

**Explanation of Significant Differences  
Commencement Bay Nearshore/Tideflats Superfund Site  
Thea Foss and Wheeler-Osgood Waterways**

**September 2004**

**SITE NAME AND LOCATION**

Thea Foss and Wheeler-Osgood Waterways  
Commencement Bay Nearshore/Tideflats  
Tacoma, Washington

**INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE**

The U.S. Environmental Protection Agency (EPA) is issuing this Explanation of Significant Differences (ESD) to document several modifications to EPA's 1989 Record of Decision for the nearshore and tideflats operable units and August 2000 ESD which identified more specifically the cleanup remedy for the Thea Foss and Wheeler-Osgood Waterways. In addition to the two waterways, this cleanup and this ESD also involves the St. Paul Waterway, the Middle Waterway, the Puyallup River at its terminus (i.e., delta) and further upstream at the U.S. Army Corps of Engineers levee, and a portion of Hylebos Creek.

The actions covered by this ESD are as follows:

- (1) to identify that the Puyallup River delta area can be used as a temporary storage area for 264,000 cubic yards (cy) of suitable sediments dredged from the confined disposal facility (CDF) in the Head of the St. Paul Waterway, while the mouth of the Thea Foss cleanup progresses. Of the 246,000 cy dredged and placed on the delta, no less than one-third of that amount will remain on the delta to benefit juvenile salmonids and create additional aquatic habitat while, up to two-thirds of that amount, 146,000 cy, will be beneficially re-used as (a) capping material in the Thea Foss Waterway; (b) to create habitat mitigation sites or (c) for capping the CDF. Placing these sediments on the Puyallup River delta is different than disposing them at the Dredged Material Management Program open water site (DMMP) in Commencement Bay as proposed in the August 2000 ESD;
- (2) to identify two new sources of capping material: (a) from the Puyallup River delta and (b) from the mouth of the Puyallup River, that can be dredged for beneficial re-use as part of the Thea Foss and Wheeler-Osgood Waterways cleanup and used as capping material in the Thea Foss Waterway or for the CDF, or as material to create or augment habitat mitigation areas;
- (3) to identify that the final volume of dredged contaminated sediments from the Thea Foss and Wheeler-Osgood Waterways and the final capacity of the St. Paul confined disposal facility (CDF) will be lower than the volume identified in the August 2000 ESD;

(4) to identify habitat mitigation projects and the total number of acres created as a result of these projects which meet the performance criteria identified in the August 2000 ESD;

(5) to provide clarification of the selected remedy and federal deauthorization of the navigation channel in the Thea Foss Waterway;

(6) to identify the basic institutional control measures that will be employed to ensure that the containment remedy in the Thea Foss Waterway will be maintained and remain protective to aquatic species in the waterways and ensure the habitat mitigation areas are preserved in perpetuity;

(7) to identify the final cleanup remedy for the NAPL seep area near SR-509 in the Head of the Thea Foss Waterway, and;

(8) to identify the project costs for the remedial actions performed by the City of Tacoma and three companies known as “the Utilities,” Puget Sound Energy, PacifiCorp and Advance Ross Sub-company.

### **Statutory Authority**

EPA is issuing this ESD in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117(c) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i), which authorize changes to the selected remedial action after issuance of a Record of Decision (ROD). This ESD will become part of the Administrative Record for the cleanup decision for the Thea Foss and Wheeler-Osgood Waterways, CB/NT Site. The Administrative Record is available for review at the following locations:

### **Administrative Record**

Environmental Protection Agency  
1200 6<sup>th</sup> Avenue, 7<sup>th</sup> floor  
Seattle, Washington  
(206) 553-4494

Tacoma Public Library - Main Branch  
1102 Tacoma Avenue South  
Northwest Room  
Tacoma, Washington 98402  
(253) 591-5666

## **SITE HISTORY, CONTAMINATION AND SELECTED REMEDY**

The Commencement Bay Nearshore/Tideflats (CB/NT) Superfund site is located in Tacoma, Washington at the southern end of the main basin of Puget Sound (Figure 1). On September 8, 1983, EPA placed the CB/NT site on the National Priorities List (NPL) of sites requiring investigation and cleanup under EPA's Superfund program. EPA made the Remedial Investigation and Feasibility Study (RI/FS) report available for public comment in February 1989. The RI/FS concluded that sediments in the nearshore/tideflats area were contaminated with a large number of hazardous substances at concentrations greatly exceeding those found in Puget Sound reference areas and which exceed sediment quality objectives (SQOs) defined for the site. The Record of Decision was signed on September 30, 1989.

The Record of Decision (ROD) identified the site boundaries which encompassed 10-12 square miles of shallow water, shoreline and adjacent land, most of which is highly developed and industrialized. The upland boundaries of the site are defined according to the contours of localized drainage basins that flow into the marine waters. The marine boundary of the site is limited to the shoreline, intertidal areas, bottom sediments and water of depths less than 60 feet below mean lower low water level (MLLW). The nearshore portion of the site is defined as the area along the Ruston shoreline from the Mouth of Thea Foss Waterway to Pt. Defiance. The tideflats portion of the site includes the Hylebos, Blair, Sitcum, Milwaukee, St. Paul, Middle, Wheeler-Osgood, and Thea Foss waterways; the Puyallup River upstream to the Interstate-5 bridge; and the adjacent land areas. In 1996, portions of the Blair and St. Paul Waterways were deleted from the NPL.

The Thea Foss waterway extends north to south and makes up about 1.5 miles of downtown shoreline for the City of Tacoma, Pierce County, Washington. The Wheeler-Osgood Waterway is approximately 0.3 miles long, runs east to west, entering the Thea Foss Waterway approximately halfway down the east shoreline just south of the 11<sup>th</sup> Avenue Bridge and north of J.M. Martinac Shipbuilding. See Figure 1a. The land use along the waterways was primarily industrial dating from the early 1890's until the 1980's.

In the past 25 years, the City of Tacoma and other entities have worked to enhance public access and create green spaces along the Thea Foss Waterway. A significant urban renewal project is underway along the Thea Foss Waterway. Marinas have been upgraded and new development has occurred, such as the Glass Museum, a renovated Alber's Mill, and Thea's Landing condominiums. There remain active, commercial businesses along the waterway, such as, marinas, J.M. Martinac, Johnny's Restaurant and Johnny's Seafood, and Colonial Fruit and Produce. The majority of the submerged lands of the Thea Foss Waterway is state-owned aquatic land, managed by the Washington Department of Natural Resources (DNR). The Wheeler-Osgood Waterway is privately owned.

The ROD selected a remedy comprised of five key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement, dredging and habitat mitigation), and monitoring, to address contaminated sediments in the waterways on the CB/NT site.

Contaminants found at elevated levels in the Thea Foss and Wheeler-Osgood Waterways include zinc, lead, mercury, high molecular weight polycyclic aromatic hydrocarbons (HPAHs), low molecular weight polycyclic aromatic hydrocarbons (LPAHs), cadmium, copper, nickel, 2-methylphenol, 4-methylphenol, bis[2-ethylhexyl] phthalate (BEP), butyl benzene phthalate, and polychlorinated biphenyls (PCBs). In addition, non-aqueous phase liquid (NAPL) seeps have been found at the head of the Thea Foss Waterway.

In July 1997, EPA issued an Explanation of Significant Differences (ESD) which modified the PCB cleanup level. In August 2000, EPA issued an ESD that described the cleanup plans for three of the waterways in Commencement Bay—the Thea Foss, Wheeler-Osgood, and Hylebos Waterways – and identified the St. Paul Waterway confined disposal facility (CDF) as one of two possible nearshore disposal sites selected to contain dredged contaminated sediments from the Thea Foss and Wheeler-Osgood and potentially Middle Waterway. The basis for the Thea Foss and Wheeler-Osgood Waterways portion of the 2000 ESD was the City of Tacoma’s Round 3 Data Evaluation and Pre-Design Evaluation Report (Hart Crowser, 1999).

## **BASIS FOR THE DOCUMENT**

After the 2000 ESD was completed, Special Notice Letters were issued in the summer of 2002 to all of the Potentially Responsible Parties (PRPs) in the Thea Foss and Wheeler- Osgood Waterways to conduct remedial action. The City of Tacoma and the three utility-related companies agreed to take responsibility for finalizing the design and performing remedial action in different parts of the waterways. The Utilities took over responsibility for finalizing the remedial design and conducting remedial action at the head of the Thea Foss Waterway (south of Station 70+10) and the City of Tacoma took responsibility for completing the design and conducting the cleanup of the remainder of the Thea Foss Waterway, commonly referred to as the “Mouth” and all of the Wheeler-Osgood Waterway.

The significant differences discussed below are as a result of changes in the cleanup plan due to finalizing the designs and modifications based on the actual work completed in the Head of the Thea Foss Waterway.

## **DESCRIPTION OF THE SIGNIFICANT DIFFERENCES**

**(1) Placement of dredged sediment on the Puyallup River delta.** The 2000 ESD identified that sediments dredged from the confined disposal facility (CDF) in the St. Paul Waterway, necessary to deepen the head of the waterway to create a disposal site, would be disposed of at the open-water Puget Sound Dredged Disposal Analysis site [PSSDA; now Dredged Material Management Program (DMMP)] in Commencement Bay. Final analysis in the 100% remedial design (Supplemental Volume, Tab 4, page 3) indicated the top five feet of material dredged from the St. Paul CDF was suitable for disposal at the DMMP site as supported in the 2000 ESD, and the material below the top five feet down to elevation -60 MLLW were below the Sediment Quality Objectives and could be beneficially reused. The top five feet of material from the CDF and sediments excavated for the toe of the off-set berm on the eastern side of the CDF, contained wood and other debris from Simpson’s log sorting yard operations located at the head of the St.

Paul Waterway. A total of 84,322 cy of sediments were disposed of at the DMMP site (65,010 cy from the top five feet of the CDF and 19,312 cy from the CDF off-set berm).

In order to complete the City's final remedial design, the compensatory habitat mitigation plans, required to compensate for unavoidable impacts to aquatic habitat by cleanup activities, had to be approved by EPA. This approval required that the mitigation and affirmative conservation measures, outlined in the 2000 ESD, were adequately achieved using the criteria in Section 404 of the Clean Water Act and the criteria requiring creation of other important positive habitat improvements identified in the *Commencement Bay Aquatic Ecosystem Assessment, Ecosystem-Scale Restoration for Juvenile Salmon Recovery* (Simenstad, 2000), which is a framework for the Commencement Bay-wide conservation and recovery strategy.

With these criteria in hand and the data indicating the deeper sediments from the St. Paul CDF were suitable for re-use, EPA, the Natural Resources Trustees (Puyallup Tribe of Indians, Washington State Fish and Wildlife, Washington Department of Ecology), Endangered Species Act (ESA) agencies – National Oceanic and Atmospheric Administration National Marine Fisheries (NOAA/NMFS) and U.S. Fish and Wildlife Service, and the community (e.g., Citizens for a Healthy Bay), identified a new habitat mitigation area using the Puyallup River delta. These dredged sediments from the CDF could augment the Puyallup River delta for beneficial aquatic habitat and be stored temporarily on the delta until capping material was needed in the Thea Foss and Wheeler- Osgood Waterways cleanup. See Figure 2.

Placing 246,000 cubic yards (cy) of dredged sediments from the St. Paul CDF 500 feet back from the north-western edge of the delta would potentially increase the size and reduce the overall depth of the delta by several feet in this area. This volume of sediments to be placed on the delta would be equal to approximately two years of bedload added to the delta from the Puyallup River.

Additional sediments placed on the Puyallup River delta would provide an environmental benefit to out-migrating juvenile salmonids and returning salmon. Increased surface area and reduced depths on the delta would provide additional shallow area where salmon can spend more time leaving, or entering, the estuarine system to undergo conversion from a fresh to saltwater environment (i.e., osmoregulate). In addition to this being a better environmental alternative for endangered species (i.e, Puget Sound Chinook salmon) and by meeting the 404 Clean Water Act and Simenstad criteria, it also reduces the City's disposal costs since tipping fees for disposing these sediments at the DMMP site would not be necessary. It also maintains the capacity of the DMMP site for the disposal of better suited materials (e.g., those that could not be beneficially reused).

The effects of placing these materials on the delta were evaluated by the City's design engineers (Hart Crowser, November 2003). It was determined that the material could be placed without triggering a slope failure near the edge of the delta (e.g., increased weight and pressure of the additional sediments would not cause the edge to collapse) if it were kept 500 feet back from the leading edge. EPA approved the plan for placement of dredged sediments from the St. Paul CDF on the Puyallup River delta. Sediments were placed on the north-western side of the delta, as

opposed to the more north-eastern side, to minimize or eliminate any potential sediment migration and deposition on adjacent Port of Tacoma properties. This action was completed between November 2003 and February 2004. Surveys taken during and after sediment placement are located in the Administrative Record.

**(2) Alternative sources of capping material.** The City of Tacoma's remedial design calls for capping 32 acres of sub- and intertidal sediments in the Thea Foss and Wheeler- Osgood Waterways, capping the CDF, and creating or augmenting several habitat mitigation areas. The City's Round 3 Data Evaluation and Pre-Design Evaluation Report, used to support the 2000 ESD, identified that capping materials would come from an upland source; although in-water sources would be considered if suitable and available in a timely manner.

This ESD identifies two alternative sources that would be acceptable for the City to use as capping material and/or material to augment or create habitat mitigation sites; (a) sediments from the Puyallup River delta or (b) sediments from the mouth of the Puyallup River from the same general location used for the St. Paul capping project in 1990.

**(A)** As discussed above, using some of the Puyallup River delta sediments as capping material is one of two alternative sources for capping material based on the origin of the material (e.g., Commencement Bay) and the nature and grain size of the material (e.g., compatible with the natural material in the Thea Foss and Wheeler- Osgood Waterways and meets the cap specifications). However, before this material is used, it must be demonstrated that it meets the cap or habitat site specifications. Beneficially reusing this material would save the City the cost of buying capping material from an upland source. Since there is a significant habitat benefit from placing the dredged CDF sediments on the delta (meeting the mitigation and affirmative conservation measures) EPA supports using only part of this material for capping purposes, or use for creating/augmenting habitat mitigation sites. Therefore, EPA will allow up to 164,000 cy of sediments (two-thirds of the total placed) from the Puyallup River delta to be used as capping material in the Thea Foss and Wheeler- Osgood Waterways, for capping (e.g., closing) the St. Paul CDF or for augmenting/creating habitat mitigation sites. EPA has determined that if some of these sediments were removed from the delta, the 82,000 cy remaining on the delta would provide a habitat advantage.

**(B)** Another alternative source for capping material for this cleanup is from the mouth of the Puyallup River, which is the southern most edge of the forming delta (the delta is expanding to the north). This source of capping material was used previously in 1988 for capping sediments north of the Simpson Company (known as the St. Paul cap). This material would also likely be a good source of capping material as it is from a similar aquatic environment as the area to be capped in the Thea Foss Waterway. This material would need to be tested to determine that it is suitable as capping material and meets all the required specifications (e.g., chemical constituents and grain size).

EPA and other resource agencies prefer this location as a potential in-water source of capping material, if an upland source is not used (versus dredging sediments from the Puyallup River delta). Experience shows that material previously excavated from the mouth of the Puyallup

River resulted in a depression which filled in within a year or two with material settling out of the river as it moved over this location. It is believed that salmon are more likely to osmoregulate in the delta where the water is calmer, as opposed to doing so in the mouth of the river where the water is moving faster. Taking material from the mouth of the Puyallup River may also be beneficial to businesses located at or near the mouth of the river since sediments settling out of the water column in the river refilling this excavation depression would be material that would not be available to settle out onto adjacent areas causing siltation problems and more frequent maintenance dredging.

**(3) Capacity of the St. Paul CDF and sediments dredged from the Thea Foss and Wheeler-Osgood Waterways.** The 2000 ESD required that the volume of the St. Paul CDF be maximized in order to allow disposal of dredged contaminated sediments from the Thea Foss and the Middle Waterways, with an estimated capacity of 600,000 - 750,000 cy. In addition, that ESD estimated that there were 620,000 cy of sediments needing “active remediation” (i.e., dredging) from the Thea Foss and Wheeler-Osgood Waterways.

After final design of the Thea Foss Waterway cleanup and the Middle Waterway design, it was determined that the Middle Waterway sediments would not be disposed in the St. Paul CDF, but would be placed in Blair Slip 1 in the Hylebos Waterway (the second in-water disposal site identified in the 2000 ESD). The City’s final design for the Thea Foss and Wheeler- Osgood Waterways identifies a final estimated dredge volume of 520,000 cy which will be placed into the St. Paul CDF. The final dredge volume identified in the remedial action bidding documents is 520,000 cy. The Utilities’ final design for the head of the Thea Foss Waterway called for dredging approximately 5,000 cy, which was disposed of at a permitted, off-site upland facility.

In the Final Design Analysis Report (November 2002, Section 5.10.4), the minimum required neatline capacity of the CDF is 545,000 cy. Assuming a bottom elevation of -50 MLLW, additional lateral excavation was required. With the configuration shown in the CDF design, the final capacity is identified as 551,000 cy.

The City’s remedial action contractor determined that consolidation of the foundation soils and the consolidation of the dredge material, plus excavating the CDF slightly steeper and deeper (to -60 ft MLLW) would increase the capacity which is necessary to accommodate the temporary increase in sediment volume created by using hydraulic dredging. Hydraulic dredging removes contaminated sediments by “vacuuming” them and suspending them in water, creating a slurry that is pumped through a pipeline and discharged into the CDF. As the suspended sediments consolidate and the overlying water is captured, treated and released, the total volume of disposed sediments consolidates in the CDF.

**(4) Habitat mitigation projects for the Thea Foss and Wheeler- Osgood Waterways remediation.** The 2000 ESD required the City “to take all appropriate and practicable steps to avoid short- and long-term unacceptable adverse impacts to the Commencement Bay aquatic environment” during the remedial design, construction and site maintenance to continue to avoid and minimize adverse impacts to aquatic habitat. In the event there were impacts to aquatic habitat, EPA required detailed compensatory mitigation plans to offset loss and other impacts

and to meet the Endangered Species Act (ESA) requirements. It was also stated that, “It is EPA’s intent that remediation, including required compensatory mitigation, of the CB/NT site cumulatively contribute toward the recovery of ESA listed species.” Drawing from the Simenstad report (2000), EPA identified “performance criteria” that must, at a minimum, be addressed in any acceptable compensatory mitigation plan. These criteria focus on the broad landscape attributes and ecosystem processes (i.e., landscape ecology) that promote juvenile salmon utilization of existing and potential Puyallup River delta and Commencement Bay habitats.

Also, the 2000 ESD identified that the creation of the St. Paul nearshore fill (CDF) will result in the loss of approximately 13.6 acres of littoral and subtidal aquatic habitat, including 7.6 acres of mudflats. The mitigation plan existing at the time, designed to offset these losses and to recovery of migratory salmonid populations, provided a nearshore habitat connection between the Puyallup River and other existing nearshore habitats. The plan included approximately 25 acres of estuarine habitat comprised of 15 acres of enhanced and 10 acres of created intertidal habitat, creation of a tidal channel and wetland marsh with a fresh water source, and preservation of land for a potential connector channel between the Puyallup River, the marshland, and the Middle Waterway.

When the 2000 ESD was finalized, none of the compensatory mitigation plans submitted to date had been approved. The City’s draft plans also indicated that several acres of intertidal habitat (4.6 acres within the Thea Foss Waterway) would have been lost and not compensated for.

Throughout development of the final remedial design, discussions regarding habitat mitigation changed in emphasis from “creating” and “enhancing” habitat per se, to (1) continuing to ensure no net loss of aquatic habitat and (2) creating or enhancing habitat at tidal elevations providing the most beneficial environment for endangered Puget Sound Chinook and other salmon, and aquatic habitat in general. The elevation identified as the most desirable were increases in the elevations between Ordinary High Water (OHW) to minus 10 ft. MLLW (littoral habitat), and specifically between -4 ft. MLLW and +4 ft. MLLW.

Table 1 provides the final habitat acreage approved by EPA in the City’s Final Design. The habitat mitigation includes creation of 11.4 acres of new aquatic habitat in the Puyallup River Side Channel, North Beach Habitat Area, and Middle Waterway Tideflat areas. This created habitat compares to net loss of aquatic habitat of 12.0 acres of aquatic habitat in the St. Paul waterway and Thea Foss Waterway. As such, Table 1 indicates a net deficit in total aquatic habitat of 0.58 acres associated with these plans. Therefore, the City is required to provide, at a minimum, an additional 0.58 acres of aquatic habitat. At this time, the City is developing the design for a project on Hylebos Creek (referred to as the Bunker Mitigation project) to provide this habitat. The Bunker Mitigation project will be designed to maximize areas with tidal elevations and habitat features that provide the most beneficial environment for endangered Puget Sound Chinook and other salmon, and aquatic habitat in general.

The 2000 ESD required that a freshwater distribution pipeline “be implemented to assure full function of the (tideflats) mitigation project” in Middle Waterway. Later studies determined this



to be infeasible. First, Simpson reserved land for several years to provide access for a freshwater pipeline to be built. After time, however, the City, or other parties, did not pursue this land and it was sold for other development purposes. After this, the City studied the option of creating a six-inch freshwater lense from an undetermined fresh water source (e.g., an artesian well or an irrigation-type system) in the Middle Waterway. The conclusion was that it was technically infeasible to create a system allowing a six-inch lens of fresh water and still be accessible to fish (e.g, if log booms or curtains were employed, freshwater would stay in, but fish would be kept out). The City also evaluated the effects of the Puyallup River as a source of freshwater to the Middle Waterway. The conclusion was that although the river provides freshwater to the west of Commencement Bay, the elements impacting this source moving into the Middle Waterway, such as seasonality, wind-direction, flow rate of the river, does not coincide with out-migrating salmon.

As a result of this study, EPA modified its requirements for the function of the tideflats project to create an intertidal brackish marsh which incorporated the previously designed dendritic channels in this area (north of the Trustee/Simpson pilot restoration project site). An irrigation system will be installed and will provide freshwater to reduce sediment pore water salinity to ten part per thousand over 50% of the contour between +11 and +12.5 ft. MLLW. This system will support eight areas (known as “nodes”) of brackish marsh species. The overall goal is that these nodes will provide a seed source for plant expansion between these nodes.

In an effort to enhance the habitat, and incorporate Simenstad’s affirmative conservation measures, “pocket beaches” were created throughout the Thea Foss. Pocket beaches are located at Pick’s Cove Marina (now called Foss Landing Marina), Foss Waterway Marina, Alber’s Mill Marina, at the head of Thea Foss adjacent to Berg Scaffolding, and at Johnny’s Seafood. Other habitat improvements are pile removal and replacement only with steel pile if necessary, removal of over water structures where feasible, marina improvements to prevent grounding floats, and create open (e.g., screened) walkways to allow natural light and to reduce the overall surface area coverage. Also, the natural contours of the Wheeler-Osgood Waterway were preserved by identifying a remedy that wasn’t “over-engineered” as in the original design (e.g., with steep slopes and riprap surrounding the waterway). Some anthropogenic material was left in the waterway to anchor the banks, but most of the areas were gently graded and the “U” shape of the waterway was maintained. This cleanup was completed in February 2003.

#### **(5) Clarification of selected remedy and consideration of federal deauthorization of the navigation channel in the Thea Foss Waterway.**

**(A) Utilities Work Area.** The August 2000 ESD described placement of a sheetpile wall to provide slope stability at a slope transition near Station 72+40. Based on further investigations of the extent of subsurface NAPL, the Utilities designed the sheetpile wall to be installed at Station 70+10. Station 70+10 is the northern extent of the Utilities’ work area. South of the sheetpile wall, the cap is installed higher than the authorized navigation depth, and precludes future dredging that could achieve the authorized depth. Therefore, the area requiring deauthorization is extended northward from Station 72+40 (as described in the August 2000 ESD) to Station 70+10.

In the final design approval, September 19, 2003, EPA stated, “Because deauthorization is an essential component of this (the Head of the waterway) cleanup, and the Utilities have agreed to move forward with remedial action without formal deauthorization, the Utilities understand and agree that, until Congress acts to deauthorize the channel to a depth above the most shallow depth of the cap, in EPA’s sole discretion, if future operations of the Thea Foss Waterway require removal, relocation, or alteration of the cap, or if the cap causes an unacceptable obstruction to the free navigation of the waterway, the Utilities will, upon notice by EPA, remove, relocate, or alter the cap. The Utilities also understand that the temporary fill authorization will be temporary, and that the agencies expect that the Utilities and the City will achieve deauthorization before the completion of construction of the City’s remedial action or the end of calendar year 2005, whichever is later. The Utilities also understand that they are placing the cap at their own risk of failing to achieve deauthorization within the specified time frame above and that they will have to remove, relocate, or otherwise alter the cap so that it is below the federally-navigable depth of the Thea Foss Waterway.”

**(B) City of Tacoma Work Area.** The final elevations of two other locations in the Thea Foss Waterway will also exceed the federally authorized navigation depth. These areas are located on the west (Stations 43+50 to 52+75) and the east (Stations 46+75 to 52+75) of the waterway and exceed the navigational depth of -19 and -21 feet in these areas. Historically these areas have exceeded (e.g., been more shallow than) the federally authorized depths and is acknowledged so by the U.S. Army Corps of Engineers (Corps). Due to design considerations, dredging to the outer edge of the channel to the navigable depth and below the depth of known contamination is not possible since there are structures on the banks of the shoreline that would be compromised by dredge cuts at these depths. The caps that will be placed on these areas are no higher than the current surface depths.

The City and Corps have an agreement regarding the encroachment between the set of stations above and if in the future the Corps needs to conduct navigational dredging of these locations, the City may have to modify the remedy based on this future use. Installing sheet pile walls for stability in these locations is likely practicable, but has not been evaluated at this point. For the City to be ensured that the remedy they put in place will not have to be removed or modified, the City would need to apply to Congress for deauthorization of these portions of the Thea Foss Waterway. This ESD is not requiring the City to apply for deauthorization of these areas.

**(6) Institutional Controls.** At the time the 2000 ESD was finalized, it was anticipated that institutional controls would be necessary to maintain integrity of the remedy. The overall objectives for these waterway-specific Institutional Control Plans remains the same as stated in the 2000 ESD:

1. Reduce potential exposure of marine organisms to contaminated sediments disposed of and confined in aquatic disposal sites or confined by capping; and
2. Reduce potential exposure to marine organism to contaminated sediments left on the CB/NT site.

As a component of remedial design and remedial action planning, the basic elements of institutional control plans have been identified and will be memorialized in final Institutional Control Plans for both the City of Tacoma and the Utilities. The basic elements include, but are not limited to: (1) proprietary land use controls on privately-owned properties through state statutory restrictive covenants, and equitable servitudes that will run with the land in perpetuity; (2) governmental controls, including permits required under Section 404 of the Clean Water Act for dredge or fill projects and Section 10 of the Rivers and Harbors Act; City of Tacoma shoreline development permits and building permits that regulate activities in, on, and adjacent to the Waterway; and restrictions on leasing state submerged lands, and/or controls placed in leases or other use authorizations issued by the Washington DNR on submerged lands affected by the remedy; (3) informational controls, such as, fish advisories by the Pierce County Department of Health, Local Notices to Mariners published by the US Coast Guard, and National Oceanographic and Atmospheric Administration (NOAA) procedures to issue notices, and revise navigation/nautical maps and charts to reflect new bottom depths in the Waterway, placement of warning buoys in the Waterway; and (4) contracts and an easement between the City of Tacoma and the current owner of the St. Paul Waterway and the confined disposal site related to granting the City access in perpetuity to maintain and monitor the CDF, and the owner agreeing to restrict land uses on the CDF and habitat mitigation areas that are not consistent with maintaining the effectiveness of the CDF and mitigation areas. Additionally, the easement also provides that habitat areas shall be preserved in perpetuity as habitat.

The Federal, State, and local permitting programs discussed above will assess and, if necessary, address contaminated sediment exposed or handled due to navigation dredging or dredging for development purposes in the future. Dredging or development permit application reviews, depending on the project, likely will result in notice to EPA and necessary measures can be required in the permits to ensure appropriate handling and disposal of contaminated dredged sediment. Institutional controls that rely on real property interests to restrict land uses are necessary and feasible to implement. On the portions of the Thea Foss Waterway where the sediment caps are located on property owned by private businesses or individuals, it is necessary to use statutory restrictive covenants to ensure that current and future uses of such properties are not inconsistent with the remedy and do not disturb the caps to the degree that the caps no longer effectively contain the contaminated sediment or NAPL underneath. Likewise, due to the long-term nature of the sediment caps, it is necessary that upon transfer of the affected properties to new purchasers that equitable servitudes and/or covenants real under Washington state real property law are affected to ensure the restricted uses run with the land against all future land owners and users.

**(7) Modifications to the Head of the Thea Foss Waterway remedial design.** At the head of the Thea Foss Waterway (South of Station 70+10), the Utilities are responsible for the design, construction, and long-term maintenance of the remedy. The Utilities re-evaluated the remedy described in the August 2000 ESD and modified a) the disposal location for dredged material and b) the final cap design in an area known as the SR-509 seep, which released NAPL droplets at low tides. See Figure 3.

The 2000 ESD stated that dredged material from the Thea Foss Waterway would be disposed in the CDF. When the Utilities took over the remedial design activities from the City in 2002, they redesigned the work required and determined that their work area required a relatively small amount of sediments to be dredged (approximately 5,000 cy). Because the St. Paul CDF was not yet constructed, and to avoid delaying cleanup in their work area, these sediments were disposed in a permitted upland landfill in Pierce County.

The 2000 ESD also identified a remedy for the head of the waterway to control the non-aqueous phase liquids (NAPL) observed between stations 72+00 and 80+00. That remedy consisted of a composite multilayered cap which may consist of sand, sorbent material and geotextile membrane over areas that have active NAPL seeps to cap and contain those seeps; dredging sediments; 3 foot thick sand caps in areas without composite; sorbent cap material; and the placement of a sheet pile wall across the waterway north of the State Route 509 bridge near Station 72+40.

The Utilities modified the cap design described in the 2000 ESD to address the active NAPL seeps. Following a removal action by the Washington State Department of Ecology on the west bank of the waterway (known as the West Bank Seep) to control a source of NAPL, one remaining active seep was identified. This area, to the east of center in the waterway, is approximately 50 ft. X 60 ft. Instead of using a sorbent material as proposed by the City of Tacoma, the Utilities selected a high-density polyethylene (HDPE) material, 60 ft. x 75 ft., to place over this active seep. The Utilities determined that no active seeps existed in the rest of the waterway, and that the material that had naturally settled out in the waterway was effectively preventing any migration of remaining subsurface NAPL. By the time the remedy was completed, the actual depth of the sand cap exceeded 3 feet in some areas, but at a minimum met the ESD cap standards throughout the waterway. See the Utilities design and remedial action construction documents in the Administrative Record.

#### **(8) Project Costs.**

The 2000 ESD provided a comparison of the cost estimates in the 1989 ROD to the estimates for implementing the remedial actions outlined in that ESD. Table 2 provides the updated cost estimates to conduct the project provided by the remedial action contractors. In addition, since the project was split in two and performed by two different parties, project costs for the Head of the Thea Foss Waterway are included as well. The costs for cleanup at the Head of the Thea Foss Waterway decreased from the estimates at the 30% design, whereas the costs for the portion of the City's cleanup actions have increased.

Table 2. Comparison of cost estimates in the 1989 ROD, 2000 ESD and 2004 ESD.

	1989 ROD cost estimate (\$ million)	2000 ESD cost estimate (\$ million)	2004 ESD cost estimate (\$ million)
Thea Foss/Wheeler-Osgood	\$ 8.89-26.7	\$ 35.9*	\$ 48.66
Head of Thea Foss	Not Available**	Not Available	\$11.5

\* included the cost of the remedy for the Head of the waterway

\*\* this portion of the waterway was identified as a discrete cleanup area, with its own cost documentation, until the Utilities took over the project in summer 2002.

The costs for the City of Tacoma's portion of the remedial action is based on the September 2004 estimate including any change orders in the project so far, which includes tax and excludes work that is also being conducted by the City's remedial action contractor for the Foss Waterway Development Authority. Documentation is in the Administrative Record. Specific cost estimates for the City's and Utilities' work is in Appendix A.

A comparison between the remedy costs and quantities estimated in the 1989 ROD and 2000 ESD and the actual costs and quantities of the Utilities remedy is difficult to make. The ROD recognized the remedy would be refined and the 2000 ESD based estimates on the City's Round 3 Data Evaluation and Pre-Design Report (1999) but neither the ROD, nor the 2000 ESD, presented a remedy equivalent to the remedy performed by the Utilities.

## **SUPPORT AGENCY COMMENTS**

The Washington State Department of Ecology (Ecology) had an opportunity to review and comment on the draft remedial design for the Puyallup River delta augmentation and alternatives for capping materials and had no comments.

The Puyallup Tribe of Indians, NOAA, the U.S. and Washington State Fish and Wildlife services and the Port of Tacoma and CHB participated in several meetings in Fall 2003 discussing the issues associated with using the Puyallup River delta as a potential disposal area for suitable materials from the St. Paul Waterway and as a potential source of capping material. All of these parties supported the concepts as presented in this ESD. The Tribe, these agencies, and community groups supported the selected remedy to the 2000 ESD, including the disposal site selection and the Thea Foss/Wheeler-Osgood cleanup plan.

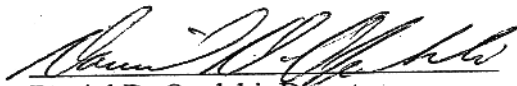
## **AFFIRMATION OF THE STATUTORY DETERMINATION**

This selected remedy as modified by this ESD is protective of human health and the environment, complies with Federal (CERCLA Section 121), State and Tribal requirements that are applicable, or relevant and appropriate to this remedial action as identified in the ROD and subsequent ESD, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. However, because treatment was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principle element. Because the decision to cap certain areas with contaminated sediments will still result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

## **PUBLIC PARTICIPATION ACTIVITIES**

Citizens for a Healthy Bay, the Puyallup Tribe of Indians, and other Natural Resource Trustees and agencies, and the Port of Tacoma, have participated in discussions and support this project. A public notice will be placed in a local newspaper announcing the availability of the ESD to the public. The Administrative Record, located at the information repositories listed above, contain the ESD and supporting documentation.

Signed:

  
Daniel D. Opalski, Director  
Office of Environmental Cleanup

9/30/04  
Date