shown consistent compliance with water quality criteria. This methodology provides more timely information to the construction manager when the Contractor exceeds water quality criteria.

Water quality monitoring will be conducted under the Port of Seattle Maintenance Dredging Water Quality Monitoring Plan (base plan) that was developed to describe water quality standards for Port dredging projects, including this project at T-91 (Appendix B). Appendix B also contains a Water Quality Monitoring Plan Supplement that provides detailed methodology, monitoring protocols, best management practices, and corrective actions to be taken during dredging and cover placement

activities conducted for the T-91 Interim Action. Monitoring will follow the protocol for dredge material that is unsuitable for open water disposal, as described in the Water Quality Monitoring Plan Supplement.

5.3 Dewatering

Dewatering of the dredged sediment will occur on the flatdeck barge; the return water will be filtered to remove suspended solids and reenter the bay adjacent to the point of dredging. The sideboards and scuppers of the barge will be covered by a filter media such as straw bales and/or geo-textile fabric to filter and retain sediment while allowing water to drain back into the surface water at the point of dredging. The dredged material will be placed on the barge in a heap to promote drainage of excess water to the scuppers. No overtopping of the sideboards will be allowed, and no free water will be directly discharged back into the surface waters without passing through the filter media to prevent release of suspended sediments.

5.4 Offloading and Disposal

The dredged material barge will be transported directly to an off-site dock managed by the disposal facility and offloaded. To contain all excess sediment that may be spilled during this offloading process, a spill-prevention apron will be used that extends out to the barge such that any spilled material will fall back into the barge and not into the site waters. Any spillage on the apron will be removed as soon as practicable and properly disposed.

Once transloaded, the dredged material will be transported to an approved Subtitle D landfill facility. Water absorbent additives such as fly ash, cement, diatomaceous earth or lime may be added prior to off-site transport to facilitate transportation. Additionally, the haul trucks, containers and/or rail gondolas will be lined to prevent release of any sediment or effluent during transportation.

5.5 Post-Dredge Sampling

After dredging is complete, but prior to the placement of clean sand (applies only to the eastern dredge area), post-dredge sampling will be conducted within the project area. Post-dredge sampling will consist of the collection of six surface sediment samples within the dredge areas (0 to 30 centimeters [cm]) – three samples will be collected from the west dredge area and three samples will be collected from the east dredge area. In addition, two surface sediment samples (0 to 10 cm) will be collected adjacent to the western dredge area (Figure 5-4). Specific sample locations and other details are provided in Appendix C.

5.6 Clean Sand Placement

Following dredging, a nominal 9-inch clean sand layer will be placed in the dredge area in the eastern dredge area portion by the pier (Figure 5-2). The sand will be obtained from an approved

commercial sand supplier and will be barged to the Site. The clean sand is not intended to be a cap. Rather, the sand will mix with the underlying sediment to provide a useable substrate for benthic species in the berth area in the eastern dredge area until the more comprehensive cleanup of the Site is undertaken. Several methods may be used by the Contractor to place the clean sand layer, however all methods will be mechanical placement methods. The likely mechanical placement method uses a barge-mounted crane. The crane placement method involves taking a bite of sand from a barge carrying the sand and slowly releasing the sand from the bucket as the operator methodically moves the bucket in a sweeping motion from side to side. This method ensures a consistent spread of material that will evenly fall through the water column and be deposited in the proper location. The sand will be tested against Ecology SMS criteria and approved by Ecology for use as the clean sand layer prior to placement activities.

6 Compliance Monitoring

MTCA requires compliance monitoring for all cleanup actions, including Interim Actions, as described in WAC 173-340-410. Compliance monitoring is required to be conducted for the following three purposes:

- Protection monitoring: Confirm that human health and the environment are adequately protected during construction, operation, and maintenance associated with the cleanup action.
- Performance monitoring: Confirm that the cleanup action has attained cleanup standards and any other performance standards.
- Confirmational monitoring: Confirm the long-term effectiveness of the cleanup action once the cleanup standards and other performance standards have been attained.

As described in WAC 173-340-410, the first type of compliance monitoring (protection monitoring) will be addressed as part of the Health and Safety Plan to be developed by the Contractor. Protection of the environment will be confirmed with water quality monitoring, as described in Section 5.2 and Appendix B.

As described in Section 4.2, this Interim Action does not include actions intended to achieve a final numerical cleanup level for the sediment because they have not been developed. Therefore, the second and third types of compliance monitoring (i.e., performance monitoring and confirmational monitoring) will consist primarily of construction quality assurance monitoring (such as a bathymetric survey) to confirm conformance with the Interim Action design drawings and specifications. In addition, as described in Section 5.5, post-dredge sampling will be conducted to inform the development and evaluation of remedial alternatives in the FS.

7 Quality Assurance/Quality Control

7.1 Contractor Quality Control

The Contractor's Quality Control Plan must be reviewed and approved by the Port Engineer prior to construction and will also be provided to Ecology for review and approval prior to construction. The Contractor will be required to submit a Quality Control Plan and Quality Control Reports. The Quality Control Plan will include the following:

- A statement of the company's quality control policies
- Company organization and designation of responsibility
- Qualifications of quality control personnel
- Employee quality control awareness and protocols
- Procedures for incorporating all subcontractors' quality control plans
- Description of routine daily and periodic quality control activities
- A description of examination, testing or inspection activities, including certifications and reports
- Procedures to communicate and control design changes and revisions in the field
- Submittal control procedures
- Procedures for nonconformance reporting and disposition
- A list of publications or references governing work on the job site
- Exhibits of any quality control forms or checklists routinely used
- Survey control plan

The Contractor's quality control representative will maintain daily quality control reports for each workday. The daily reports will be factual records reporting test results and quality control activities and will be verified by the Contractor's quality control representative.

7.2 Construction Monitoring and Field Documentation

Requirements for construction monitoring and field documentation will be provided in the Quality Control Plan and will include, but not be limited to, the following:

- **Water Quality:** The Contractor will be subject to the requirements and procedures specified in the Water Quality Monitoring Plan (Appendix B). The Contractor will be required to provide written acknowledgement of understanding of all requirements and procedures contained in the Water Quality Monitoring Plan with respect to water quality monitoring, best management practices, and notification procedures.
- **DMM:** If a DMM is discovered or removed via dredging, Port Security will take custody of the DMM. The Port is coordinating the handling of DMMs with USACE FUDS. Details regarding

the treatment of DMMs during dredging will be presented in a separate plan (e.g., the Contractor's work plan).

- **Cultural Resource Monitoring and Inadvertent Discovery:** Terminal 91 is a highly modified industrial waterfront facility. Anchor QEA reviewed basic information, including the proposed dredging limits, historical dredging, and existing cultural resources records and investigations in the vicinity of the project area, contained in the Department of Archaeology and Historic Preservation's Washington Information System for Architectural and Archaeological Records Data (WISAARD). Based on this review, the proposed project area has a low likelihood of encountering significant archaeological deposits and human remains within upper sediments that have been previously removed or recently deposited (Hodges 2007). The presence of DMMs at the Site represents a recorded archaeological resource that has been at least partially removed and which was previously determined to be not eligible for listing in the National Register of Historic Places (DAHP 2026). As part of federal permitting process (see Section 4.3), the Port will coordinate with the USACE for compliance with Section 106 of the NHPA, and the Contractor will be required to follow applicable conditions of the permit authorization related to cultural and historical resources.

8 Schedule and Reporting

Pending public review of this IAWP (scheduled for June/July 2026) and Ecology approvals, Interim Action-related construction work is scheduled to begin no earlier than November 2026. A detailed project schedule will be established at the time of contractor selection and will be provided to Ecology. Work will be conducted within the in-water work window, which is expected to be September 1 through February 15 and will be documented in the permit issued by USACE.

Upon completion of Interim Action construction activities (anticipated to occur in early 2027) and receipt of validated post-dredge sample data, an Interim Action Completion Report will be prepared and submitted to Ecology for review and approval. The Interim Action Completion Report will include the following:

- Description of construction and monitoring activities
- Final bathymetric survey data
- Results of the post-dredge sediment sampling

The Interim Action will be integrated into the final Site cleanup action that will be completed following finalization and Ecology approval of the Site RI/FS and CAP for the Site. A final CAP is anticipated within the next several years.

9 References

Anchor QEA and Windward, 2025. *Terminal 91 Sediment Cleanup Unit: Feasibility Study Work Plan*. Final. Submitted to the Washington State Department of Ecology April 14, 2025. Anchor QEA, Seattle, Washington.

DAHP (Department of Archaeology and Historic Preservation), 2026. WISAARD Database. Archaeological site number 45KI0133. Accessed February 23, 2026. https://wisaard.dahp.wa.gov/.

DMMO (Dredged Material Management Office), 1992. *Decision on the Suitability of Dredged Material Tested Under PSDAA Guidelines for the Port of Seattle Terminal 91 Project (92-2-008-11), for Disposal at the PSDDA Elliott Bay Open-Water Nondispersive Site*. Prepared by the Dredged Material Management Office, U.S. Army Corps of Engineers, Seattle District. November 18, 1992.

DMMO, 2006. *Determination on the Suitability of Proposed Dredged Material from the Port of Seattle T-91 in Smith Cove, Seattle, Washington (File # 200601091) Evaluated Under Section 404 of the Clean Water Act for Open-Water Disposal at the Elliott Bay DMMP Disposal Site*. Prepared by the Dredged Material Management Office, U.S. Army Corps of Engineers, Seattle District. November 9, 2006.

DMMO, 2008. *DMMP Supplemental Determination on the Sediment Quality of the Exposed Sediment Surface After Dredging to Verify Compliance with the Washington State Antidegradation Policy for the Port of Seattle T-91 (T-91), Seattle Washington Maintenance Dredging Project (200601091)*. Prepared by the Dredged Material Management Office, U.S. Army Corps of Engineers, Seattle District. August 14, 2008.

DMMP, n.d. *Dredged Material Management Program Biennial Report*: *Dredging Years 2008/2009*. Prepared by the Dredge Material Management Program Agencies.

Ecology (Washington State Department of Ecology), 2008. *Dioxins, Furans, and other Contaminants in Surface Sediment and English Sole Collected from Greater Elliott Bay (Seattle)*. Pub. No. 08-03-017. Environmental Assessment Program, Washington State Department of Ecology, Olympia, Washington.

Ecology, 2020. Agreed Order No. DE 24768. Washington State Department of Ecology.

Ecology, 2025. *Sediment Cleanup User's Manual (SCUM)*. Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Fourth revision December 2025. Pub. No. 12-09-057. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, Washington.

Hodges, C., 2007. Northwest Archaeological Associates, Inc. Letter to: Jason Jordan, Port of Seattle. Regarding: Results of Archaeological Fieldwork, Pier 91 Berth Dredging, Seattle, Washington. On file at Department of Archaeology and Historic Preservation, Olympia, Washington.

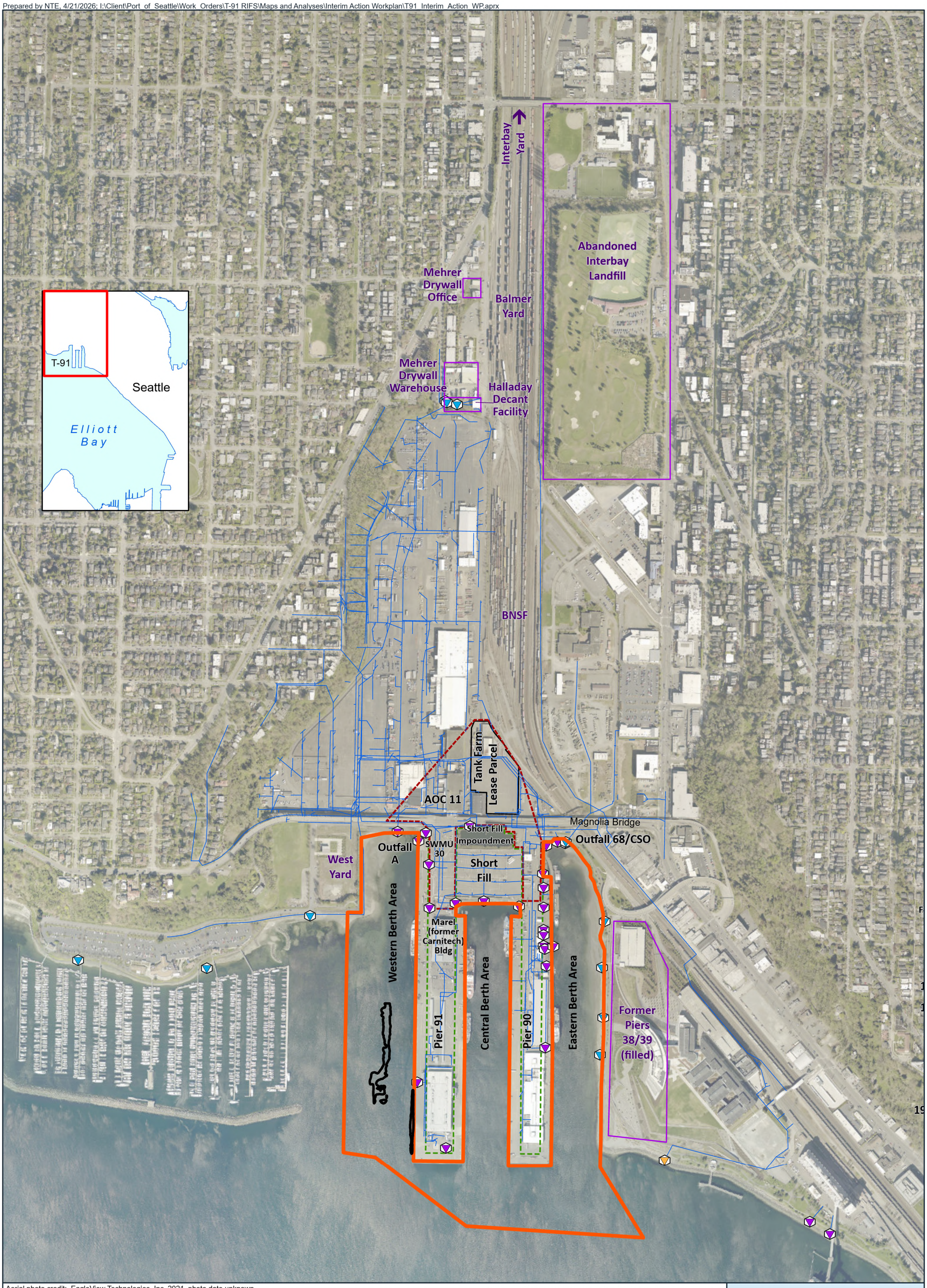
Port of Seattle, 2024. Order No. 2024-08 – Cruise Ships and Shore Power Utilization. Adopted June 11, 2024. Accessed February 5, 2026. https://www.portseattle.org/sites/default/files/2024-06/Order%20No%202024_08.pdf.

USACE (U.S. Army Corps of Engineers), 2013. *Former Seattle Naval Supply Depot, Piers 91 and 91 – Port of Seattle. Formerly Used Defense Site #F10WA012501. Remedial Investigation, Draft Final Report*. U.S. Army Corps of Engineers, Omaha Military Munitions Design Center, Omaha, Nebraska.

Windward (Windward Environmental LLC), 2023. *Terminal 91 Submerged Lands Remedial Investigation.* Revised Draft. Submitted to the Washington State Department of Ecology December 22, 2023. Windward Environmental LLC. Seattle, Washington.

Figures

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

- City outfall
- Other outfall
- Port outfall
- Drain line
- Tank farm affected area
- Pier head line
- Adjacent property
- Interim Action dredge area
- Preliminary SCU boundary

0 300 600
Feet

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

Overview of Terminal 91 Site and Project Area

Seattle, WA

FIGURE 1-1

DRAFT
MAY 1, 2026

BARR



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

Interim Action dredge area

T-91 AO SCU boundary

Elevation

- > 0
- > -4 and ≤ 0
- > -10 and ≤ -4
- > -20 and ≤ -10
- > -30 and ≤ -20
- > -40 and ≤ -30
- > -50 and ≤ -40
- > -75 and ≤ -50
- ≤ -75

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

N

0 300 600

Feet

DRAFT
MAY 1, 2026

West Cruise Maintenance Dredging Project

Seattle, WA

FIGURE 1-2

BARR

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

Stormwater structures

- Port outfall
- Interim Action dredge area

Approximate Historical Dredge Areas

- Approximate dredge area (1990s)
- Approximate dredge area (2007/2008)
- T-91 AO SCU boundary

0 300 600

Feet

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

Historical Dredge Areas in the Terminal 91 Western Berth area

Seattle, WA

FIGURE 3-1

DRAFT

MAY 1, 2026

BARR

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx

Surface sediment location
- Windward 2025
- Windward 2021
- Windward 2017
- Windward 2016
- Post-Dredge Evaluation 2008

Subsurface core location
- Windward 2022
- Windward 2021
- Windward 2014
- Windward 2013
- -4 ft MLLW contour

Stormwater structures
- Port outfall
- Interim Action dredge area
- T-91 AO SCU boundary

SS-04
T91-RI-SS06
Western Berth Area
DMMP-POS91-AO-0290-S1
T91-RI-SS07
DMMP-POS91-AO-0290-S2
T91-RI-SS08
T91-RI-SC04
DMMP-POS91-AO-0290-S3
T91-RI-SS09
SS-06
T91-FS25-SS101
T91-RI-SC05
T91-RI-SS10
SS-07
Pier 91
SS-08
T91-RI-SS11
T91-RI-SC06
T91-RI-SS13
T91-RI-SS12
T91-RI-SS17
T91-RI-SS14
T91-RI-SC07

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600
Feet

DRAFT
MAY 1, 2026

Surface and Subsurface Sediment Sample Locations

Seattle, WA

FIGURE 3-2

BARR

Surface sediment benthic SMS exceedance status

- > CSL exceedances
- > SCO and ≤ CSL exceedances
- No exceedances

Surface sediment total organic carbon

- < 0.5%
- > 3.5%
- Bioassay location
- -4 ft MLLW contour

Stormwater structures

- Port outfall
- Interim Action dredge area
- T-91 AO SCU boundary

Box Legend

Location Name	
Analyte	Exceedance Factor
Total PCBs	2.2
Mercury	1.3

Black text represents SCO exceedance and exceedance factor
Red text represents CSL exceedance and exceedance factor

*Individual PAHs represents the max EF for any individual PAH, in samples where SMS exceedances occur for any individual PAH.

Western Berth Area

T91-RI-SS06	
Individual PAHs*	1.5

T91-RI-SS08	
Individual PAHs*	1
Total HPAHs	1.5

T91-RI-SS09	
Individual PAHs*	1.8
Total HPAHs	1.6

T91-2017-SS-06	
Total PCBs	1.8
Individual PAHs*	1.4
Total HPAHs	1.9
1,4-Dichlorobenzene	1

T91-FS25-SS101

T91-RI-SS10	
Total PCBs	3.7

Pier 91

T91-RI-SS13	
Zinc	3

T91-RI-SS14	
Mercury	1.4

T91-RI-SS17	
Individual PAHs*	1.2
Mercury	1.4

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600
Feet

Site concentrations are OC-normalized where sediment TOC ranges between 0.5 and 3.5% and compared with SMS criteria. In cases where TOC is outside this range (i.e., < 0.5 or > 3.5%), dry weight sediment concentrations are compared to AET marine sediment criteria.

DRAFT
MAY 1, 2026

Benthic SMS Exceedances in Surface Sediment

Seattle, WA

FIGURE 3-3

BARR

Surface sediment benthic SMS exceedance status

- > CSL exceedances
- > SCO and ≤ CSL exceedances
- No exceedances

Subsurface sediment benthic SMS exceedance status

- > CSL exceedances
- > SCO and ≤ CSL exceedances
- No exceedances

Surface sediment total organic carbon

- < 0.5%
- > 3.5%
- -4 ft MLLW contour

Stormwater structures

- Port outfall
- Interim Action dredge area
- T-91 AO SCU boundary
- Vessel prop scour areas with scour depths greater than 4 ft

Box Legend

Location Name	
Depth Interval	Analyte
0-1 ft	Total PCBs
1-2 ft	Mercury

Black text represents SCO exceedance
Red text represents CSL exceedance

*Individual PAHs represents the max EF for any individual PAH, in samples where SMS exceedances occur for any individual PAH.

Western Berth Area

Pier 91

T91-FS25-SS101

T91-RI-SC04	
0-2 ft	Total PCBs
	Individual PAHs*
	Mercury
	1,4-Dichlorobenzene
2-4 ft	Total PCBs
	Individual PAHs*
	Mercury
	1,4-Dichlorobenzene
4-5.5 ft	Total PCBs
	Individual PAHs*
	Mercury
	1,4-Dichlorobenzene
5-7.5 ft	No exceedances
7.5-9.3 ft	No exceedances

T91-RI-SC05	
0-2 ft	Total PCBs
	Individual PAHs*
	Mercury
	1,4-Dichlorobenzene
2-3.8 ft	Individual PAHs*
	Mercury
3.8-5.8 ft	No exceedances
5.8-6.8 ft	No exceedances
6.8-8.9 ft	No exceedances

T91-RI-SC06	
0-2 ft	No exceedances
2-3.2 ft	No exceedances

T91-RI-SC07	
0-1 ft	Mercury
	1,4-Dichlorobenzene
1-2 ft	No exceedances
2-4 ft	No exceedances

Legend for Vertical Extent Cores

Area
Loc ID
-39.8

- ← mudline elevation (ft MLLW)
- A ← red indicates detected concentrations exceeding the CSL
- B ← yellow indicates detected concentrations exceeding the SCO
- C ← white indicates detected concentrations not exceeding SMS criteria
- D ← medium grey indicates intervals not analyzed
- ← dark grey indicates dredge intervals not analyzed

Core Intervals

Western Berth

Locations ordered north to south

location ID:	SC04	SC05	SC06	SC07
year:	2021	2022	2021	2021
mudline:	-37.4	-37.6	-42.8	-53.4
-27 to -28 ft				
-28 to -29 ft				
-29 to -30 ft				
-30 to -31 ft				
-31 to -32 ft				
-32 to -33 ft				
-33 to -34 ft				
-34 to -35 ft				
-35 to -36 ft				
-36 to -37 ft				
-37 to -38 ft	A (0-2)			
-38 to -39 ft		A (0-2)		
-39 to -40 ft	B (2-4)			
-40 to -41 ft		B (2-3.8)		
-41 to -42 ft	C (4-5.5)			
-42 to -43 ft	D (5-7.5)	C (3.8-5.8)		
-43 to -44 ft			A (0-2)	
-44 to -45 ft	E (7.5-9.3)	D (5.8-6.8)		
-45 to -46 ft		E (6.8-8.9)	B (2-3.2)	
-46 to -47 ft				
-53 to -54 ft				A (0-1)
-54 to -55 ft				B (1-2)
-55 to -56 ft				C (2-4)
-56 to -57 ft				

Site concentrations are OC-normalized where sediment TOC ranges between 0.5 and 3.5% and compared with SMS criteria. In cases where TOC is outside this range (i.e., < 0.5 or > 3.5%), dry weight sediment concentrations are compared to AET marine sediment criteria.
Total PCBs are the sum of Aroclors for SMS comparisons.

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

0 300 600
Feet

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

Benthic SMS Exceedances in Subsurface Sediment

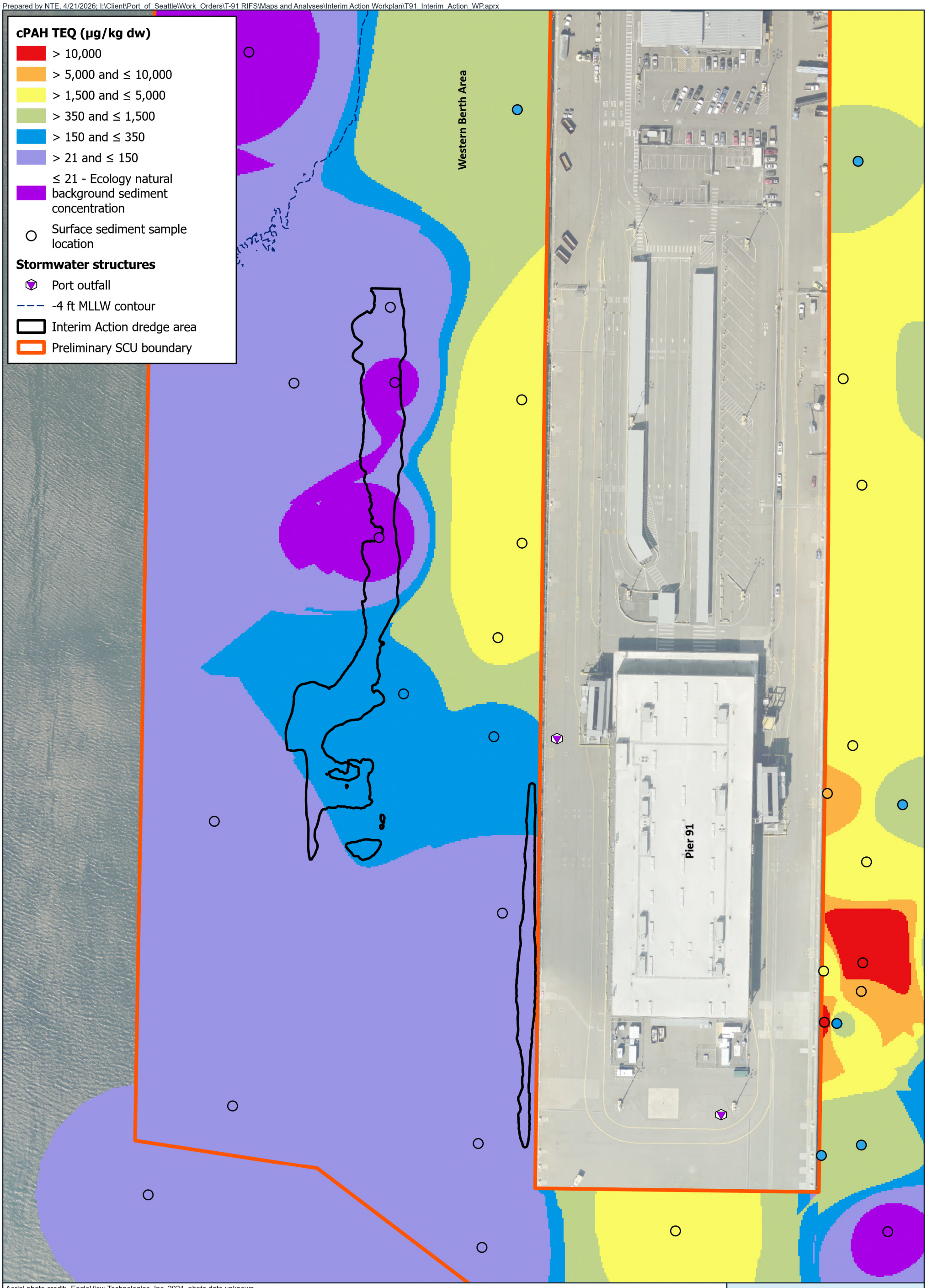
Seattle, WA

FIGURE 3-4

DRAFT
MAY 1, 2026

BARR

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

DRAFT
MAY 1, 2026

Surface Sediment Interpolation of cPAH TEQ

Seattle, WA

FIGURE 3-5

BARR

Total PCBs Aroclors (µg/kg dw)

- > 1,000
- > 650 and ≤ 1,000
- > 130 and ≤ 650
- > 65 and ≤ 130
- > 35 and ≤ 65
- > 5 and ≤ 35
- ≤ 5
- Surface sediment sample location

Stormwater structures

- Port outfall
- -4 ft MLLW contour
- Interim Action dredge area
- Preliminary SCU boundary

The total PCB congener natural background concentration is 3.5 µg/kg dw, as provided in SCUM (Ecology 2025).

Western Berth Area

Pier 91

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

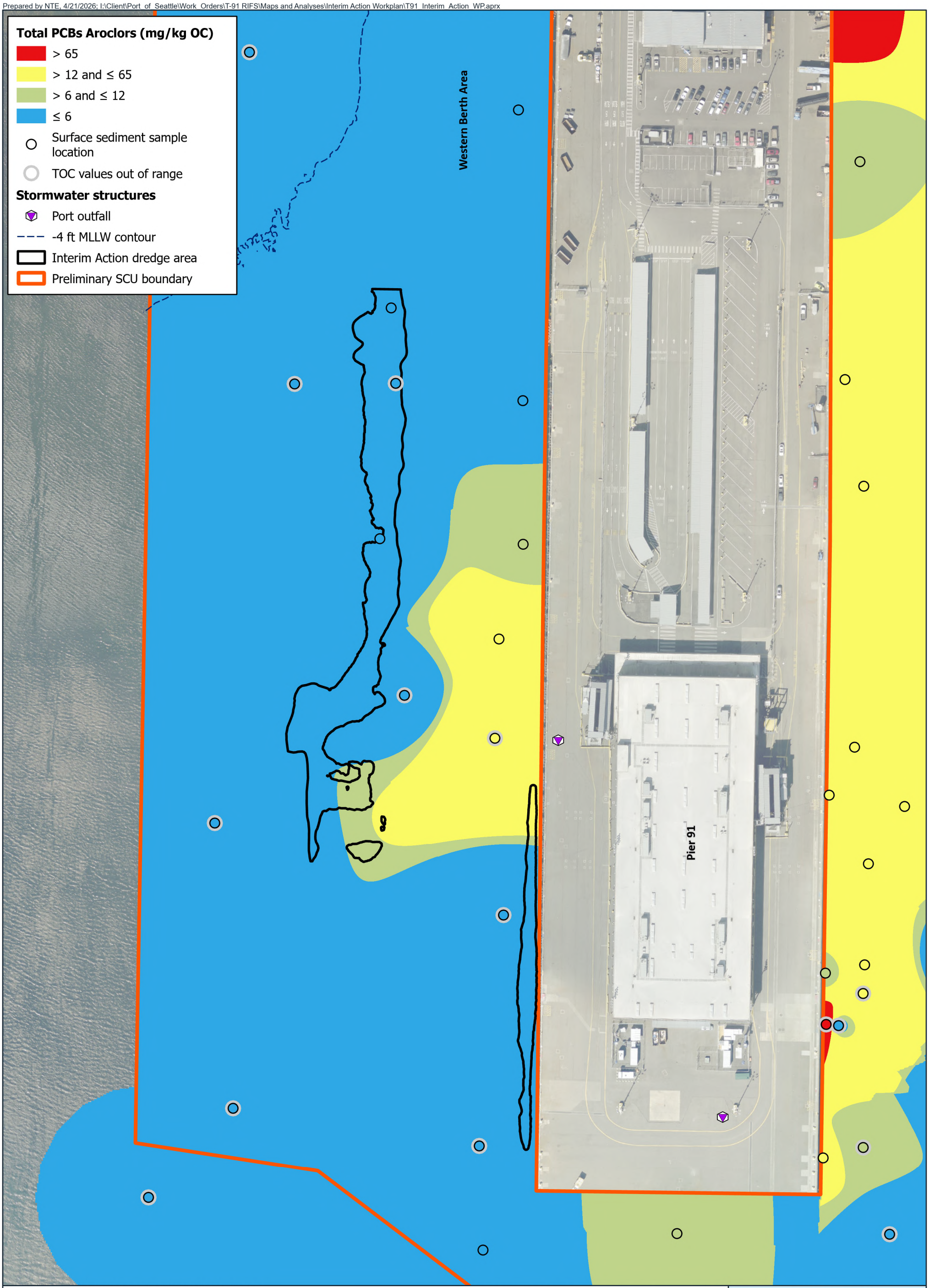
DRAFT
MAY 1, 2026

Surface Sediment Interpolation of Total PCB Aroclors (dry weight)

Seattle, WA

FIGURE 3-6

BARR



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

DRAFT
MAY 1, 2026

Surface Sediment Interpolation of Total PCB Aroclors (OC-normalized)

Seattle, WA

FIGURE 3-7

BARR

Mercury (mg/kg dw)

- > 1.2
- > 0.59 and ≤ 1.2
- > 0.41 and ≤ 0.59
- > 0.30 and ≤ 0.41
- > 0.20 and ≤ 0.30
- ≤ 0.20 - Ecology natural background sediment concentration
- Surface sediment sample location

Stormwater structures

- Port outfall
- -4 ft MLLW contour
- Interim Action dredge area
- Preliminary SCU boundary

Western Berth Area

Pier 91

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

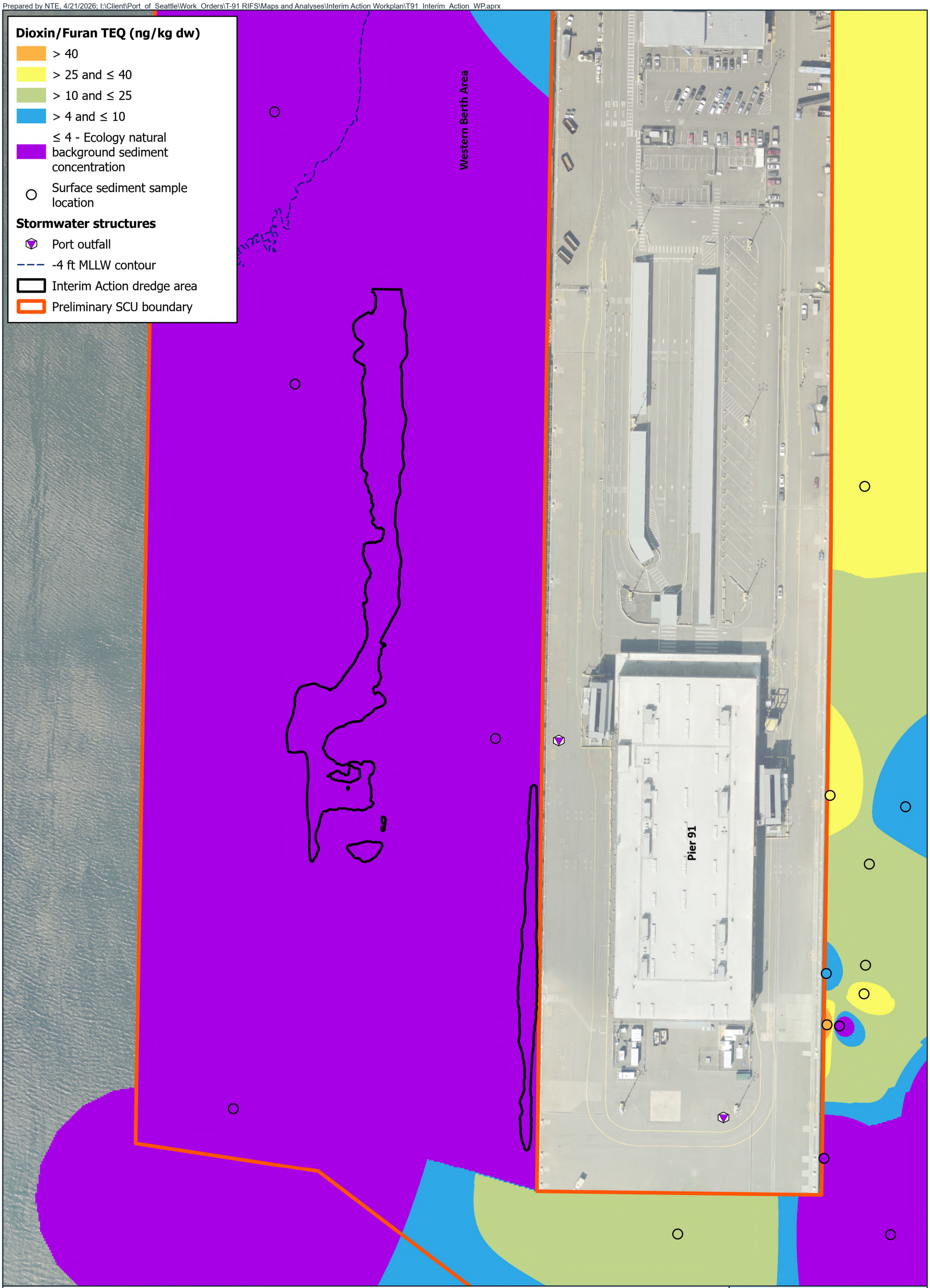
DRAFT
MAY 1, 2026

Surface Sediment Interpolation of Mercury Concentrations

Seattle, WA

FIGURE 3-8

BARR



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

DRAFT
MAY 1, 2026

Surface Sediment Interpolation of Dioxin/Furan TEQ

Seattle, WA

FIGURE 3-9

BARR

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx

Total organic carbon

- > 3.5 %
- > 2.5% and ≤ 3.5%
- > 1.5% and ≤ 2.5%
- > 0.5% and ≤ 1.5%
- ≤ 0.5%
- Surface sediment sample location

Stormwater structures

- Port outfall
- -4 ft MLLW contour
- Interim Action dredge area
- Preliminary SCU boundary

Western Berth Area

Pier 91

Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

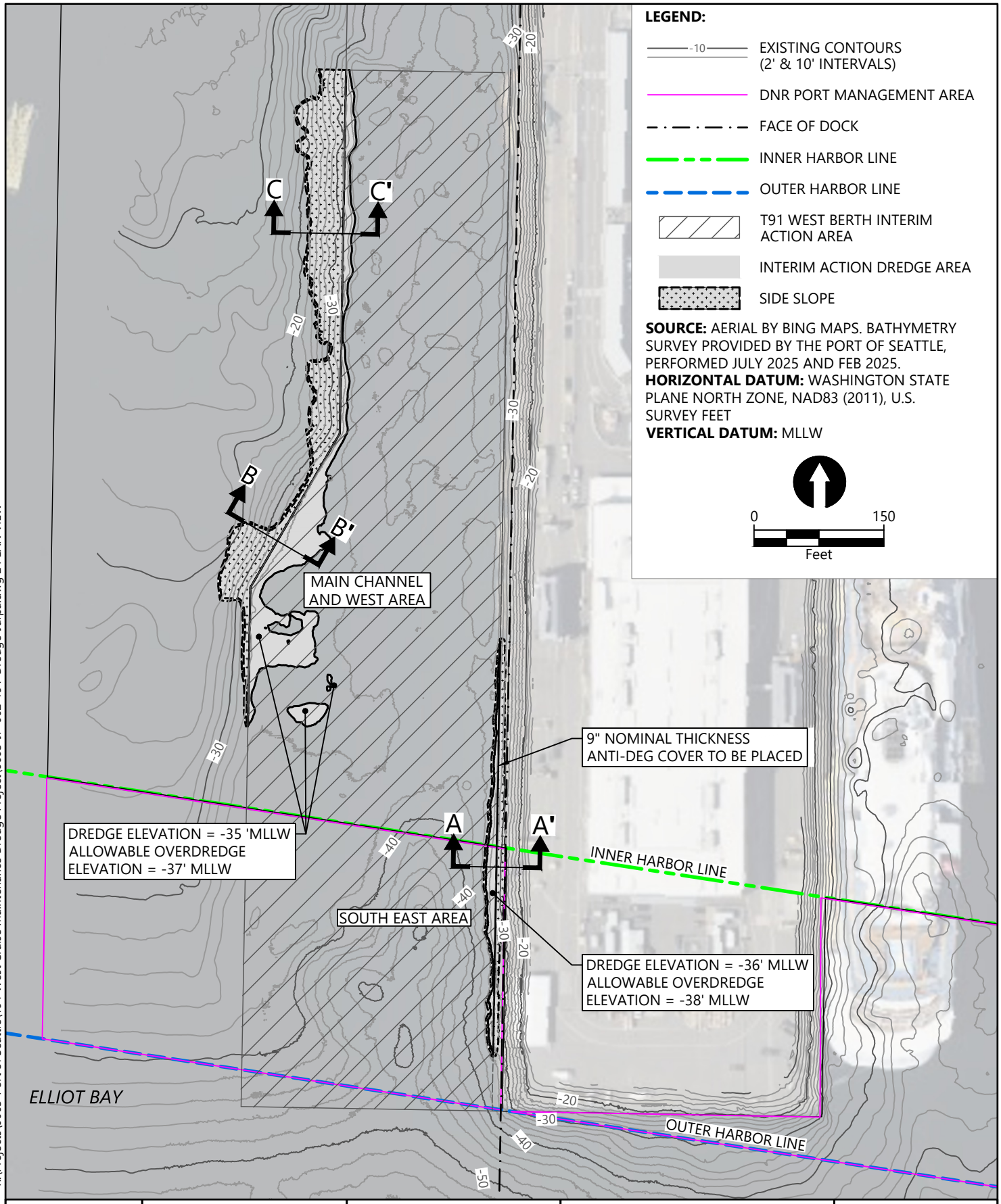
DRAFT
MAY 1, 2026

Surface Sediment Interpolation of Total Organic Carbon

Seattle, WA

FIGURE 3-10

BARR



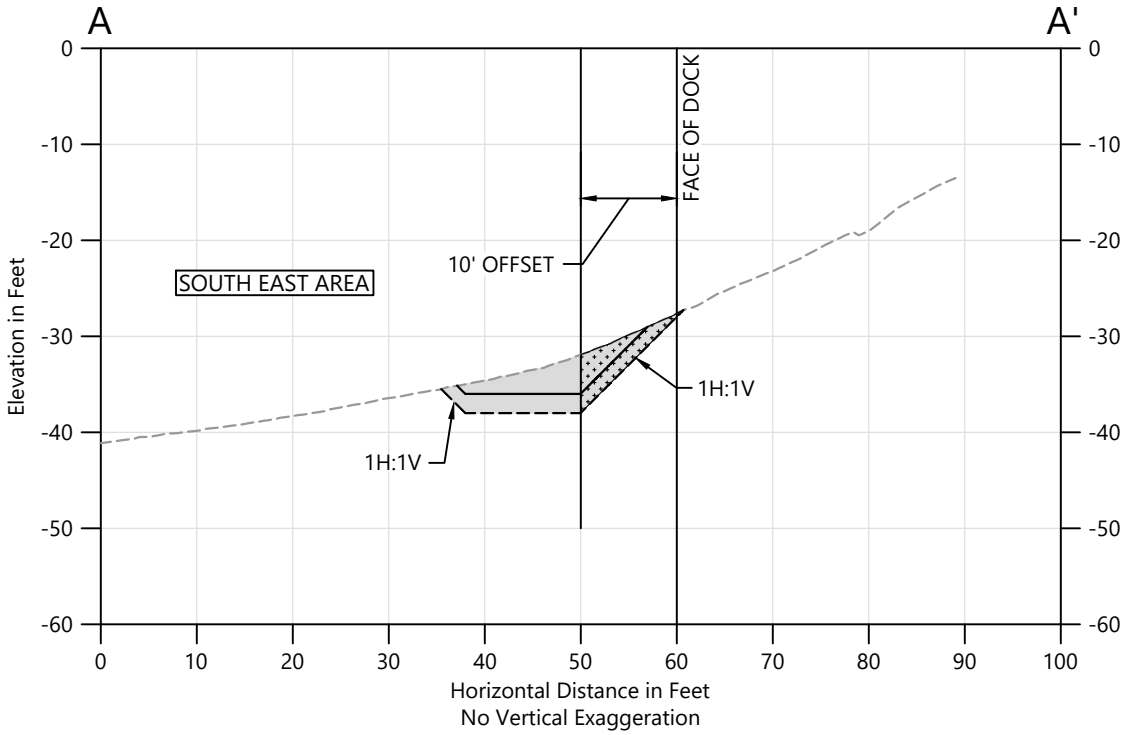
K:\Projects\0003-Port of Seattle\T91 West Cruise Maintenance Dredge Project\0003-JP-002-T91-Dredge-Jarpa.dwg 2 PLAN VIEW

Feb 10, 2026 9:07am tgriga

ANCHOR QEA
1201 3RD AVE, SUITE 2600
SEATTLE, WA 98101
206-287-9130

Figure 5-1.
T91 Dredge Areas

DRAFT
February 2026



LEGEND:

- EXISTING BATHYMETRY (JULY 2024)
- DREDGE ELEVATION = -36' MLLW
- ALLOWABLE OVERDREDGE ELEVATION = -38' MLLW
- INTERIM ACTION DREDGE AREA
- SIDE SLOPE SLOUGH MATERIAL

NOTES:

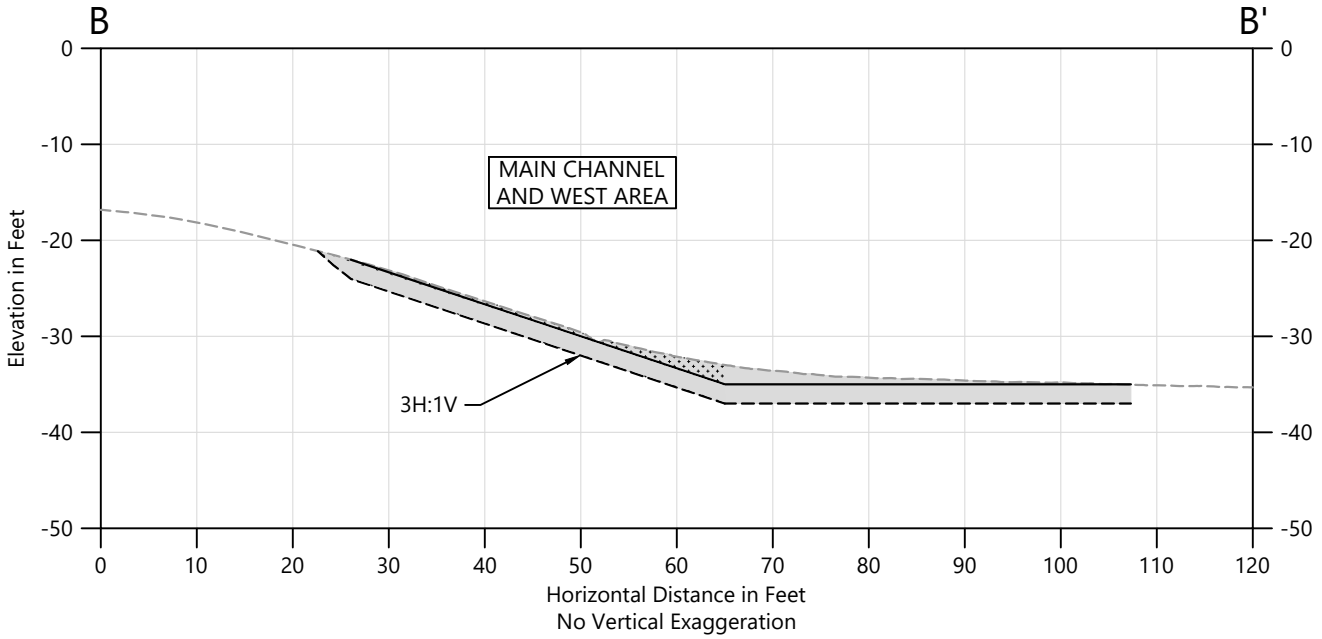
1. THE HORIZONTAL EXTENT OF THE REQUIRED DREDGE AREA FOR THE SOUTH EAST AREA IS DEFINED BY THE -35 FT MLLW CONTOUR LINE. THE REQUIRED DREDGE ELEVATION IS -36 FT MLLW PLUS ALLOWABLE OVERDREDGE TO -38 FT MLLW.
2. SEE DREDGE DETAILS AND PLACEMENT DETAILS ON SHEET 5.

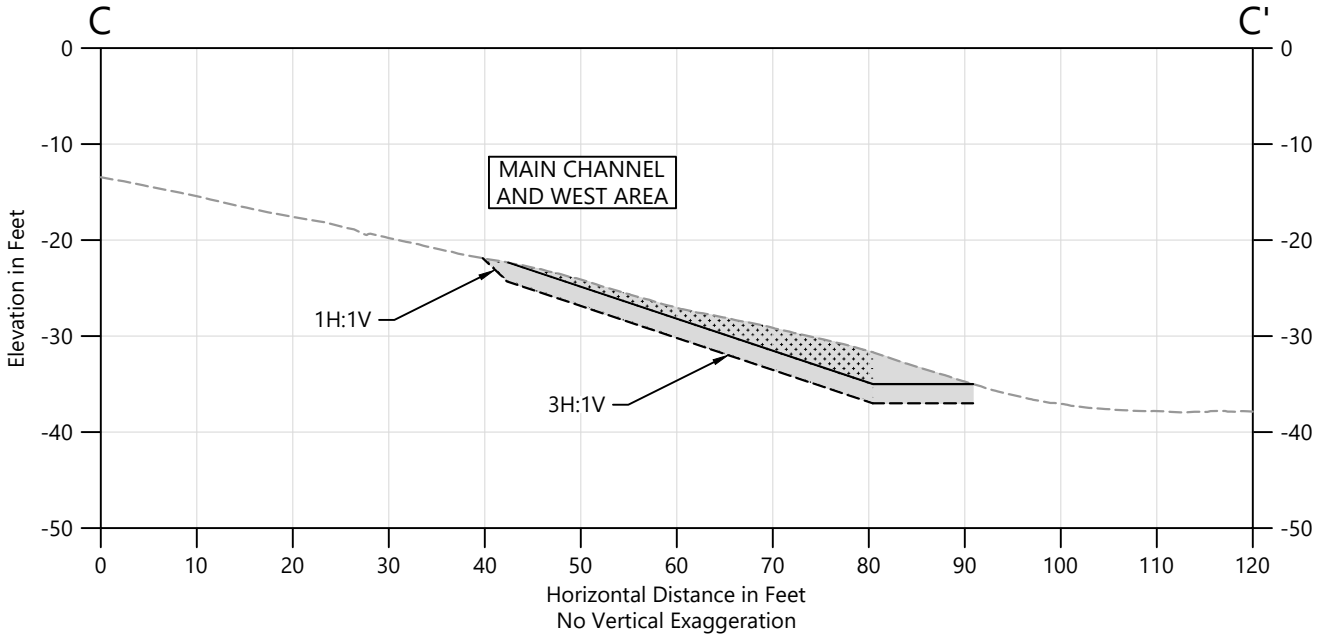
K:\Projects\0003-Port of Seattle\T91 West Cruise Maintenance Dredge Project\0003-JP-002-T91-Dredge-Jarpa.dwg 3 CROSS SECTIONS
Feb 10, 2026 9:07am tgriga

ANCHOR QEA
1201 3RD AVE, SUITE 2600
SEATTLE, WA 98101
206-287-9130

Figure 5-2.
T91 East Dredge Area Cross Section

DRAFT
February 2026





LEGEND:

- EXISTING BATHYMETRY (JULY 2024)
- DREDGE ELEVATION = -35' MLLW
- ALLOWABLE OVERDREDGE ELEVATION = -37' MLLW
- INTERIM ACTION DREDGE AREA
- REQUIRED SIDE SLOPE REMOVAL MATERIAL

NOTES:

SEE DREDGE DETAILS ON SHEET 5.

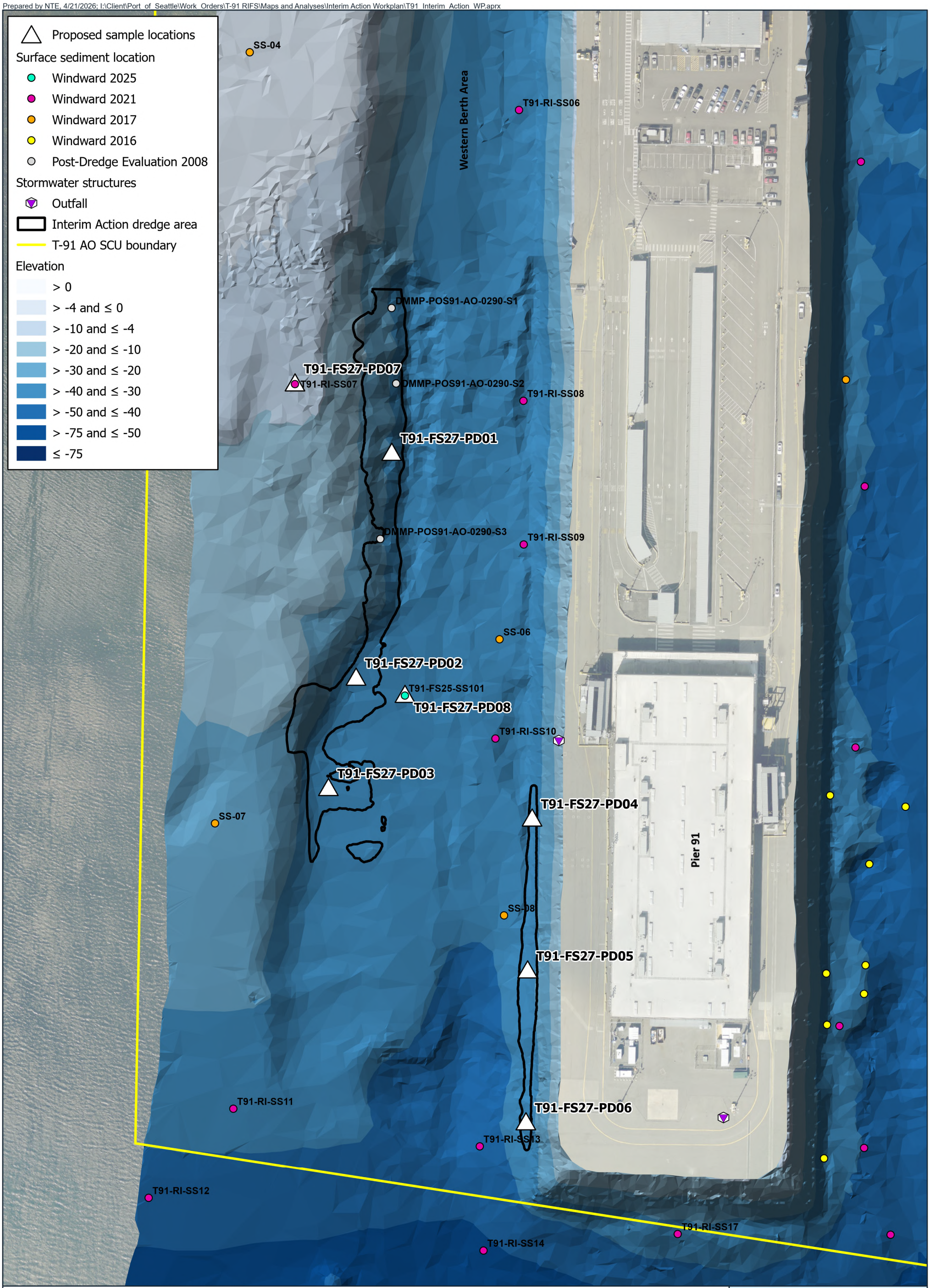
ANCHOR QEA
1201 3RD AVE, SUITE 2600
SEATTLE, WA 98101
206-287-9130

Figure 5-3.
T91 West Dredge Area Cross Sections

DRAFT
February 2026

K:\Projects\0003-Port of Seattle\T91 West Cruise Maintenance Dredge Project\0003-JP-002-T91-Dredge-Jarpa.dwg 4 CROSS SECTIONS
Feb 10, 2026 9:07am tgriga

Prepared by NTE, 4/21/2026; I:\Client\Port_of_Seattle\Work_Orders\T-91 RIFS\Maps and Analyses\Interim Action Workplan\T91_Interim_Action_WP.aprx



Aerial photo credit: EagleView Technologies, Inc. 2021, photo date unknown

TERMINAL 91 WEST CRUISE MAINTENANCE DREDGING PROJECT: INTERIM ACTION WORK PLAN

0 300 600

Feet

DRAFT
MAY 1, 2026

Post-Dredge Sediment Sampling Locations

Seattle, WA

FIGURE 5-4

BARR

Appendix A
Sediment Data from Project Area

Appendix B
Water Quality Monitoring Plan

WATER QUALITY MONITORING PLAN

PORT OF SEATTLE MAINTENANCE DREDGING

Prepared for:
Port of Seattle
2711 Alaskan Way
Seattle, Washington 98121

Prepared by:
Clearway Environmental LLC
5002 13th Ave S
Seattle, WA 98108

Anchor QEA, Inc.
1201 3rd Avenue, Suite 2600
Seattle, WA 98101

October 2025

Table of Contents

Table of Contents ii

Acronyms and Abbreviations iv

1. Introduction 1

1.1 WQMP Objectives 2

1.2 Document Organization 2

2. Water Quality Monitoring Team and Responsibilities 4

2.1 Project Oversight 4

2.2 Field Monitoring 4

3. Project Locations 5

3.1 Location Nomenclature 5

3.2 Project Vicinity and Site Locations Figures 5

4. Field Monitoring 8

4.1 Water Quality Standards 8

4.1.1 Turbidity 8

4.2 Monitoring Stations and Depths 8

4.2.1 Background Monitoring Station 8

4.2.2 Dredging Monitoring Stations 8

4.2.3 Monitoring Depth 9

4.3 Field Monitoring Frequency and Schedule 9

4.3.1 Visual Monitoring 9

4.3.2 Instrument-Based Monitoring 9

4.3.2.1 Suitable Material Field Monitoring Frequency and Schedule 9

4.3.2.2 Unsuitable Material Field Monitoring Frequency and Schedule 10

4.4 Field Monitoring Methods and Equipment 10

4.4.1 Monitoring Station Determination and Documentation 10

4.4.2 Water Quality Measurements 10

4.4.4 Monitoring Documentation 11

5. Corrective Actions and Notifications 12

5.1 Actions for an Elevation During Visual Monitoring 12

5.2 Corrective Actions for an Elevation at the Early Warning Station 12

5.3 Process to Confirm an Exceedance at the Compliance Station 12

5.4 Corrective Actions 13

5.5 Notifications 14

6. Best Management Practices 15

7. Quality Assurance/Quality Control 17
7.1 Field QA/QC 17
8. Reporting 18
8.1 Daily Reporting 18
8.1.1 Suitable Material Exceedance Reporting 18
8.1.2 Unsuitable Material Exceedance Reporting 18
8.2 Weekly Reporting 18
8.3 Water Quality Monitoring Completion Summary 18

Figures

Figure 1: Project Vicinity Map 6
Figure 2: Project Area Map 7

Appendices

Appendix A. Chain of Command
Appendix B. Water Quality Monitoring Field Form
Appendix C. Visual Monitoring Field Form
Appendix D. Turbidity Meter Calibration Worksheet
Appendix E. Process to Confirm an Exceedance (Flowcharts)
Appendix F. Daily Log
Appendix G. Daily Safety Briefing Form
Appendix H. Water Quality Monitoring Plan Overview Table

Acronyms and Abbreviations

401 WQC	Clean Water Act Section 401 Water Quality Certification
BGS	Background Station
BMP	best management practice
CS	Compliance Station
DMMP	Dredged Material Management Program
Ecology	Washington State Department of Ecology
EWS	Early Warning Station
FC	Field Coordinator
FL	Field Lead
GPS	Geographical Positioning System
IWA	in-water work area
NTU	Nephelometric Turbidity Unit
PM	Project Manager
Port	Port of Seattle and/or Port's Project Representative
Project	Port of Seattle Maintenance Dredging
QA	quality assurance
QC	quality control
T-#	Terminal Number
WAC	Washington Administrative Code
WQMP	Water Quality Monitoring Plan

1. Introduction

The Port of Seattle (Port) anticipates conducting future maintenance dredging at berth and channel locations within the East and West Waterways of the Duwamish River, as well as at cruise ship berth facilities in Elliott Bay. To obtain the necessary regulatory approvals, the Port is seeking a Clean Water Act Section 401 Water Quality Certification (401 WQC) for its proposed 10-year Comprehensive Routine Maintenance, Repair, and Scientific Sampling Program (Repair and Maintenance Program).

The Repair and Maintenance Program includes routine maintenance dredging at various sites, including the East and West Waterways and Pier 66 cruise ship berth in Elliott Bay. The Port expects to begin dredging within the West Waterway federal navigation channel, and at Terminals 18 (T-18), 30 (T-30), and 46 (T-46) (See Figures 1 and 2). As additional maintenance dredge activities are identified over the duration of the 10-year Program, individual maintenance dredge projects may be conducted at specific facilities which may include:

- East Waterway Navigation Channel
- West Waterway Navigation Channel
- T-18
- T-25
- Pier 28/Slip 27
- T-30
- T-46
- T-5
- Pier 66

Additionally, the Port is planning to conduct maintenance dredging at the Terminal 91 (T-91) cruise ship berth facility. Because this location is not included in the Port's Repair and Maintenance Program permit application, a separate 401 WQC is anticipated for the T-91 project. This document outlines the base Water Quality Monitoring Plan (WQMP) to be implemented for all maintenance dredging conducted under the Repair and Maintenance Program 401 WQC. It will also serve as the base plan for the planned maintenance dredging project at T-91.

Site-specific supplements to this base WQMP will be provided for each upcoming, proposed project, and multiple project sites may be addressed in one supplement. Within these specialized supplements, additional information specific to each project and site will be provided and will include site-specific details such as conceptual water quality monitoring station diagrams, anticipated dredging depths and volumes, in-water work areas, and in-water work windows.

This WQMP proposes monitoring for conventional water quality standards as outlined in Washington Administrative Code (WAC) 173-201A. Monitoring for acute or chronic chemical toxicity as outlined in WAC 173-240 is not proposed as chemical concentrations are not anticipated to be a concern at the proposed maintenance dredging locations. The Port will coordinate with the Dredged Material Management Program (DMMP) to determine the need for

placing an anti-degradation clean cover over dredged areas, based on the results of the DMMP sediment characterization. This WQMP proposes visual monitoring during clean cover placement. Additionally, the Project includes best management practices (BMPs) such as lowering the bucket through the water column to release close to the bottom. Section 6 includes further discussion of BMPs.

Since each maintenance dredging event may have different site conditions and sediment chemistry, the Port will coordinate with Ecology before each maintenance dredging event to assess site-specific condition(s). Based on this evaluation, additional monitoring requirements or chemical analysis may be included by addenda (site-specific WQMP) to address any site-specific concerns.

The Port will conduct pre-dredge bathymetric surveys to define the maintenance dredge locations and will notify Ecology of the anticipated dredging volumes per dredge event. Based on sediment characterization results, the Port and DMMP will evaluate the need to place a clean sand cover layer in different dredging locations as an anti-degradation layer post-dredging.

The final amount of sediment removal may vary based on the final dredge footprint and need to place an anti-degradation cover.

Dredged sediment, deemed suitable by the DMMP, will be placed within the Elliott Bay unconfined open water disposal site (see Figures 1 and 2). Sediment determined to be unsuitable will be disposed of at an approved upland disposal facility. For material determined suitable for open water disposal and beneficial use, the Port may also coordinate with the Beneficial Use Review team to assess the availability of a receiving site that can support the project.

Water quality monitoring will be conducted to assess the contractor's compliance with the Washington State Department of Ecology's (Ecology's) water quality standards according to WAC 173-201A, and federal, state, and local regulations pertaining to water quality. This WQMP describes the monitoring to be implemented during maintenance dredging and clean material placement activities to verify compliance with applicable water quality criteria and the corrective measures to be implemented if there are confirmed exceedances during water quality monitoring.

1.1 WQMP Objectives

The objectives of the WQMP are to:

- Ensure that water quality conditions are within the prescribed limits required by Ecology's 401 water quality certification, WAC 173-201A, and described in this plan.
- Allow for appropriate adjustment of construction activities in a manner that ensures protection of the natural environment during construction.

1.2 Document Organization

The remainder of this document includes the following information:

- **Section 2, Project Team and Responsibilities:** This section describes Project organization and team member responsibilities for implementing the WQMP.
- **Section 3, Project Locations:** This section describes the dredging locations, elevations, and anticipated volumes.
- **Section 4, Field Monitoring:** This section describes the field monitoring frequency, schedule, methods, and equipment for conducting the water quality monitoring program.
- **Section 5, Corrective Actions and Notifications:** This section describes response actions if there are confirmed water quality exceedances.
- **Section 6, Best Management Practices**: This section describes procedures the contractor is anticipated to employ to minimize negative impacts to the aquatic environment during dredging.
- **Section 7, Quality Assurance/Quality Control:** This section describes quality assurance/quality control (QA/QC) procedures.
- **Section 8, Reporting:** This section provides water quality monitoring reporting requirements.

2. Water Quality Monitoring Team and Responsibilities

This section describes WQMP team member roles and responsibilities for oversight and field monitoring during each maintenance dredging event. Appendix A provides a flow chart for Chain of Command.

2.1 Project Oversight

The Project Manager (PM) will be responsible for coordinating activities between the Port and other parties for each maintenance dredging event. The PM will provide oversight for the water quality monitoring program and any other considerations associated with planning, dredging, and disposal operations, and will coordinate as necessary with the Port to verify that all QA/QC goals are met. The PM may be Port staff or the Port may delegate this role to a consultant responsible for implementing the WQMP.

The Field Coordinator (FC) will be responsible for coordinating and verifying the timely and successful completion of water quality monitoring. The FC will prepare the weekly reports and Water Quality Monitoring Results Report described in Section 8. The FC will report to and be directed by the PM.

2.2 Field Monitoring

The Field Lead (FL) will be responsible for day-to-day field operations. The FL will be responsible for conducting the field monitoring at the required frequency, ensuring accurate positioning and recording of monitoring stations, depths, and water quality parameters in accordance with this WQMP. The FL will direct the field crew and will report to and be directed by the FC.

At no point will field monitoring staff direct, interfere, or communicate directly with the contractor, unless expressly asked to do so by the Port's Project Representative.

3. Project Locations

The Port is planning to perform maintenance dredging at multiple sites (see Figures 1 and 2).

3.1 Location Nomenclature

Project locations will be identified as follows:

- **Project**: refers to overall project, including all sites (all terminals and West Waterway).
- **Site**: refers to an individual terminal, or the West Waterway, as shown in Figures 1 and 2.
- **In-water work area (IWA)**: refers to the actual location where activities requiring monitoring (maintenance dredging) occur on any given day. This area includes the dredging plant and material barge. The outer perimeter of this equipment will be used to measure distance to Background, Early Warning and Compliance Stations.

3.2 Project Vicinity and Site Locations Figures

Figure 1 (following) depicts the project vicinity and Figure 2 provides a map of proposed site locations.

Figure 1: Project Vicinity Map

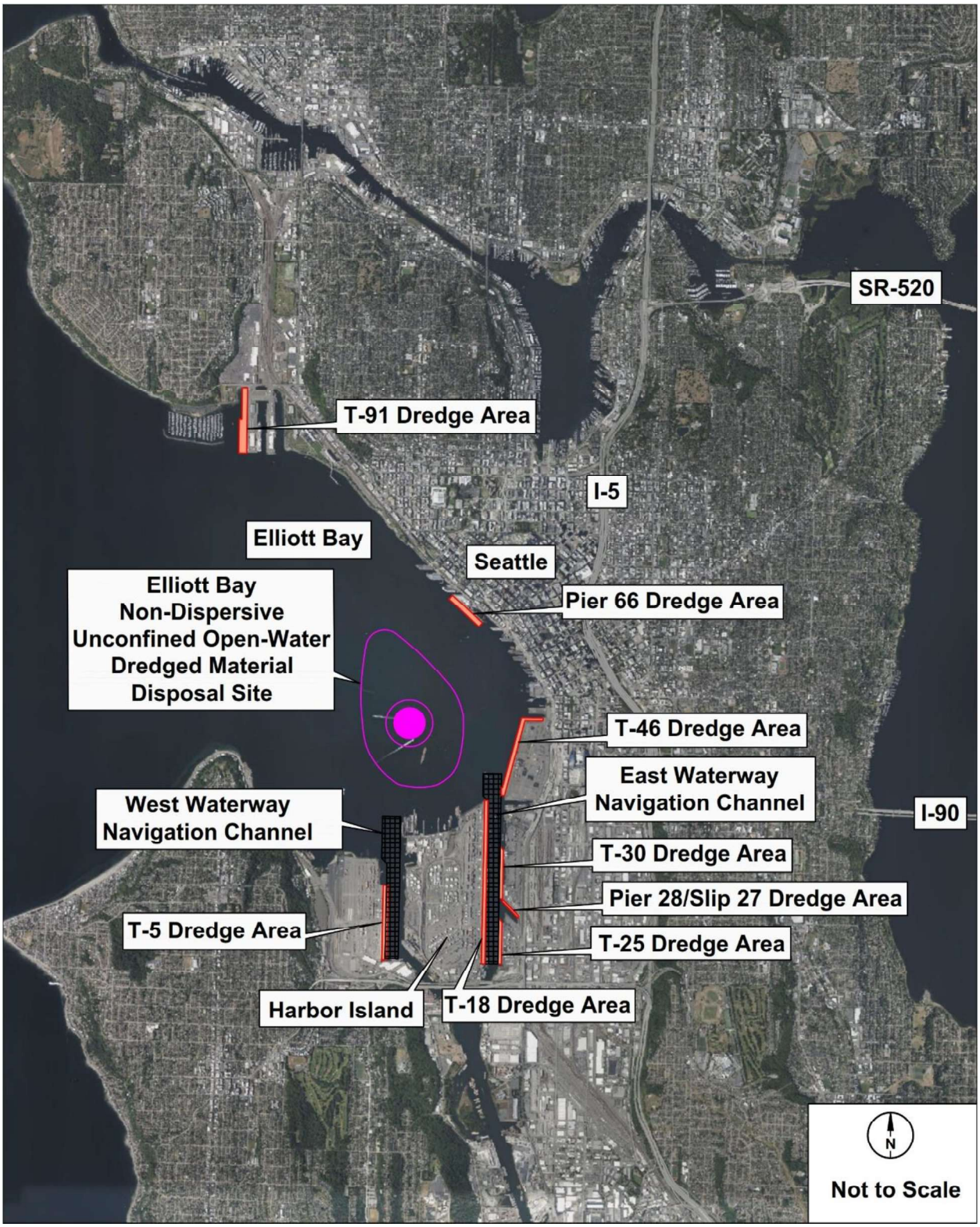
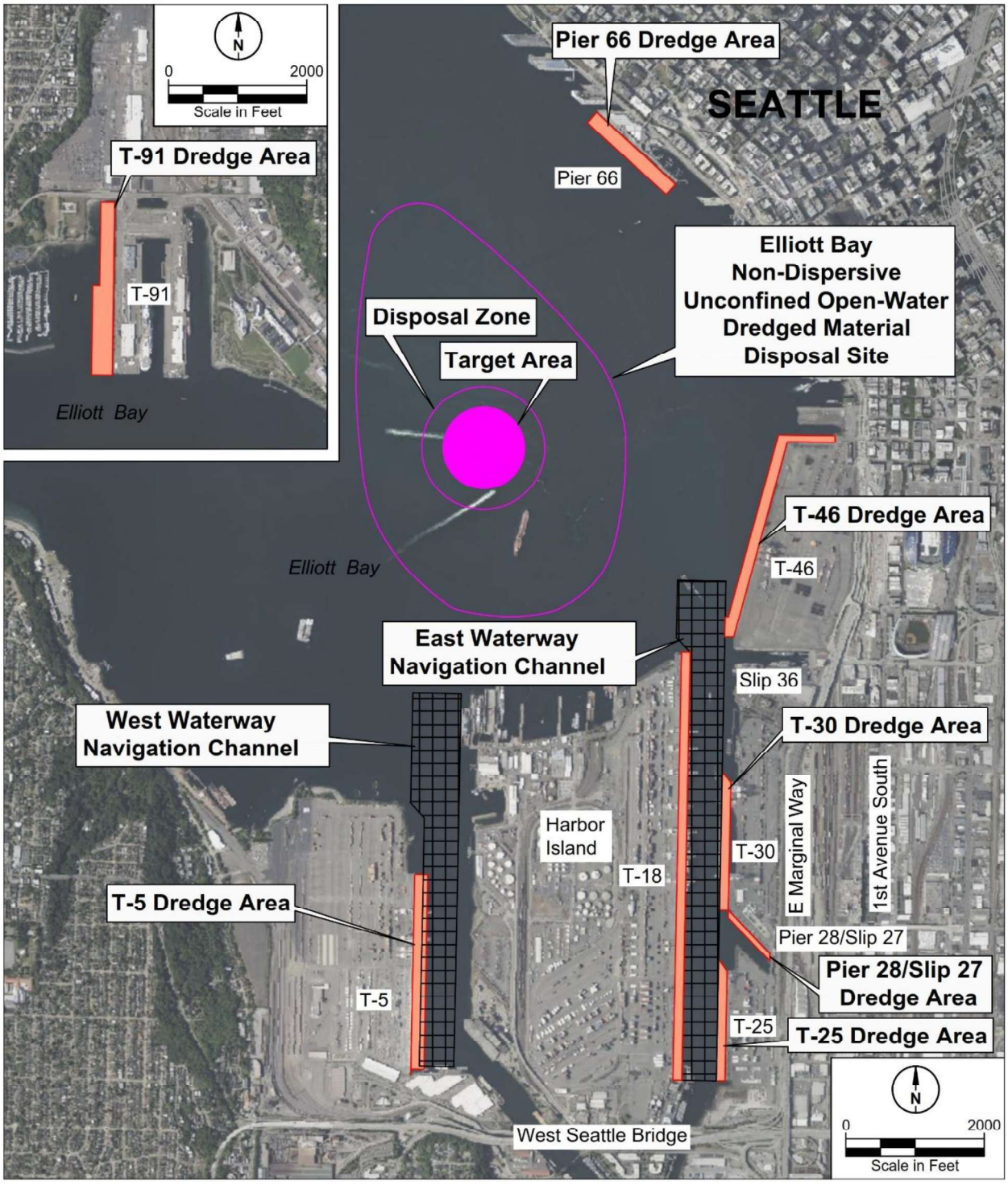


Figure 2: Project Area Map



4. Field Monitoring

This section describes standards and field methods for conducting water quality monitoring during maintenance dredging.

Abbreviations for the monitoring stations will be as follows:

- BGS: Background Station
- EWS: Early Warning Station
- CS: Compliance Station

4.1 Water Quality Standards

The water quality standards in this plan are the requirements of Washington State's Water Quality Standards for Surface Water (WAC 173-201A) for Elliott Bay, which has an Aquatic Life Use rating of "excellent" (WAC 173-201A-612).

4.1.1 Turbidity

Per WAC 173-201A-210 Table 210 (1)(e), turbidity measured as a one-day maximum must not exceed 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.

4.2 Monitoring Stations and Depths

This section includes information regarding monitoring stations and depths.

4.2.1 Background Monitoring Station

The Background Station (BGS) will be located at least 300 feet up-current from the in-water work area (IWA) in an area unaffected by the active work. The BGS will always be up-current and there will only be one BGS at any given time. Its exact location will be determined based upon the time-specific site conditions encountered. Measurements recorded at each BGS will be used as baseline data for determining the appropriate water quality compliance criteria and for comparison purposes. The BGS will be recorded first, then monitoring will occur at the EWS, then the CS.

4.2.2 Dredging Monitoring Stations

All monitoring station locations will be based on the location of the IWA, the tidal cycle, observations of the current, and whether a visible turbidity plume is observable (i.e., monitoring station will be located within a visible plume).The monitoring stations will be located down-current of the IWA. Visual Monitoring will occur within a visually observational distance from the IWA.

The Early Warning Station (EWS) for water quality measurements are at a 100-ft radii from the IWA. Turbidity greater than standard at the EWS is considered an elevation. Measurements

from the EWS that indicate an elevation will trigger a BMP check. The monitor will conduct BMP checks to verify that BMPs are in place and properly functioning.

The Compliance Station (CS) for water quality measurements is at a 150-ft radius from the IWA. Turbidity greater than standard at the CS is considered a potential exceedance, and a confirmed measurement 30 minutes later is considered a confirmed exceedance. Measurements from the CS will be used to determine if water quality conditions comply with water quality criteria for the project.

A description of how the operation will be modified if water quality measurements indicate a confirmed exceedance is provided in sections 5.1 and 5.2.

4.2.3 Monitoring Depth

At each station, water quality parameter measurements will be recorded at 3 feet below the water surface, the mid-point of the water column, and at 3 feet above the sediment bed. Water depth will be determined by using a fathometer at the monitoring station and will be recorded on the Water Quality Monitoring Field Form (Appendix B).

4.3 Field Monitoring Frequency and Schedule

Water quality monitoring will be conducted during maintenance dredging activities during daytime work activities only. The frequency of monitoring will be phased to require more intensive monitoring at the start of work at each site and will be reduced if no confirmed exceedances are measured. Monitoring will begin 1 hour after the start of daily operations with the second monitoring event occurring no more than four hours later. Because site conditions and equipment measurements can be variable, when a regularly scheduled monitoring event shows an initial water quality elevation or exceedance, a second measurement will be taken approximately 30 minutes later to confirm that the elevation or exceedance persists due to the construction activity. Two measured exceedances are defined as a confirmed exceedance.

4.3.1 Visual Monitoring

Visual monitoring will occur continuously, defined as for the entire duration of the activity, including during clean cover sand placement. Results will be recorded on the Visual Monitoring Field Form twice daily (Appendix C).

4.3.2 Instrument-Based Monitoring

The monitoring schedule is dependent upon which terminal is being dredged and therefore organized into monitoring schedules for dredged material suitable for open-water disposal or in-water beneficial use placement (suitable) and dredged material unsuitable for open-water disposal or in-water beneficial use placement (unsuitable).

4.3.2.1 Suitable Material Field Monitoring Frequency and Schedule

- *Intensive:* Record water quality criteria measurements twice daily for the first two days of dredging. If no confirmed exceedances are recorded during this period, monitoring will shift to visual monitoring only. In the event of a confirmed exceedance at the CS or a

change in work activities (i.e., dredging location changes from one terminal to another), Intensive Monitoring will restart.

- *Routine:* Routine monitoring for suitable material will consist of visual monitoring only. A visual exceedance at the CS restarts the Intensive Monitoring.

If a confirmed exceedance at the CS is recorded, Ecology must be notified within 24 hours as described in Section 5.3. The monitoring frequency will revert to Intensive Monitoring and the phased approach will be repeated from the first day of the triggered Intensive Monitoring.

4.3.2.2 Unsuitable Material Field Monitoring Frequency and Schedule

- *Intensive:* Record water quality criteria measurements twice daily for the first five days of dredging. If no confirmed exceedances are recorded during this period, monitoring will shift to the routine schedule. In the event of a confirmed exceedance at the CS or a change in work activities (i.e., dredging location changes from one terminal to another), Intensive Monitoring will restart.
- *Routine:* Record water quality criteria measurements twice daily, two days per week during dredging. In the event of a confirmed exceedance at the CS, Intensive Monitoring will restart.

If a confirmed exceedance at the CS is recorded, Ecology must be notified within 2 hours as described in Section 5.3. The monitoring frequency will revert to Intensive Monitoring and the phased approach will be repeated from the first day of the triggered Intensive Monitoring.

4.4 Field Monitoring Methods and Equipment

This section provides information regarding monitoring station determination, water quality monitoring methods, equipment calibration and use, and documentation.

4.4.1 Monitoring Station Determination and Documentation

A range finder, in conjunction with Geographical Positioning System (GPS), will be used to determine station locations at target monitoring distances in relation to the IWA. Once the vessel is on the station, the vessel operator will maintain the position while monitoring occurs. GPS coordinates and monitoring station name will be recorded on the Water Quality Monitoring Field Form (Appendix B). In each round of monitoring, the Background Station (BGS) will be monitored first, followed by the EWS and the CS.

4.4.2 Water Quality Measurements

Water quality measurements will be taken using a Hydrolab MS5 multi-parameter water quality sonde, YSI multi-meter, or equivalent. The depth at each station will be measured and the water quality parameter measurements will be recorded at three depths at each of the monitoring stations (BGS, EWS and CS).

4.4.3 Monitoring Equipment Calibration and Use

Field monitoring equipment will be calibrated daily and allowed to equilibrate prior to use. Calibration information will be recorded on the Turbidity Meter Calibration Worksheet (Appendix

D). Monitoring equipment will be used according to the manufacturer's recommendations. Unusual or questionable readings will be noted and duplicate readings will be recorded.

4.4.4 Monitoring Documentation

All monitoring results will be entered directly on the Water Quality Monitoring Field Form (Appendix B) and Visual Monitoring Field Form (Appendix C). Field datasheets will be checked for completeness and accuracy. Data generated in the field on hard copy will be provided to the PM who will record and document the data.

5. Corrective Actions and Notifications

This section describes corrective actions to be initiated in response to a confirmed exceedance at the Compliance Stations. Appendix E provides flow charts that detail the process to confirm an exceedance and to implement corrective actions, for both suitable and unsuitable material.

5.1 Actions for an Elevation During Visual Monitoring

In the event that a turbidity plume is observed, the plume will be followed downstream to its endpoint, and its endpoint location and approximate downstream distance from the IWA will be recorded on the Visual Monitoring Field Form (Appendix C). If the plume is confirmed to not be caused by outside influences, instrument-based monitoring will begin at the EWS, which will inform if monitoring needs to occur immediately at the CS, as described below.

5.2 Corrective Actions for an Elevation at the Early Warning Station

If water quality measurements show there is an elevation at the EWS, the following sequence of responses will be initiated:

1. The FL will visually assess the station vicinity for potential outside influences, such as storm drains or sediment disturbance from nearby vessels.
2. A confirmation measurement will be taken 30 minutes after the initial reading. If outside influences are observed, the FL will inform the FC and PM. The PM will consult with the Port. Additional discretionary measurements may be taken to understand the nature of the outside influence.
3. If the confirmation measurement meets all the water quality criteria, the monitoring crew will return to monitoring, according to the assigned schedule.
4. If the confirmation measurement exceeds criteria, measurements will be taken at the CS (regardless of prior CS monitoring schedule) and the FL will contact the FC and PM to report the confirmed elevation. The PM will notify the Port.
    a. Suitable Material: If the work is occurring in an area of suitable material and an elevation is recorded, this will trigger a BMP check. The monitor will conduct BMP checks to verify that BMPs are in place and properly functioning.
    b. Unsuitable Material: If the work is occurring in an area of unsuitable material, the Port will notify the contractor to implement additional BMPs and operational checks to reduce water quality impacts, and the contractor will modify its work activity using these additional controls (see Section 6). Compliance monitoring will continue on schedule.

5.3 Process to Confirm an Exceedance at the Compliance Station

If water quality measurements show there is an exceedance at the CS, the following sequence of responses will be initiated:

1. The FL will visually assess the station vicinity for potential outside influences, such as storm drains or sediment disturbance from nearby vessels.
2. A confirmation measurement will be taken 30 minutes after the initial reading.
3. If outside influences are observed, the FL will inform the FC and PM. The PM will consult with the Port. Additional discretionary measurements may be taken to understand the nature of the outside influence.
4. If the confirmation measurement meets all the water quality criteria, the monitoring crew will return to monitoring, according to the assigned schedule.
5. If the initial Compliance Station measurement exceeds criteria, the FL will contact the FC and PM to report the confirmed exceedance. The PM will notify the Port. The Port will notify the contractor to perform BMP checks and operational checks to reduce water quality impacts, and the contractor will modify its work activity using BMPs (see Section 6).
6. The FL will take measurements within 30 to 60 minutes after the contractor has implemented work modification(s) to assess the effectiveness of the contractor's work modification(s) to meet water quality criteria. Additional confirmation measurements will be taken if necessary.
    a) If water quality criteria are met at the Compliance Station after 30 to 60 minutes, monitoring will continue according to the Intensive Monitoring frequency.
    b) If water quality criteria are not met at the Compliance Station after 30 to 60 minutes;
        i. Suitable Material: The contractor shall implement more stringent BMPs and the Port or the contractor shall assess the cause of the water quality problem and take immediate action to stop, contain, and correct the problem and prevent further turbidity exceedances. The Port will notify Ecology within 24 hours.
        ii. Unsuitable Material: The contractor shall stop dredging and the Port or the contractor shall assess the cause of the water quality problem and take immediate action to stop, contain, and correct the problem and prevent further turbidity exceedances. The Port will notify Ecology within 2 hours.
    c) In the event that a turbidity plume is observed, the plume will be followed downstream to its endpoint, and its endpoint location and approximate downstream distance from the IWA will be recorded on the Visual Monitoring Field Form (Appendix C).

5.4 Corrective Actions

Corrective actions will be implemented to address water quality criteria confirmed exceedance events associated with dredging. If a water quality criteria exceedance event is confirmed, the Port's Project Representative will notify the contractor as soon as possible (within 1 hour maximum) of the confirmed exceedance event and will direct the contractor to identify and implement its approach to return operations to compliance with water quality criteria. The approach may involve modifying operations or implementing additional BMPs.

Additional corrective actions may be required in the event of a continued water quality criteria confirmed exceedance at the compliance boundary; these actions are described in Section 6. If the water quality criteria exceedance continues, even with additional BMPs and/or operational modifications, the Ports' Project Representative will discuss implementation of other BMPs or operational modifications, or a Stop Work directive to temporarily stop work to further assess the source of the confirmed exceedance event and identify effective measures to comply with water quality criteria.

Only the Port has the authority to initiate a Stop Work Order to the contractor. The conditions that can trigger a Stop Work Order include, but may not be limited to:

- Evidence of a significant oil sheen
- Evidence of distressed or dying fish
- Repeated, confirmed exceedances of water quality criteria at the compliance boundary may require a Stop Work Order in order to investigate root cause for the ongoing exceedances to control impacts to water quality.

5.5 Notifications

As addressed in Section 5.1, if a water quality criteria exceedance event is confirmed, the Port's Project Representative will notify the contractor as soon as possible (within 1 hour maximum) of the confirmed exceedance event and will direct the contractor to identify and implement its approach to return operations to compliance with water quality criteria. The Port will notify Ecology of the confirmed exceedance event(s) and corrective actions taken within 2 hours for areas with unsuitable material, and 24 hours for areas with suitable material. Notification shall be to Ecology's Federal Permit Manager via email to fednotification@ecy.wa.gov and cc to laura.inouye@ecy.wa.gov and austin.schmalz@ecy.wa.gov. Notifications need to be identified with WQC Order Number (e.g., #140969), Corps reference # (e.g., NWS-2021-842-WRD) and include the Project Proponent name, project name, project location, project contact and the contact phone number. For up-to-date reporting information, refer to Ecology's "Report a Spill" webpage. The Port will, at a minimum, provide Ecology with the following information:

- A description of nature and cause of exceedance.
- The period of non-compliance, including exact dates, duration, and times and/or the anticipated time when the Applicant will return to compliance.
- The steps taken, or to be taken, to reduce, eliminate, and prevent recurrence of non-compliance.
- In addition, within five (5) days after notification of an exceedance, the Port shall submit a written report to Ecology that describes the nature of the exceedance, turbidity results and location, photographs, and any other pertinent information.

If there is evidence of a significant oil sheen, the Port will immediately report to Ecology's Northwest Regional 24-hour Spill Response Office at (206) 594-0000.

6. Best Management Practices

BMPs will be employed during maintenance dredging to avoid or minimize potential water quality exceedances. The contractor will be responsible for selecting and implementing BMPs to comply with the 401 Water Quality Certification and State water quality criteria at the designated compliance boundary. The contractor's work must comply with Ecology's issued 401 Water Quality Certification and the following BMPs are included in the design specifications as contract requirements:

- All dredging is to be done using only mechanical bucket dredging techniques. Use of any other type of dredging techniques requires preapproval from Ecology.
- Dredging operations shall be conducted in a manner that minimizes the disturbance or siltation of adjacent waters and prevents the accidental discharge of petroleum products, chemicals, or other toxic or deleterious substances into the waters of the State.
- The receiving scow or barge shall not be overfilled to the point where dredge material overtops the sidewalls.
- In-water activities will be limited to periods determined appropriate by participating state and federal agencies to avoid potential adverse effects on migratory fish.
- All equipment shall be inspected daily to ensure that it is in proper working condition.
- The contractor shall utilize real-time positioning control when implementing maintenance dredging.
- The contractor shall develop a Construction Workplan that will be submitted to the U.S. Army Corps of Engineers and Ecology.
- The contractor will be responsible for preparing and implementing a Spill Prevention, Control, and Countermeasures Plan to be used for the duration of each maintenance dredging event.
    - On-site equipment using oil, gasoline, or diesel will be checked for evidence of leakage. If evidence of leakage is found, the further use of such equipment will be suspended until the deficiency has been satisfactorily corrected.
    - Excess or waste materials, petroleum products, fresh cement, lime or concrete, chemicals, or other toxic or deleterious materials will not be allowed to enter waters of the State.
    - An oil containment boom will be stocked on site. If there is a potential that floating debris may enter the aquatic area, the boom will be employed to collect floating debris prior to commencing work. The boom will also be utilized in the event of an oil spill, in which case the boom shall remain in place until all oily materials and floating debris have been collected, and sheen(s) dissipated.
    - Oil-absorbent materials will be employed if floating oil sheen is observed on the surface of the aquatic area. Used absorbent materials shall be collected, securely stored on site, and then properly disposed of at an approved upland facility.
- Bottom stockpiling of the dredged sediment will be prohibited.

- Operational controls will be applied to the return water from material and haul barges, including:
    - Filtering return effluent from the material barge to prevent release of suspended solids
    - Eliminating barge overflow (i.e., eliminating or reducing barge overflow reduces the volume of fine material that flows from the barge in the overflow)
- Cover sand will be placed by lowering the bucket through the water column to slowly release as close to the bottom as possible. The Port will specify a maximum percentage of fines acceptable in the material to be placed to minimize turbidity. Visual monitoring will occur during this activity.

Possible additional corrective measures that the contractor may utilize if their activities are out of compliance with water quality criteria include, but are not limited to, the following:

- Operational BMPs:
    - Slowing the speed of the dredge bucket through the water column
    - Avoiding overfilling of the bucket
    - Taking dredge material into the bucket in a single “bite”
    - Avoiding extreme tidal, current, or weather conditions
- Structural BMPs:
    - Modifying equipment to better control sediment resuspension, including use of environmental closed bucket when the site conditions support use of this type of bucket (e.g., little debris, soft unconsolidated sediment)
    - Installing a sediment barrier such as a silt/turbidity curtain. This BMP is considered to have limited effect due to the deep water elevations where maintenance dredging is needed.

7. Quality Assurance/Quality Control

The QA/QC objective for this Project is to ensure that the data collected are of known and acceptable quality, so that the goals of the water quality program can be achieved. Specific QA/QC requirements for field monitoring are provided below.

7.1 Field QA/QC

All field staff will be experienced in water quality monitoring. Staff will be trained in standardized field monitoring and data collection procedures, requirements, data management protocol, and QC. Data will be peer-reviewed before use in final deliverables. Staff will be fully trained in the calibration and standard operation procedures of field instruments. All field staff will have 40-hour Hazardous Waste Operations and Emergency Response certification with current 8-hour refresher, as necessary, to comply with Occupational Safety and Health Administration 29 Code of Federal Regulations 1910.120(e)(3).

Instruments and equipment will be inspected before each monitoring event. Any field equipment that is faulty or not functioning properly will not be used for monitoring or sample collection. A calibration check will be performed on the water quality meter and fathometer prior to monitoring each day using certified calibration standards. If water quality meter results are not consistent with standards, manufacturer's guidelines will be used to recalibrate the instrument. Standard instrument operating procedures will be used for all field instruments.

8. Reporting

This section describes reporting protocol for water quality monitoring activities, including communication responsibilities in the event of a confirmed exceedance event and summary reporting.

If there is evidence of a significant oil sheen, the Port will immediately report to Ecology's Northwest Regional 24-hour Spill Response Office at (206) 594-0000.

8.1 Daily Reporting

At the end of each monitoring day, a brief summary of water quality monitoring activities, field data sheets, and results of the monitoring will be provided by the FC to the PM. A daily log form is provided in Appendix F for use in recording general activities and observations, and other relevant information such as start and end times, and locations. A daily safety briefing form is provided in Appendix G to be completed at the start of each workday. A detailed description of each water quality standard to be monitored is provided in Section 4.1, above. An overview of water quality criteria and their application is provided in tabular format in Appendix H.

8.1.1 Suitable Material Exceedance Reporting

In the event of a confirmed exceedance within an area of suitable material, the Port will report this information to the Ecology representative listed in the water quality certification within 24 hours.

8.1.2 Unsuitable Material Exceedance Reporting

In the event of a confirmed exceedance within an area of unsuitable material, the Port will report this information to the Ecology representative listed in the water quality certification within 2 hours.

8.2 Weekly Reporting

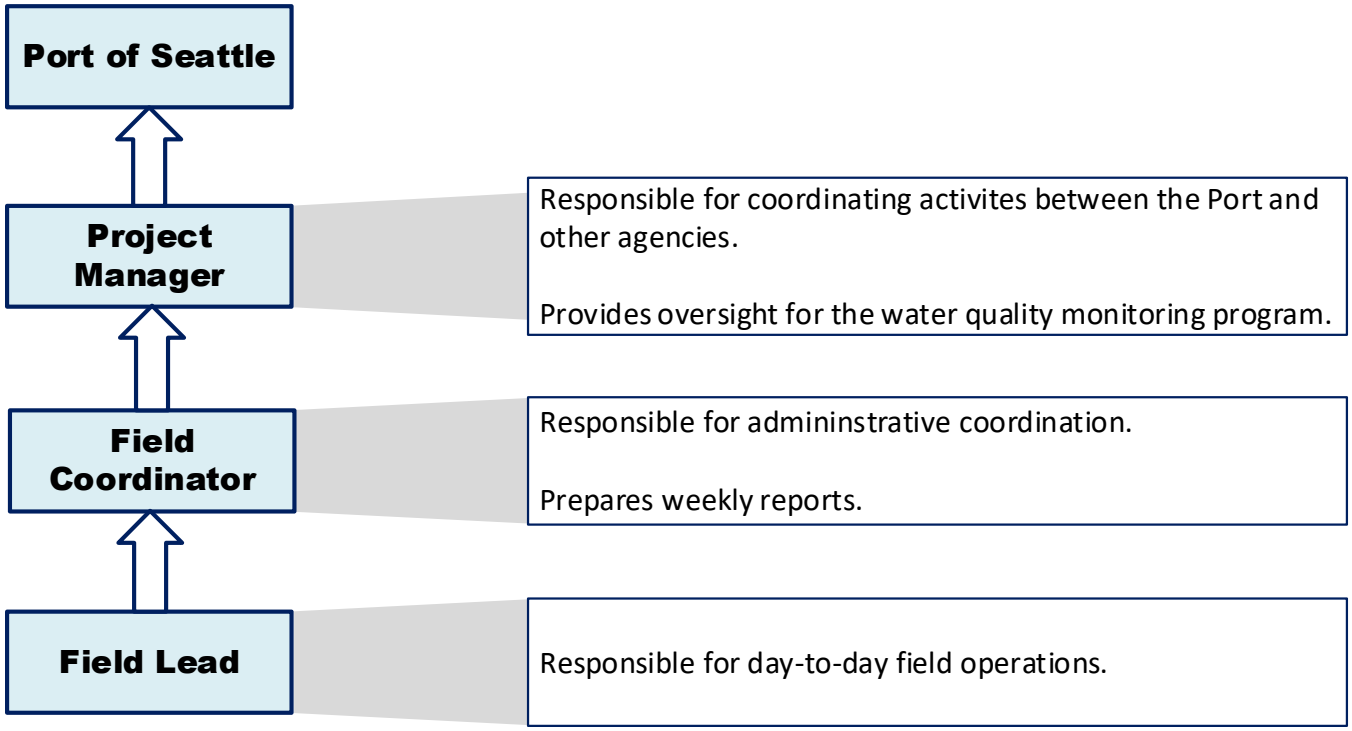
Weekly water quality monitoring data will be compiled into a summary table with a comparison to water quality compliance criteria. Weekly reports will be provided to Ecology. Weekly reports will summarize any confirmed exceedances, and corrective actions that were employed to achieve compliance with water quality criteria.

8.3 Water Quality Monitoring Completion Summary

After each maintenance dredging event is completed, water quality monitoring data will be summarized in a Water Quality Monitoring Results Report to be submitted to Ecology. The Water Quality Monitoring Results Report will include the following sections:

- Site background and content
- Field monitoring and sampling methods and actual sample locations
- Method deviations from this WQMP
- Results of monitoring, including data validation and water quality measurements
- Summary of confirmed exceedances and description of corrective actions taken

Appendix A. Chain of Command



Contact Information

Project Manager: Name	Phone Number	Date
Field Coordinator: Name	Phone Number	Date
Field Lead: Name	Phone Number	Date

Appendix B. Water Quality Monitoring Field Form

Water Quality Monitoring Field Form

Port of Seattle Maintenance Dredging Project

Water Quality Monitoring Field Form

Site Name:_____

Date:	Time Start @ BGS:	Monitoring Personnel:
Monitoring Frequency (circle one) Intensive Routine		Weather Observations:

Station ID	Tide Stage (Flood, Ebb or Slack)	GPS Coordinates (decimal degrees) Northing Latitude	GPS Coordinates (decimal degrees) Easting Latitude	Time	Depth (ft)		Turbidity (NTU)	DO (mg/L)	Temp (°C)	pH (pH units)	Notes / List any criteria not met *(Note that temperature requires 7-day average calculations for met / not met)*
BGS		47.	122.		Surface						
					Middle						
					Bottom						
EWS		47.	122.		Surface						
					Middle						
					Bottom						
CS		47.	122.		Surface						
					Middle						
					Bottom						
BGS		47.	122.		Surface						
					Middle						
					Bottom						
EWS		47.	122.		Surface						
					Middle						
					Bottom						
CS		47.	122.		Surface						
					Middle						
					Bottom						

BGS = Background Station; EWS = Early Warning Station, CS = Compliance Station. Refer to Appendix G for parameter criteria

Tidal Elevations	Time	Elev.	Time	Elev.
High				
Low				

Appendix C. Visual Water Quality Monitoring Field Form

Port of Seattle Maintenance Dredging: Visual Monitoring Field Form

Staff Initials	**Date / Time**	**Tide Stage** (ebb, flow, slack)	**Sheen, Floating Debris, or Distressed or Dying Fish or Wildlife Observed** (Y/N, brief description)	**BGS Turbidity** (note time of most recent record)	**EWS Turbidity** (note time of most recent record)	**CS Turbidity** (note time of most recent record)	**Plume Chasing:** Approx. Distance from IWA and GPS Coordinates of Endpoint of Plume

BGS = Background Station, EW = Early Warning Station, CS = Compliance Station, IWA = In-water Work Area

Appendix D. Turbidity Meter Calibration Worksheet

Turbidity Meter Calibration Worksheet

Turbidity Meter Calibration Worksheet

Project Name: _____

Project Number:_____

Date: _____

Reminder: Allow 2 minutes to warm up before calibration or use.

Turbidity Date: Calibration by:				
Initial 0 NTU	Final 0 NTU	Temp. (°C)	Initial ____ NTU	Final ____ NTU

Turbidity Std (_____) Lot # _____ Exp Date: _____

Turbidity Std (_____) Lot # _____ Exp Date: _____

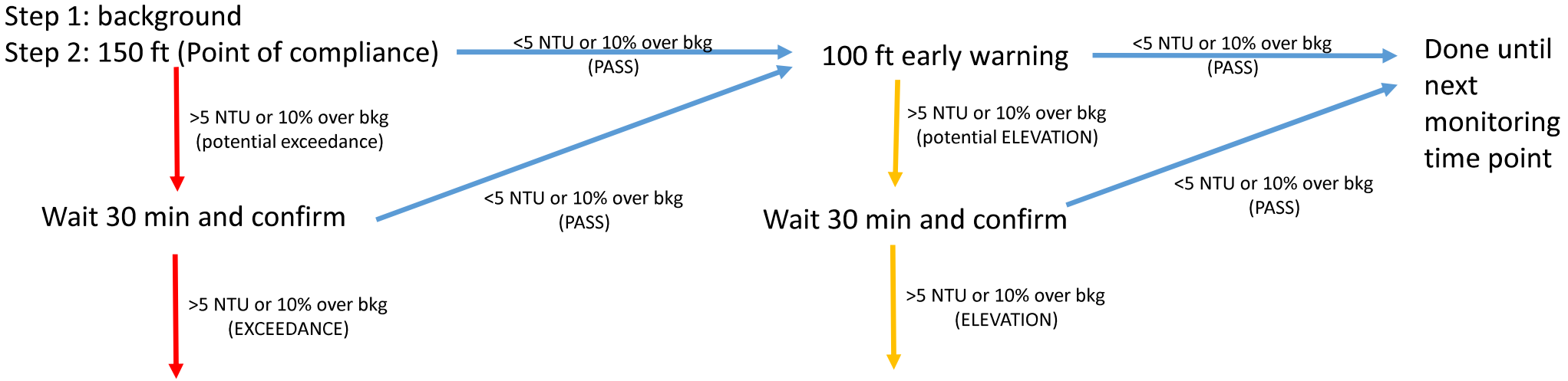
Turbidity Std (_____) Lot # _____ Exp Date: _____

Notes:

Appendix E. Process to Confirm an Exceedance

Appendix E-1: Dredging of Suitable Material
Appendix E-2: Dredging of Unsuitable Material

DREDGING OF SUITABLE MATERIAL: 1 hour after activity begins, twice a day, for 2 days in the first week; then to visual. Visual or measured exceedance restarts physical monitoring period.



REPORT EXCEEDANCE within 24 hours.

Implement more stringent BMPs.

Follow plume downstream to find extent of exceedance

Monitor hourly (background and point of compliance):

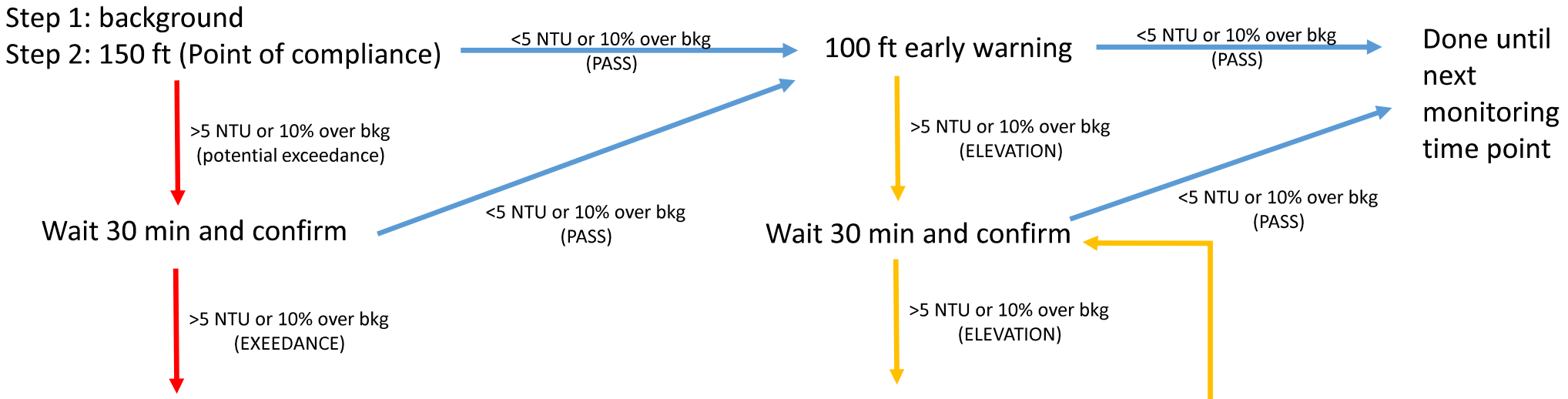
- If turbidity decreasing, continue monitoring until compliance met (or until sunset)
- If turbidity not decreasing within 2 hours of implementing BMPs, stop work.

Re-start the 2 day physical monitoring sequence.

Check BMPs, implement more stringent if all existing BMPs functioning.

Continue compliance monitoring on schedule.

DREDGING OF UNSUITABLE MATERIAL: 1 hour after activity begins, twice a day, for 5 days a week (intensive phase); then to 2X day twice a week (routine phase). Visual or measured exceedance restarts physical monitoring period.



REPORT EXCEEDANCE within 2 hours

<u>Stop work,</u> continue monitoring until compliance met or sunset (dangerous to monitor in dark).

Follow plume downstream to find extent of exceedance

Implement more stringent BMPs when re-starting work after compliance met.

Re-start the intensive monitoring sequence.

Check existing BMPs, and potentially implement more stringent BMPs.

Monitor at 30-60 minute intervals to track efficacy of new BMPs.

Appendix F. Daily Log

Daily Log

Daily Log

PROJECT NAME: _____ **DATE:** _____

SITE ID(s): _____ **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: _____

Appendix G. Daily Safety Briefing Form

Daily Safety Briefing Form

DAILY SAFETY BRIEFING

DATE: _____

PROJECT NAME: _____

PROJECT NO: _____

Meeting Conductor / Company: _____

Health & Safety Officer / Company: _____

Field Lead / Company: _____

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☐ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Chain of Command
- ☐ Communication
- ☐ Site Security
- ☐ Vessel Safety Protocols
- ☐ Work Zones
- ☐ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Other:
- ☐ Lifting Techniques
- ☐ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☐ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: _____

DAILY WORK SCOPE: _____

SITE-SPECIFIC HAZARDS: _____

SAFETY COMMENTS: _____

ATTENDEES

PRINTED NAME / COMPANY	SIGNATURE

Appendix H. Water Quality Monitoring Plan Overview Table

Parameter	Water Quality Criteria	
Turbidity	**WAC 173-201A-210 Table 210 (1)(e)** **Summary:** Turbidity measured as a one-day maximum must not exceed 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.	**Application:** Turbidity measured as a one-day maximum must not exceed 5 NTUs over background when the background is 50 NTUs or less. When background is more than 50 NTUs, the one-day maximum must not exceed a 10 percent increase above background
Visual Observations	Ongoing visual observations will include monitoring for turbidity, presence of sheen, distressed or dying fish, and floating debris.	
Monitoring Locations	• Compliance Station: 150 feet down-current of in-water work area • Background Station: 300 feet up-current of in-water work area	
Monitoring Depths	• Surface: 3 feet below water level • Middle: midpoint between surface and mudline • Botton: 3 feet above mudline	
Monitoring Frequency	**Intensive:** Intensive monitoring will occur for the first 4 days of dredging and will restart after any water quality exceedance. Record water quality criteria measurements twice daily during in-water work. If no confirmed water quality exceedances are measured at the Compliance Station for 4 continuous days, then monitoring will shift to the "Routine" schedule.	
	Routine: Record water quality criteria measurements twice daily on 1 day of each week. If a confirmed water quality exceedance is determined to have occurred at the Compliance Station, monitoring will return to the "Intensive" schedule.	
Response Actions	A water quality exceedance at the Compliance Station triggers notification to the Filed Coordinator, who will notify the Project Manager, who will notify the Port. Only the Port may direct the contractor. The contractor will modify work and implement BMPs as necessary. The Field Coordinator will continue monitoring to confirm the effectiveness of corrective measures, and reinitiation of the "Intensive" monitoring schedule. Ecology will be notified within 2 hours of the water quality criteria non-compliance.	

TERMINAL 91 BERTHING AREA SUPPLEMENT TO THE WATER QUALITY MONITORING PLAN

PORT OF SEATTLE MAINTENANCE DREDGING

Prepared for:
Port of Seattle
2711 Alaskan Way
Seattle, Washington 98121

Prepared by:
Clearway Environmental LLC
5002 13th Ave S
Seattle, WA 98108

Anchor QEA, Inc.
1201 3rd Avenue, Suite 2600
Seattle, WA 98101

February 2026

Introduction

The base Water Quality Monitoring Plan (WQMP), the Port of Seattle Maintenance Dredging Water Quality Monitoring Plan (Port of Seattle 2025), provides detailed methodology, monitoring protocols, best management practices (BMPs), and corrective actions to be taken during dredging and cover placement activities conducted under the Repair and Maintenance Program 401 Water Quality Certification and for maintenance dredging at Terminal 91. As described in the base WQMP, site specific supplements will be provided for each upcoming, proposed Port of Seattle (Port) project, and multiple projects may be addressed in one supplement.

This document is the site-specific supplement to the base WQMP for the Interim Action dredging and cover placement at Terminal 91 (T-91). T-91 is located at the north end of Elliott Bay. The Interim Action activities will occur in the western berth. This specialized supplement to the base WQMP provides additional information specific to the T-91 Interim Action activities, and includes site-specific details including:

- Anticipated dredging, disposal, and clean cover placement details (areas and volumes)
- Monitoring protocols
- In-water work window
- References
- Attachment A
- Figures

Dredging, Disposal, and Clean Cover Placement Details

The required dredge elevation at T-91 is -35 feet Mean Lower Low Water (MLLW) in the western dredge area (i.e., the western edge of the western berth), with a maximum allowable over-dredge elevation of -37 feet MLLW. The required dredge elevation in the eastern dredge area (i.e., along the eastern edge of the western berth) is -36.5 feet MLLW, with a maximum allowable over-dredge elevation of -38 feet MLLW. The Port will also be placing clean cover material in the eastern dredge area. Cover placement thickness is planned at nine inches. However, over-placement may be an additional three inches, for a total of 12 inches clean cover placement.

The dredged material will be disposed of at a pre-approved upland landfill facility.

Table 1 provides details on dredging, disposal, and clean cover quantities.

Table 1.
Dredging, Disposal, and Clean Cover Material Quantities

Project Area	Required Dredged Surface Area (sy)	Upland Landfill Disposal Volume (cy)				Clean Cover Material		
		Volume to -35 feet MLLW	Volume to -36 feet MLLW	Volume to -37 feet MLLW	Volume to -38 feet MLLW	Surface Area (sy)	Volume (cy, with 9-inch placement)	Volume (cy, with 12-inch placement)
Western dredge area	4,190	1,270	2,600	3,980	--	--	--	--
Eastern dredge Area	820	--	300	510	760	300	75	100

Notes:
cy: cubic yard
sy: square yard
MLLW: mean lower low water
--: not applicable

Monitoring Protocols

The base WQMP (Port 2025) provides detailed methodology, monitoring protocols, BMPs, and corrective actions during dredging and cover placement activities.

Available chemistry data presented in Section 3 of the Interim Action Work Plan indicate that contaminant concentrations are moderately elevated, but are below concentrations present in the Terminal 18 dredge area. An analysis of water quality concentrations conducted for Terminal 18 dredging indicated that water quality concentrations were not likely to adversely affect aquatic life as a result of dredging (Anchor QEA, 2025). This conclusion is also appropriate for Terminal 91 because concentrations are lower than Terminal 18 concentrations Therefore, the project will follow the "Process to Confirm an Exceedance" Flow Chart (Attachment A) that has been created specifically for T-91, which replaces the base WQMP's Appendix E. This Flow Chart matches the approved flow chart for dredging conducted of material that was unsuitable for open water disposal at Terminal 18 under that WQMP Supplement.

Adjustments made for the T-91 Process to Confirm an Exceedance include:

1. Notification of an exceedance will be within 2 hours for contaminated sediments. Any corrective changes to BMPs will be conveyed to the Port during this notification period.
2. 30 minutes after a confirmed exceedance will be allowed for corrective BMP implementation and for water quality criteria to be met, before stopping dredging. The threshold for a confirmed exceedance follows WAC 173-201A-210 guidance as exceeding 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.

3. An exceedance point of 35 NTU above background will be in place. If 35 NTU above background is measured during an exceedance event, this will trigger an immediate stop in dredging. After compliance is met, new BMPs will be implemented before restarting dredging.

In-Water Work Window

Project activities at T-91 will take place during the approved permitted in-water work window, which is expected to be September 1 to February 15.

References

Anchor QEA 2025. *Proposed Water Quality Monitoring Requirements for Terminal 18 Maintenance Dredging, based on LDW Upper Reach Water Quality Monitoring Data and Associated Sediment Chemistry Data.* Anchor QEA. October 2025.

Ecology 2025. Water Quality Certification Order No. 23666 (Corps No. NWS-2024-311), Port of Seattle Programmatic Routine Maintenance, Repair, and Scientific Sampling, King County, Washington. Washington State Department of Ecology. Northwest Region Office. Shoreline, WA. June 23.

Port of Seattle 2025. *Port of Seattle Maintenance Dredging Water Quality Monitoring Plan*. Port of Seattle. Prepared by Clearway Environmental LLC and Anchor QEA. October 2025.

Attachment A

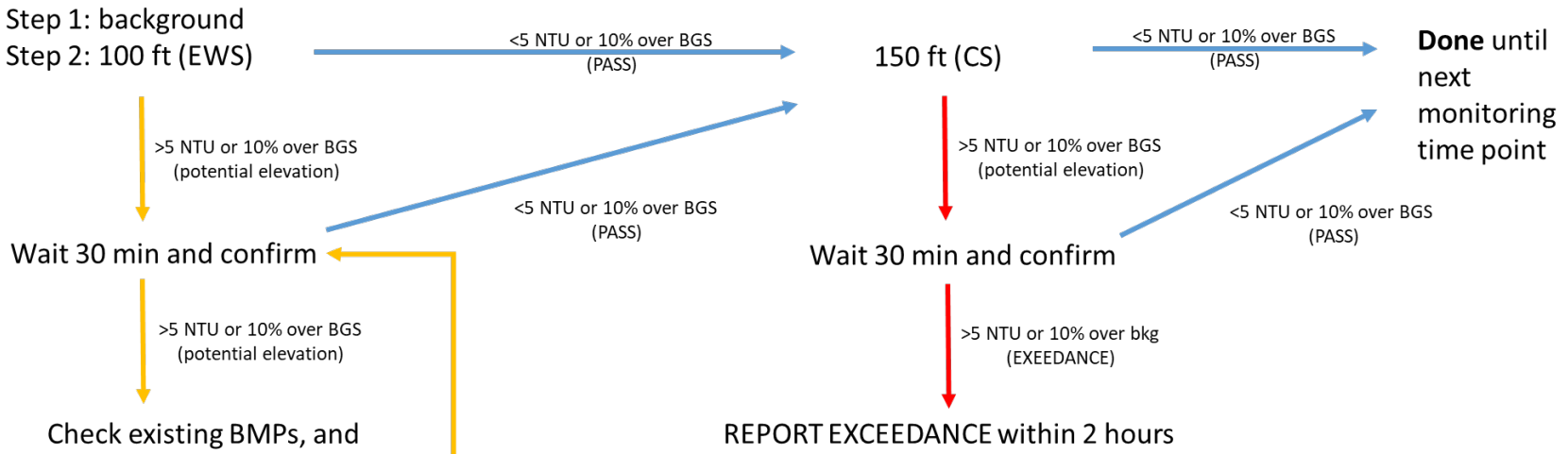
T-91 Site-Specific Process to Confirm an Exceedance Flow Chart

Figures

Figure 1: Water Quality Monitoring Map

Attachment A. T-91 Site-Specific Process to Confirm an Exceedance Flow Chart

DREDGING OF MATERIAL AT T-91 (UNSUITABLE FLOWCHART): 1 hour after activity begins, twice a day, for 5 days a week (intensive phase); then to 2X day twice a week (routine phase). Visual or measured exceedance restarts physical monitoring period.



Work may continue for 30 minutes after exceedance while new BMPs are implemented.

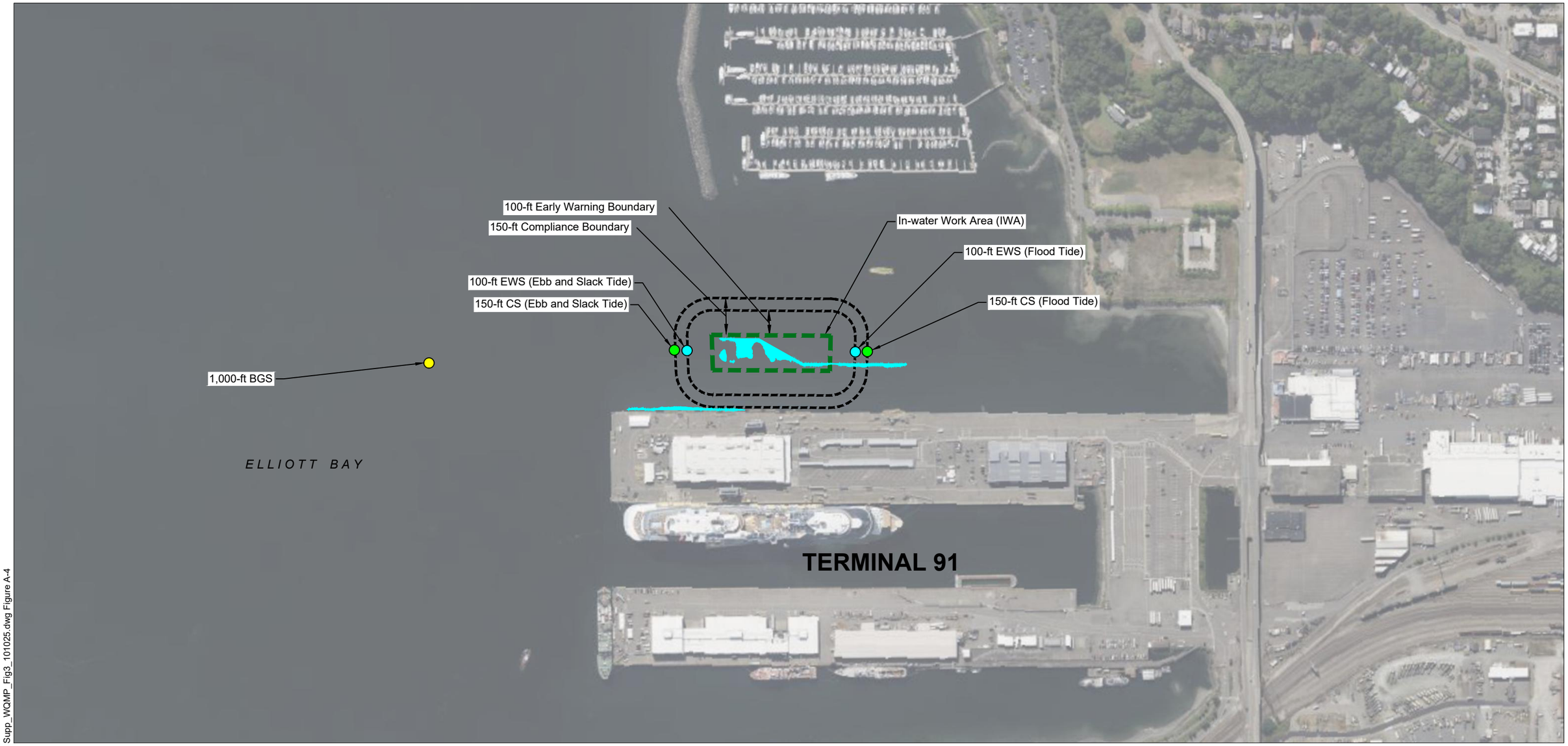
Follow plume downstream to find extent of exceedance.

Implement BMPs when re-starting work after compliance met.

Re-start the intensive monitoring sequence.

A confirmed exceedance of 35 NTU above background will trigger immediate stop of dredging. Additional BMPs will be implemented and intensive monitoring will restart.

Figures



Supp_WQMP_Fig3_101025.dwg Figure A-4

Feb 11, 2026 5:31pm chadd

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

NOTES:

- **The background station (BGS) to be located 1,000-ft south of the in-water work area (IWA).**
- **The early warning station (EWS) and compliance station (CS) monitoring locations will be oriented based on current direction.**
- **During flood tides, the EWS and CS will be north (down-current) of the IWA.**
- **During ebb and slack tides, the EWS and CS will be south (down-current) of the IWA.**
- **The IWA will move within the T-91 site depending on activity and equipment location.**

LEGEND:

- In-water Work Area
- Proposed Dredged Area
- Background Station (BGS)
- Early Warning Station (EWS)
- Compliance Station (CS)

N

0 400

Scale in Feet

Clearway Environmental

ANCHOR QEA

Terminal 91

Figure 1
Water Quality Monitoring Map
Terminal 91 West Cruise Dredging - Supplement to the
Port of Seattle Maintenance Dredging Water Quality Monitoring Plan

Appendix C
Post-Dredge Sampling Details

C1 Introduction

As described in Section 5 of the Interim Action Work Plan (IAWP), after dredging is complete, but prior to the placement of clean sand in the eastern dredge area, post-dredge sediment sampling will be conducted within the project area. This appendix provides details regarding the collection and analysis of these samples. This appendix describes the sampling design details (i.e., sample locations and analytes). All procedures for this sample collection effort (e.g., field collection methods, analytical methods, etc.) are the same as those described in the sampling and analysis plan (SAP)/quality assurance project plan (QAPP) prepared as Appendix B of the Feasibility Study (FS) Work Plan (WP; Anchor and Windward 2025).

C2 Sample Locations and Collection

A total of eight surface sediment samples will be collected to evaluate post-dredge conditions (Figure 5-4). The objective for these eight samples is as follows:

- Western dredge area – Three samples (0 to 30 cm) will be collected from the west dredge area to characterize post-dredge conditions to support the FS.
- Eastern dredge area – Three samples (0 to 30 cm) will be collected from the east dredge area to characterize post-dredge conditions to support the FS.
- Adjacent to western dredge area – Two samples (0 to 10 cm) will be collected from near the western dredge area (co-located with previously collected samples) at Ecology's request to confirm that there will be minimal impact on surrounding sediment associated with the maintenance dredging.

For the six samples to be collected within the dredge areas, the sample depth of 0 to 30 cm is intended to characterize both the current sediment surface as well as somewhat deeper material that may be exposed as sediment settles along the edges of the dredge slope following dredging. Sample IDs and target coordinates are provided in Table C-1.

Table C-1
Post-Dredge Sample Locations

Area	Sample ID[1]	Sample Interval	Target Coordinates[2]		Notes
			X	Y	
Western Dredge Area	T91-FS27-PD01	0-30 cm	1257952	233318	
	T91-FS27-PD02	0-30 cm	1257905	233020	
	T91-FS27-PD03	0-30 cm	1257868	232874	
Eastern dredge area (along pier)	T91-FS27-PD04	0-30 cm	1258138	232833	
	T91-FS27-PD05	0-30 cm	1258132	232632	
	T91-FS27-PD06	0-30 cm	1258130	232431	

Area	Sample ID[1]	Sample Interval	Target Coordinates[2]		Notes
			X	Y	
Adjacent to western dredge area	T91-FS27-PD07	0-10 cm	1257824	233410	Reoccupy T91-RI-SS07
	T91-FS27-PD08	0-10 cm	1257970	232997	Reoccupy T91-FS25-SS101

Notes:

1. Sample identification will generally follow the same scheme used for surface sediment samples in the FS WP. IDs will include the project area ID (T91), project phase ID (FS), sampling year (27 for 2027), PD for post-dredge sediment sample, and two-digit sample number.
2. Target coordinates are presented in WA-N-NAD83 (2011) horizontal datum, US survey feet.

ID: identification
NAD83: North American Datum of 1983

Prior to the collection of post-dredge samples, target locations will be verified relative to the final dredge prism. During collection of the post-dredge sediment samples, the field crew will attempt to collect samples as close as possible to the target location. However, if sample collection at the target location is unsuccessful (i.e., it does not meet the acceptance criteria outlined in the FS WP SAP/QAPP), the target location may be shifted by up to 30 feet (while staying within the final dredge prism) as needed to obtain an acceptable sample. In addition, while a depth of 30 cm is targeted for sample collection, if an acceptable grab sample with a depth of 30 cm is not obtained after three attempts, a shallower depth (minimum of 10 cm) will be accepted.

C3 Analytes

All samples will be analyzed for the full suite of marine sediment SMS chemicals (i.e., PCB Aroclors, metals, PAHs, phthalates, and other SVOCs; Ecology 2025). In addition, a composite sample including an equal volume of sediment from the three samples collected from the western dredge area (i.e., PD01, PD02, and PD03) will be analyzed for PCB congeners and dioxins/furans to support confirmation that no further action is needed in this area as part of the FS. A composite sample (which provides an estimate of the average concentration) is appropriate given that the PCB congener and dioxins/furans data will be compared to natural background concentrations in SCUM (Ecology 2025), which are applicable on an area-wide basis. In addition, for all eight sample locations, archive material will be collected and held frozen at the laboratory. Table C-2 provides a summary of the analytes for the post-dredge samples.

Table C-2
Analytes for Post-Dredge Samples

Parameter	Count of Samples
PCB Aroclors	8 (all post-dredge samples)
PCB congeners	1 (western dredge area composite sample)
SVOCs (PAHs, phthalates, and other SVOCs)	8 (all post-dredge samples)

Parameter	Count of Samples
Metals	8 (all post-dredge samples)
Conventionals (TOC, percent solids)	8 (all post-dredge samples)
Dioxins/furans	1 (western dredge area composite sample)
Archive	8 (all post-dredge samples)

Notes:
PAHs: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
SVOC: semivolatile organic compound
TOC: total organic carbon

C4 Quality Assurance/Quality Control (QA/QC)

No QA/QC samples will be required for the post-dredge samples. As specified in the FS WP, Stage 2B validation will be conducted for all samples.

C5 Reporting

As described in Section 8 of the IAWP, post-dredge samples results will be included as part of the Interim Action Completion Report. The post-dredge sampling data report will include the following:

- Figure showing actual post-dredge sample locations along with the final dredge prism
- Validated chemistry results compared with relevant criteria (i.e., SMS)
- Brief description of field activities, including any field or laboratory deviations
- Laboratory and data validation reports

In addition, as described in the FS WP, validated data will be uploaded to the Ecology's Environmental Information Management (EIM) database.

C6 References

Anchor QEA and Windward Environmental, 2025. *Terminal 91 Sediment Cleanup Unit: Feasibility Study Work Plan*. Final. Submitted to the Washington State Department of Ecology April 14, 2025.

Ecology (Washington State Department of Ecology), 2025. *Sediment Cleanup User's Manual.* Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Fourth revision December 2025.20251. Pub. No. 12-09-057. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, Washington.