

Duwamish/Diagonal CSO/SD Sediment Remediation Project Closure Report

1.0 Introduction

This Closure Report documents the work performed during the sediment remediation project at the King County Duwamish Combined Sewer Overflow (CSO) outfall and the City of Seattle Diagonal Way CSO/Storm Drain (SD) outfall (Duwamish/Diagonal CSO/SD) site on the Duwamish River in Seattle, Washington (Figure 1). This Closure Report describes the dredging, transport, disposal, and capping methods which occurred between November 2003 and March 2004.

1.1. BACKGROUND

To implement the requirements of the 1991 Consent Decree (United States District Court 1991) defining the terms of a natural resources damage agreement, the Elliott Bay/Duwamish Restoration Program (EBDRP) was established. Program oversight is provided by the EBDRP Panel, which is composed of federal, state, and tribal natural resource trustees, the Municipality of Metropolitan Seattle (which subsequently became part of King County government and is now the King County Department of Natural Resources and Parks [KCDNRP]), and the City of Seattle (City). The goals of the EBDRP include remediation of contaminated sediments associated with KCDNRP and City CSOs and SDs, restoration of habitat in Elliott Bay and the Duwamish River, and control of potential sources of contaminants from the outfalls.

In 1992, a Sediment Remediation Technical Working Group (SRTWG) was established by the EBDRP Panel to address contaminated sediment issues. The SRTWG identified 24 potential sediment remediation sites associated with KCDNRP and City CSOs and SDs. These sites were evaluated against several criteria, which included extent of contamination, degree of source control near sites, and public input, as reported in the Final Concept Document (EBDRP 1994a). Ultimately, the SRTWG selected three sites (the Duwamish Pump Station CSO and Diagonal Way CSO/SD, the Norfolk CSO, and the Seattle Waterfront) for further investigation. This Closure Report addresses the construction activities at the Duwamish Pump Station CSO and the Diagonal Way CSO/SD outfalls, which were combined into one site due to their proximity (i.e., the Duwamish/Diagonal outfalls).

In 1994, the Duwamish/Diagonal Cleanup Study Plan was prepared by KCDNRP on behalf of the EBDRP Panel. The five documents that comprise the Plan are the *Cleanup Study Workplan* (EBDRP 1994b), the *Sampling and Analysis Plan* (EBDRP 1994c), the *Phase 2 Sampling and Analysis Plan* (EBDRP 1996a), the *Health and Safety Plan* (EBDRP 1994d), and the *Public Participation Plan* (EBDRP 1994e). These plans provide the framework for the Duwamish/Diagonal sediment cleanup study that was approved by Ecology under the Washington State Model Toxic Control Act (MTCA).

The *Cleanup Study Workplan* identified nine chemicals or classes of chemicals of potential concern, based on six preliminary sediment samples collected near the outfalls in 1992 (EBDRP 1994b; Appendix B, Pre-Phase 1 Data). The chemicals of concern (COCs) exceeding Sediment Management Standards (SMS) sediment quality criteria were mercury, silver, zinc, chlorinated benzenes, phthalate acid esters, polychlorinated biphenyls (PCBs), high molecular weight polycyclic aromatic hydrocarbons (HPAHs), benzoic acid, and tributyltin.

KCDNRP implemented field collection activities, described in the *Sampling and Analysis Plan* (EBDRP 1994c), between August 1994 and September 1996. The primary goal was to determine the extent of sediment contamination around the Duwamish/Diagonal outfalls based on comparison to SMS criteria. Sediment chemistry data collected by U.S. Environmental Protection Agency (EPA) in 1998 for a National Priority List evaluation were also used to define areas exceeding SMS for four specific chemicals, PCBs, mercury, and two phthalate compounds. The results of these efforts were presented in the *Draft Duwamish/Diagonal CSO/SD Cleanup Study Report* (EBDRP 2001). The preferred remedial action was to install an engineered sediment cap to isolate contaminated sediment, but maintain existing bottom elevations for navigation and fisheries in a 5-acre area in front of the outfalls. Based on public comment, the project site was expanded from 5 acres to 7 acres so the remedial action included mechanical dredging of approximately 70,000 cubic yards (cy) of contaminated sediment. All dredged material was to be placed on barges and the contaminated sediments were to be transported to either a nearshore confined disposal (NCD) site in Tacoma, Washington, or to an offloading facility in the East Waterway for transport and disposal at a permitted Subtitle D landfill. Capping the site with clean material to produce final bottom elevations that were approximately equal to pre-dredge bottom elevations required different layers of capping material for isolation and armoring to prevent erosion from tug boats using an adjacent mooring pier.

A public meeting was held by EPA in Tacoma, Washington, on August 19, 2003, regarding the use of the Blair Slip 1 NCD site for disposal of the Duwamish/Diagonal sediments. Parties testified both for and against the use of the NCD disposal site. In the end, King County withdrew its plan to dispose of the Duwamish/Diagonal sediments at Blair Slip 1 due to time constraints and opted for upland disposal to ensure that construction could move forward during the 2003-2004 dredging window, as approved in the project permits.

To approve the expanded 7-acre cleanup project, Washington Department of Ecology (Ecology) and EPA required more information than was contained in the *Draft Cleanup Study Report* (EBDRP 2001). To help expedite the approval process, King County provided the following three documents, which were to be included in a Finalized Cleanup Study Report:

- 1) Expanded Area Document For Duwamish/Diagonal Cleanup Project (33 pages)
- 2) Source Control Summary Document (70 pages)
- 3) Responsiveness Summary Document (55 pages)

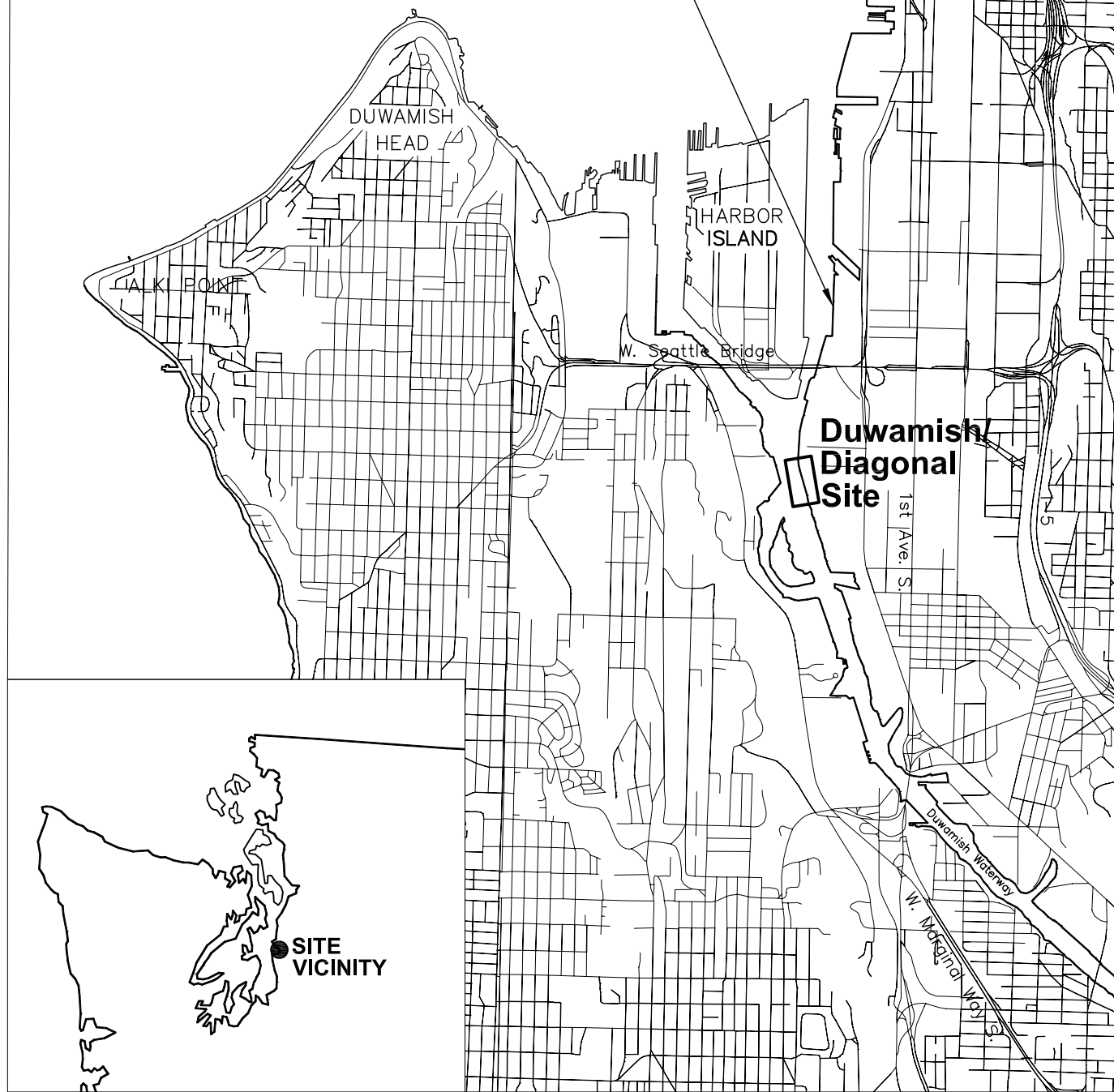
Two monitoring plans (*Water Quality Monitoring Sampling and Analysis Plan and Sediment Monitoring Sampling and Analysis Plan*) were also required for the approval process, which King County submitted in October 2003 and are included in Appendices F and G.

This Closure Report discusses the construction activities performed to implement the cleanup.



0 4000
Scale in Feet

Offloading/Rehandling Site At Terminal 25



Not to Scale

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Duwamish/Diagonal Sediment Remediation Project

Duwamish/Diagonal Vicinity Map

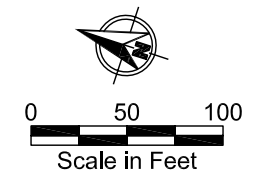
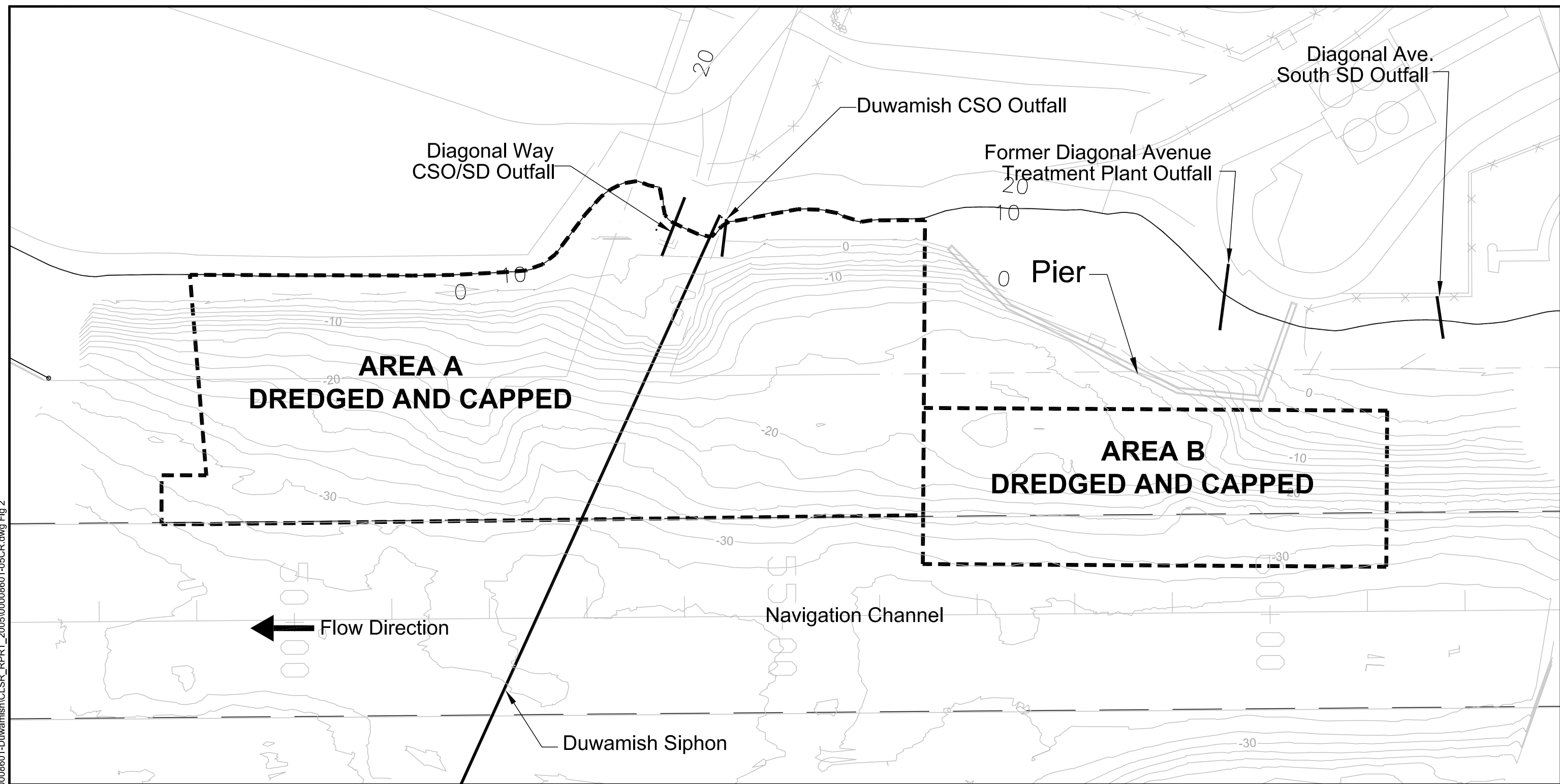
Figure 1

1.2. OBJECTIVES

The objective of the project was to remediate contaminated sediment in a 5-acre rectangle (Area A) and a 2-acre rectangle (Area B), as shown in Figure 2. The extent of contaminated sediment removal for the two primary COCs, bis(2-ethylhexyl)phthalate (BEHP) and PCBs, is shown in Figures 3 and 4, respectively. Area A was the original proposed cleanup area designed to address chemicals associated with discharges from the Duwamish/Diagonal CSO/SD and remediates about 5 acres of the highest BEHP values in surface sediments. The upstream and downstream boundaries of Area A were set based on bioassay testing results, and the offshore boundary was set at the edge of the navigation channel. The 2-acre Area B addresses a historic chemical “hot spot” associated with discharges from a historic sewage treatment plant. High PCB values in these sediments represent a significant risk of recontamination to cleanup Area A if sediments in Area B were dredged at a later time. The offshore boundary of Area B extends 50 feet into the navigation channel in order to remove all of the chemical “hot spot” where PCB values exceed the Cleanup Screening Level (CSL). Areas A and B do not include all sediments above the Sediment Quality Standards (SQS) for PCBs, but all sediments that are near the Duwamish/Diagonal CSO/SD site and exceed the SQS for PCBs will be evaluated as part of the Lower Duwamish Superfund Study.

The cleanup action for Areas A and B involved first removing sufficient contaminated sediment from both cleanup areas to make room for an effective layer of cap material. Then the remaining contaminated sediments within each cleanup area were covered with a minimum of 3 feet of capping material to isolate the remaining chemicals from the environment and return the site to approximately the bottom elevations that existed prior to dredging.

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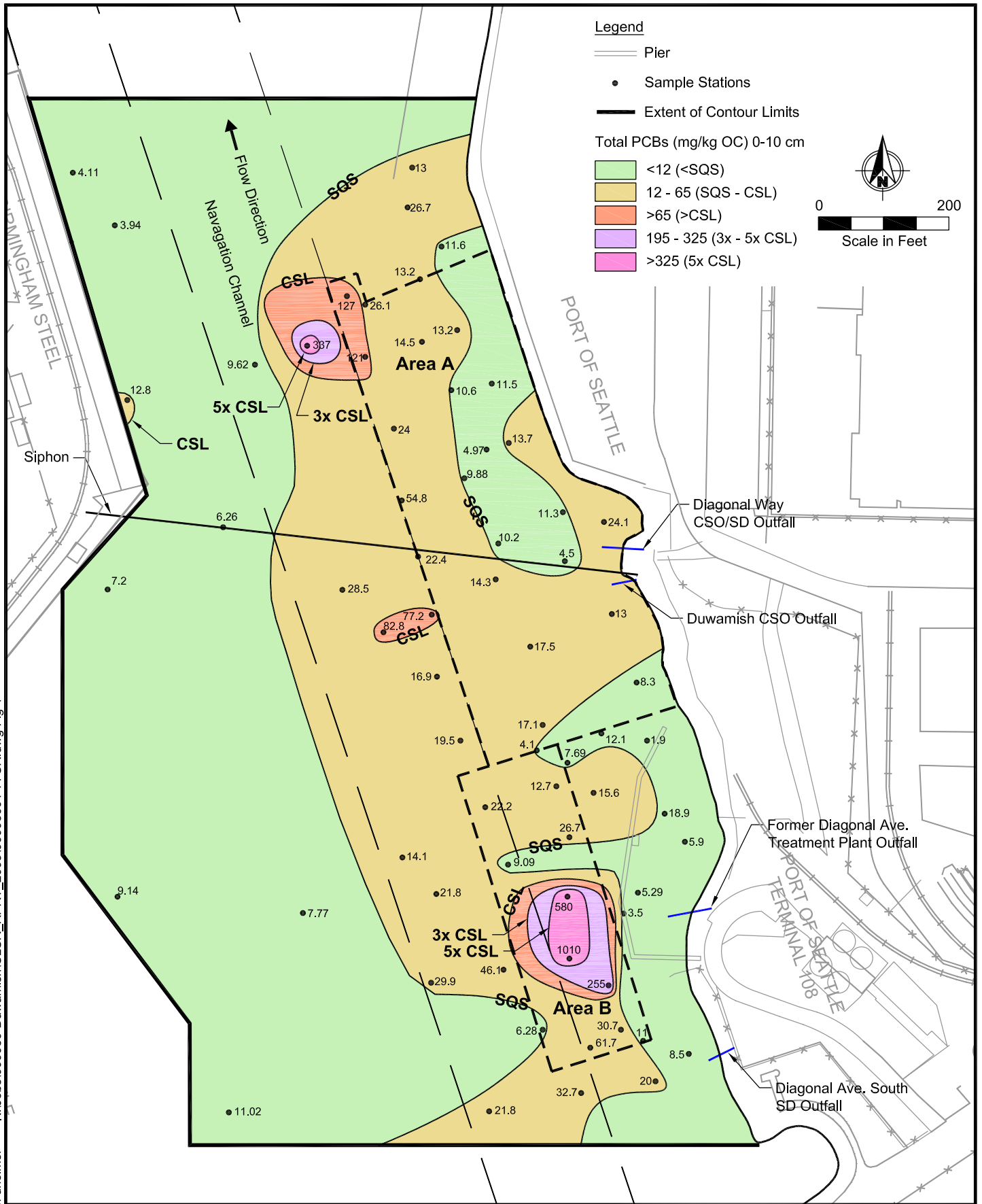
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Duwamish/Diagonal Sediment Remediation Project

Cleanup Areas A and B Dredged and Capped

Figure 2

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Duwamish/Diagonal Sediment Remediation Project

Total PCBs Distribution in Surface Sediment (0-10 cm)

Figure 4