New Bedford Harbor Superfund Site

Operable Unit (OU) 1

Focused Feasibility Evaluation:

Comparison of Confined Disposal Facilities (CDFs) A, B &C versus Off-Site Disposal for PCB Contaminated Sediment

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1.0 Introduction

1.1 Site Background

The New Bedford Harbor Superfund Site (the Site), located in Bristol County, Massachusetts, encompasses approximately 18,000 acres and extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into Buzzards Bay (Figure 1, Site Location Map). The Site has been divided into three areas consistent with geographical features of the area and gradients of contamination. The Upper Harbor comprises approximately 200 acres. The boundary between the Upper and Lower Harbor is the Coggeshall Street Bridge, where the width of the harbor narrows to approximately 100 feet. The Lower Harbor comprises approximately 750 acres. The boundary between the Lower and Outer Harbor is the New Bedford hurricane barrier (constructed in the mid-1960s). The Outer Harbor area extends to its southern (and the Site's) boundary formed by an imaginary line drawn from Rock Point (the southern tip of West Island in Fairhaven) southwesterly to Negro Ledge and then southwesterly to Mishaum Point in Dartmouth and encompasses an area of approximately 17,000 acres.

The Site has been divided into three Operable Units (OUs), or phases of cleanup. The Upper Harbor and Lower Harbor (OU1); the Hot Spot area (OU2); and the Outer Harbor (OU3).

The Record of Decision (ROD) for OU2 was signed on April 6, 1990; an Explanation of Significant Differences (ESD) was issued in April 1992; a second ESD was issued in October 1995; and finally, a ROD Amendment for OU2 was issued in April 1999. The OU2 remedy provided for the dredging of approximately 14,000 cubic yards (cy) of the most highly contaminated sediment (PCB concentrations ranging from 4,000-100,000 parts per million (ppm)), dewatering, water treatment, air monitoring and disposal of the dewatered sediment at an off-site TSCA-permitted disposal facility. [TSCA is the Toxic Substances Control Act, which, among other things, regulates management and disposal of PCB-contaminated waste.] The OU2 remedial efforts were completed in May 2000 and OU2 is considered closed. The OU2 geographical area was generally located in a five-acre area in the Upper Harbor near the Aerovox facility, which was the primary source of PCB contamination to the Site. This area is within the OU1 geographical area (contaminated sediment remaining in the Upper and Lower Harbor areas are addressed under the OU1 remedy (see below)).

The ROD for OU3 is currently unscheduled. EPA is in the process of performing the remedial investigation for OU3 and has not yet selected a remedy.

This Focused Feasibility Evaluation (FFE) is issued with respect to an element of the OU1 ROD: the disposal of approximately 175,000 cy of PCB-contaminated sediment currently slated for CDF disposal. A summary of the OU1 remedy and the purpose of the FFE are detailed below.

1.2 Summary of OU1 Remedy Decision Documents

The ROD for OU1 (also known as ROD 2 or the 1998 ROD) was signed on September 25, 1998. The cleanup plan selected in the ROD called for dredging of approximately 450,000 cy of *in situ* sediment in the Upper Harbor and Lower Harbor with PCBs above the selected cleanup goals:

- Upper Harbor subtidal and mudflat areas: 10 ppm PCBs
- Lower Harbor subtidal and mudflat areas: 50 ppm PCBs
- Intertidal areas with abutting residential land use: 1 ppm PCBs
- Intertidal areas with public access of abutting recreational land use: 25 ppm PCBs
- Saltmarsh areas with little or no public access: 50 ppm PCBs.

The OU1 ROD called for the construction of four shoreline confined disposal facilities (CDFs) (A, B, C, and D) to contain and isolate the dredged sediment (further discussed in Section 1.5 below), associated water treatment, capping of the CDFs, long-term monitoring and maintenance, and institutional controls. The CDFs were conceptually located in PCB-contaminated areas to avoid the need to dredge an additional approximately 126,000 cy of *in situ* sediment, which instead would have been contained within the footprint of the CDFs.

In September 2001, EPA issued an ESD revising the OU1 remedy (ESD1). ESD1, among other changes, reduced the footprint of CDF D, revised the CDF D wall design, incorporated the use of mechanical dewatering for the dredged sediments (to reduce the disposal volume), and incorporated a rail spur for use in the cleanup efforts. Benefits of dewatering are detailed in ESD1 and include the production of a dewatered sediment “filter cake” that could be placed mechanically into the CDFs and is drier than the slurry from hydraulic dredging. This would reduce the time required for consolidation, capping and beneficial reuse of the final CDFs. This ESD also noted that the total estimated volume of *in situ* sediment to be dredged could be as high as 800,000 cy.

In August 2002, EPA issued the second ESD revising the OU1 remedy (ESD2). ESD2 eliminated the construction of the planned 17-acre CDF D (the largest of the four CDFs), and instead selected off-site disposal for the dredged and dewatered sediment slated for that CDF (further discussed in Section 1.5 below). A smaller shoreline facility, Area D, replaced CDF D in the same area to support both the sediment dewatering building and the rail car and truck loading area required for off-site disposal of the dewatered sediment. ESD2 also added the desanding operation at EPA’s Sawyer Street facility as a component of the remedy, which improves the efficiency of the dewatering operation.

In March 2010, EPA issued the third ESD revising the OU1 remedy (ESD3). ESD3 documented the use of Cell #1 (located at Sawyer Street) for temporary storage of PCB- and hazardous waste-contaminated sediment from OU1.

In March 2011, EPA issued the fourth ESD revising the OU1 remedy (ESD4). ESD4 incorporated the construction and use of a Lower Harbor Confined Aquatic Disposal (CAD) cell (LHCC) for permanent disposal of approximately 300,000 cy of mechanically dredged sediment. The fourth ESD also updated the volume of total *in situ* contaminated sediment to be addressed to meet cleanup goals to be approximately 900,000 cy, of which approximately 425,000 cy would be disposed of off-site, approximately 300,000 cy would be disposed of in the LHCC, and approximately 175,000 cy would be disposed of in remaining CDFs A, B, and C.

1.3 Current Status of OU1 Cleanup Efforts

The end of the 2014 dredge season marked the successful completion of the eleventh season of OU1 remedial dredging at the New Bedford Harbor Superfund Site. Over the 11 seasons of dredging, EPA has completed the dredging and removal of approximately 327,000 cy of *in situ* sediment mainly from the Upper Harbor. Incorporating dredging conducted in early action efforts prior to the implementation of full-scale dredging, the total volume of contaminated sediment dredged from the New Bedford Harbor Superfund site since the issuance of the OU1 ROD is approximately 365,000 cy. Figure 2 shows the areas dredged through 2013.

In September 2013, the U.S. District Court approved a landmark $366.25 million cash-out settlement with AVX Corp., whose corporate predecessor, Aerovox Corp., owned and operated what was known as the Aerovox facility, an electrical manufacturing plant located on the western shore of New Bedford Harbor (through "reopeners" of a 1992 settlement with AVX). Due to prior limitations in Superfund funding (which had typically been $15 million per year for this Site), the project was expected to take another 40 years. With this settlement, this project will be accelerated to be substantially completed within 5 to 7 years.

As a result of the settlement, EPA was able to implement equipment upgrades and improvements for the 2014 dredge season and fund a much longer dredge season than was feasible at a lower funding level over the prior 10 years. Figure 3 shows the dredge areas completed during the 2014 dredge season. EPA dredged approximately 77,000 cy *in situ* PCB-contaminated sediment during the 2014 dredge season. This represents almost a four-fold increase in annual dredge production over past years and is the first demonstration of the expedited cleanup of the New Bedford Harbor Superfund Site as a result of the settlement.

In addition, construction of the LHCC is underway and expected to be completed in 2015. Following completion of CAD cell construction, mechanical dredging of contaminated sediment and disposal into the LHCC will likely be performed in 2016 through 2018, and the dredged sediment will be allowed to consolidate in the cell followed by capping, consistent with ESD4.

With the accelerated pace of cleanup, EPA will shortly need to build CDFs A, B, and C for the disposal of approximately 175,000 cy of *in-situ* PCB-contaminated sediment, or consider alternative(s).

1.4 Purpose of the Focused Feasibility Evaluation

As detailed above in Section 1.2, the New Bedford Harbor OU1 remedy currently includes a combination of technologies for disposal of contaminated sediment from the Upper and Lower Harbors, including shoreline Confined Disposal Facilities (CDFs), a Confined Aquatic Disposal (CAD) cell, and off-site disposal. With respect to the CDFs, as discussed in detail in ESD2, preliminary design work indicated that significant cost and implementability concerns exist and that EPA would need to re-evaluate their use going forward.

Consistent with ESD2, EPA, in responses to comments on the settlement, notified the public that we would evaluate alternative disposal options and consider other protective, cost-effective alternatives for the disposal of contaminated sediment other than the selected CDFs A, B and C.

This FFE documents EPA's analysis and comparison of disposal in the CDFs versus off-site disposal for PCB-contaminated sediment. Although not required to be prepared, consistent with "A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents", this FFE may be used to support an Explanation of Significant Differences (ESD) by offering a comparison of the original and alternative remedial disposal alternatives. The purpose of this FFE is to offer a "focused" evaluation of disposal alternatives for contaminated sediment slated for disposal in CDFs A, B and C, and thus, this FFE limits discussion to that purpose. For overall information on the Site, please visit the New Bedford Harbor Superfund Site website at http://www2.epa.gov/new-bedford-harbor.

It is important to note that included in the 900,000 cy estimate of contaminated sediment to be addressed under the OU1 remedy is approximately 48,000 cy of intertidal vegetated material. This vegetated contaminated sediment volume from the intertidal saltmarsh and fringe wetland areas is planned for mechanical excavation, likely from shoreline locations. Due to the presence of vegetation and the nature of this material, this contaminated sediment volume would not be processed through desanding or dewatering equipment. Since the approximately 725,000 cy of contaminated sediment currently slated for disposal via the LHCC or desanding, dewatering and off-site disposal is subtidal, this vegetated contaminated sediment volume needs to be accounted for in the 175,000 cy of contaminated sediment for which disposal alternatives are being evaluated in this FFE. As such, the volume of contaminated sediment under evaluation includes the 48,000 cy of *in situ* vegetated contaminated sediment and 127,000 cy of *in situ* subtidal sediment.

Following issuance of this FFE, if EPA proposes to change the disposal of the approximately 175,000 cy of *in situ* PCB-contaminated sediment from CDFs A, B and C to off-site disposal, then EPA intends to issue a draft ESD to propose such change. The basis for the modification of the OU1 remedy would include the analysis performed in this FFE. EPA will accept comments on the draft ESD during a formal public comment period.

1.5 Background on Selection of CDFs and CDF Capacity

The cleanup plan selected in the OU1 ROD included the construction and operation of four shoreline CDFs and water treatment facilities. The conceptual locations of the four CDFs are depicted in OU1 ROD Figures 21a and 21b, replicated here as Figures 4 and 5. As envisioned, contaminated sediment disposed in the CDFs would be allowed to consolidate and then capped. Institutional controls and long-term monitoring would be implemented to ensure long-term protectiveness.

The conceptual ‘air’ capacities of the four CDFs as documented in the Administrative Record for the OU1 ROD, are as follows:

CDF A = Capacity of 56,400 cy
CDF B = Capacity of 50,700 cy
CDF C = Capacity of 93,800 cy
CDF D = Capacity of 435,000 cy

A total storage capacity of approximately 635,900 cy was needed for the approximately 450,000 cy of *in situ* contaminated sediment to be dredged and placed into the CDFs. The increased volume results from the hydraulic dredging of the sediment which can account for an increase in volume between an estimated 30 to 40% (referred to as the ‘bulking factor’). At the time of the OU1 ROD, mechanical dewatering was not part of the remedy. Mechanical dewatering and making of filter cake from hydraulic slurry greatly reduces the volume of the contaminated sediment needing disposal. Mechanical dewatering was added as a component of the remedy in 2001 with ESD1.

Note that the four originally proposed CDFs were sited so as to avoid dredging approximately 126,000 cy of *in situ* PCB-contaminated sediment within footprints of the CDFs; thus the actual estimate of OU1 contaminated sediment to be addressed under the OU1 ROD was approximately 576,000 cy *in situ*.

As noted in Section 1.2, ESD2 eliminated CDF D for a variety of cost and engineering reasons and selected off-site disposal for the sediment slated for CDF D, which was later modified by ESD4 to include disposal in the LHCC.

As further noted above in Section 1.2, ESD4 updated the estimate of *in situ* contaminated sediment to be addressed under the OU1 ROD to approximately 900,000 cy (versus the 576,000 cy initially estimated in the OU1 ROD). ESD4 provides an analysis, in Section II.C., documenting that the 435,000 cy ‘air’ capacity of CDF D translates to 725,000 cy of *in situ* sediment capacity.[1] Of the 725,000 cy of *in-situ* PCB-contaminated sediment originally slated to be disposed of in CDF D, approximately 425,000 cy would be disposed of off-site[2], and approximately 300,000 cy would be disposed of in the LHCC.

Based on the updated contaminated sediment estimate of 900,000 cy of *in situ* sediment to be addressed and the estimated volume of 725,000 cy originally slated for CDF D (now slated

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[1] As a result of desanding and dewatering operations that are now part of the remedy (ESD1 and ESD2), the conceptual “air space” capacity of the CDF can be assumed to reflect dewatered sediment. The original capacity is divided by a 0.6 conversion factor to calculate the volume of *in situ* sediment that could be accommodated in that available air space. Therefore, the total volume currently slated for off-site disposal and disposal in the LHCC is considered to be approximately 725,000 cy of *in situ* sediment. See ESD4, Section II.C.

[2] Included in this estimate of 425,000 cubic yards is approximately 10,000 cubic yards of contaminated sediment in the Outer Harbor just south of the New Bedford Hurricane Barrier near the New Bedford shore that have been addressed by a pilot underwater cap.

for off-site disposal and the LHCC), approximately 175,000 cy (900,000 cy minus 725,000 cy) of *in situ* contaminated sediment is currently slated for disposal in CDFs A, B and C.

In January 2014, EPA determined that construction of CFD C within the area between Sawyer Street and Coggeshall Street could be avoided and limited the overall size of CDF C to only the area adjacent to the previously constructed Pilot CDF. This remedial design change was determined to be a non-significant or minor change. This change was estimated to result in a reduction in capacity of CDF C by one-half to two-thirds the original conceptual design capacity (hereinafter "modified-C").

Using the 'air space' capacities listed above, under the current OU1 remedy, CDFs A, B and modified-C have the conceptual 'air' capacity of 140,000-154,000 cy (56,400 + 50,700 + (93,800 / 2 or 3)), more than adequate to accommodate the approximately 175,000 cy *in situ* contaminated sediments currently slated for CDFs.[3]

2.0 Development of Disposal Alternatives for the FFE

EPA prepared a Feasibility Study (FS) for OU1 for the Site in 1990 that lead to the 1998 OU1 ROD. The 1990 FS considered a range of disposal alternatives for dredged sediment, including CDFs, CAD cells, upland disposal, ocean disposal, and off-site disposal. Currently, the OU1 remedy (1998 OU1 ROD as modified by four ESDs) includes a combination of disposal alternatives – CDFs, a CAD cell and off-site disposal – for the disposal of contaminated sediments.

In the 1990 FS, EPA evaluated a "No Action" alternative for OU1 that involved no active remediation for the Upper Harbor and Lower Harbor. This "No Action" alternative for OU1 was determined to fail to meet the two NCP threshold criteria since it would not be protective of human health or the environment and would not meet applicable or relevant and appropriate requirements (ARARs). For the purpose of this FFE, the "No Action" alternative for the disposal is the construction and use of CDFs A, B and modified-C.

At the time of the 1990 FS, disposal of PCB-contaminated sediment in upland disposal locations in the New Bedford Harbor area, but away from the harbor, and in offshore (i.e., ocean) open water disposal locations were eliminated from further consideration. Although these disposal options are technically feasible, lack of suitable sites, permitting conflicts, and the regulatory environment led to the determination that neither disposal option would be acceptable.

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[3] As noted in Section 1.4, the volume of contaminated sediment under evaluation includes approximately 48,000 cy of *in situ* vegetated contaminated sediment and 127,000 cy of *in situ* subtidal sediment. The approximately 48,000 cy of contaminated vegetated material would be stabilized for transportation through the addition of Portland cement, resulting in an estimated volume increase of 13%, making the volume for disposal approximately 54,000 cy. For the purpose of this FFE, for subtidal sediments, the conversion factor discussed above (see footnote 1) was adjusted to a 0.65 conversion factor to account for both sand and dewatered sediment filter cake. As such, 127,000 cy of *in situ* subtidal sediment translates to approximately 83,000 cy of sand and dewatered sediment filter cake. Therefore, the storage volume, or "air" capacity, of the CDF would need to be approximately 137,000 cy with additional adequate capacity for interim and final cap material.

These same concerns exist today for upland disposal and offshore open water disposal. Therefore, the disposal alternatives of upland disposal and offshore disposal were not evaluated in this FFE.

With respect to disposal in a CAD cell, ESD4 called for using the LHCC for disposal of approximately 300,000 cy of OU1's approximately 900,000 cy of contaminated sediment. There are complex and time-consuming approval, design, engineering and contracting efforts that would need to be conducted to provide for the construction of another Superfund CAD cell. Using EPA's experience with the LHCC, siting, design, contracting and construction of another CAD cell could take 4-5 years and would need to be followed by mechanical dredging and filling of the CAD and ultimately capping. In addition, the 48,000 cy of vegetated material is not suitable for disposal in a CAD due to the presence of vegetation. EPA is committed to an accelerated cleanup, and therefore another Superfund CAD cell was not evaluated in this FFE.

In this FFE, EPA evaluated the CDF disposal and off-site disposal for the 175,000 cy of *in situ* contaminated sediment currently slated for disposal in CDFs A, B and modified-C.

2.1 Disposal Alternatives Evaluated

2.1.1 Alternative 1 – Confined Disposal Facilities (CDFs)

A CDF is an engineered structure consisting of dikes or other structures that enclose a disposal area for containment of dredged sediment and is designed to provide the required storage volume for dredged material. A CDF may be constructed as an upland site, as a shoreline site with one or more sides exposed to the water, or as an island containment area. As conceptually planned under the OU1 ROD, CDFs A, B and modified-C were to be shoreline structures. See Figure 4. For the purpose of this FFE, primarily to simplify the cost estimate, it was assumed that only one shoreline CDF would need to be constructed to accommodate the 175,000 cy of *in situ* sediment. As detailed in Section 1.5 above, the storage volume or "air space" of the CDF would need to be approximately 137,000 cy with additional adequate capacity for interim and final cap material (for a total capacity estimated as 145,000 cy).

2.1.2 Alternative 2 – Off-Site Transportation and Disposal

Off-site disposal is the transportation and permanent disposal of contaminated material at a facility that is permitted to accept and dispose of the material. Prior to disposal, the contaminated material would be characterized and classified as either a non-hazardous or hazardous material based on RCRA regulations and as either a TSCA waste (≥50 ppm PCBs) or non-TSCA. As currently performed at the Site, disposal of contaminated sediment via off-site transportation and disposal provides for the disposal of dewatered sediment filter cake with ≥ 50 ppm PCB at a TSCA-permitted facility or a RCRA hazardous waste-permitted landfill and disposal of material with <50 ppm PCBs at a state-permitted non-hazardous waste RCRA Subtitle D landfill. For this analysis, accounting for desanding and dewatering and disposal of the stabilized vegetated contaminated sediment, the volume of material for off-site disposal would be approximately 137,000 cy.

3.0 Detailed Analysis of Alternatives

3.1 Evaluation Criteria

3.1.1 Threshold Criteria

In accordance with the NCP, two threshold criteria must be met in order for the alternative to be eligible for selection.

1. **Overall Protection of Human Health and the Environment**: This evaluation criterion provides an assessment as to whether the alternative adequately protects human health and the environment, and draws on the assessments conducted under other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. As part of the determination of protectiveness, the evaluation describes how risks through each pathway would be eliminated, reduced, or controlled through treatment, engineering, or institutional controls.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**: Alternatives are assessed as to whether they attain federal and state legally applicable or relevant and appropriate requirements (ARARs), including:
   - Chemical-specific ARARs (e.g., maximum contaminant levels [MCLs], Ambient Water Quality Criteria [AWQC]);
   - Location-specific ARARs (e.g., requirements for constructing a hazardous waste facility in a floodplain);
   - Action-specific ARARs (e.g., Toxic Substances Control Act requirements for PCB remediation waste); and,
   - Other criteria, advisories, and guidelines, as appropriate.

3.1.2 Primary Balancing Criteria

The following five criteria are used to compare and evaluate those alternatives which fulfill the two threshold criteria.

3. **Long-Term Effectiveness and Permanence**: Alternatives are assessed for the long-term effectiveness and permanence they afford, and the degree of certainty that the alternative will prove successful. Factors that can be considered, according to the NCP and RI/FS Guidance, are as follows:
   - Long-term reliability and adequacy of the engineering and institutional controls, including uncertainties associated with land disposal of untreated wastes and residuals.
   - Magnitude of residual risks in terms of amounts and concentrations of wastes remaining following implementation of a remedial action, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous substances and their constituents.
4. **Reduction of Toxicity, Mobility or Volume through Treatment**: CERCLA expresses a preference for remedial alternatives that employ treatment that reduces the toxicity, mobility, or volume of hazardous substances. Relevant factors include:

- The treatment processes that the remedies employ and the materials they will treat;
- The amount of hazardous materials that will be destroyed or treated;
- The degree of expected reduction in toxicity, mobility, or volume;
- The degree to which the treatment is irreversible; and,
- The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous substances and their constituents.

5. **Short-Term Effectiveness**: The short-term effectiveness of alternatives is assessed considering such appropriate factors as:
   - Protection of the community during remedial actions;
   - Protection of the workers during remedial actions;
   - Potential adverse environmental impacts resulting from construction and implementation; and
   - Time until remedial response objectives (*i.e.*, RAOs and PRGs) are achieved.
6. **Implementability**: The ease or difficulty of implementing the alternatives are assessed by considering the following factors:
   - Technical Feasibility
     - Degree of difficulty associated with constructing and operating the technology;
     - Expected operational reliability of the technologies;
     - Ease of undertaking additional remedial actions, if necessary; and
     - Ability to monitor the effectiveness of the alternative.
   - Administrative Feasibility
     - Need to coordinate with and obtain necessary approvals and permits (*e.g.*, obtaining permits for off-site activities, rights-of-way for construction, etc.) from other agencies and offices.
   - Availability of Services and Materials
     - Availability of necessary equipment and specialists;
     - Availability of adequate capacity and location of needed treatment, storage, and disposal services;
     - Availability of prospective technologies; and
     - Availability of services and materials, plus the potential for obtaining competitive bids.
7. **Cost**: Costs for CERCLA evaluation are divided into two principal categories (i.e., capital costs and annual operation and maintenance (O&M) costs). A number of principal elements of a remedial alternative may fall into the category of direct and indirect capital costs:
   - Construction costs;
   - Equipment costs;
   - Site development costs;
   - Building and services costs;
   - Transport and disposal costs;
   - Engineering expenses;
   - Startup and shakedown costs; and
   - Contingency allowances.

Those items not placed into the capital cost category are considered to be O&M costs, among which are the following:

- Operating labor costs;
- Materials and energy costs;
- Purchased services;
- Administrative and insurance costs; and
- Costs of periodic site reviews.

Costs are estimated and translated into present worth costs for comparison. Present worth is the amount required to fund a project assuming that amount can be invested at the start of the project for a given rate of return as the project progresses. Present worth estimates help evaluate various options on an equal basis.

3.1.3 Modifying Criteria

The two modifying criteria discussed below are used in the final evaluation of remedial alternatives generally after EPA has received public comment on the RI/FS and Proposed Plan.

8. **State Acceptance**: This criterion addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers. This criterion provides the state with the opportunity to assess any technical or administrative issues and concerns regarding each of the alternatives. State acceptance is not addressed in this FFE, but would be addressed following public comment on the ESD.
9. **Community Acceptance**: This criterion addresses the public's general response to the alternatives described in the FFE and follow-on decision document. Issues and concerns the public may have regarding each of the alternatives falls into this category of evaluation. Community acceptance is not addressed in this FFE document, but would be addressed following public comment on the ESD.

3.2 Individual Analysis of Alternatives

3.2.1 Alternative 1 – Confined Disposal Facilities (CDFs)

See Section 2.1.1 for a description of this alternative. As this disposal option for the approximately 175,000 cy of PCB-contaminated sediment to be disposed of in CDFs A, B and modified-C is currently part of the OU1 remedy, this alternative has already been determined to meet the NCP's nine criteria. Nonetheless, this subsection presents an updated analysis of the CDF disposal component, which is the "No Action" alternative for this FFE. A summary of the analysis is presented in Table 1.

3.2.1.1 Threshold Criteria

Criteria 1: Overall Protection of Human Health and the Environment

Contaminated sediment above cleanup goals that drive unacceptable risks would be removed through dredging and permanently isolated in CDFs. Dredging of contaminated sediment and disposal in shoreline CDFs would effectively reduce the potential for direct contact exposure and limit the source of PCB contamination in surface water and biota. Exposure pathways would be eliminated or addressed through the implementation of institutional controls and long-term monitoring to ensure that the remedy remains protective of human health and the environment.

The CDF construction and permanent location of the CDF facilities would cause environmental impacts, as the biota and intertidal and subtidal resource within the footprint of the CDFs would be permanently destroyed. However, any wetland habitat impacted by the remedial efforts would be restored or mitigated.

Criteria 2: Compliance with ARARs

Section XII and Table 8 of the OU1 ROD provide a detailed discussion and listing of ARARs for the New Bedford Harbor Superfund Site. The ARARs table (Table 8) from the OU1 ROD is reproduced herein as Attachment A. However, former regulations that incorporated requirements of Executive Orders 11988 (Management of Floodplain) and 11990 (Protection of Wetlands) at 40 CFR Part 6, Appendix A, as cited in the 1998 ROD, no longer exist. Federal Emergency Management Agency (FEMA) regulations at 44 CFR § 9, which set forth the policy, procedure and responsibilities to implement and enforce these Executive Orders, are considered relevant and appropriate. These regulations have been previously cited as an ARAR in ESD4 for the LHCC component of the OU1 remedy.

The goal of the remedy, including the disposal component, is to reduce health risks due to consumption of PCB-contaminated local seafood, as well as reduce health risks due to contact with or incidental ingestion of PCB-contaminated shoreline sediment and improve the severely degraded ecosystem. This will be accomplished by dredging and off-site disposal of PCB-contaminated sediment in order to lower PCB concentrations in sediment and in the water column. The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.

CDFs would be designed and constructed to ensure that wetlands, fish and wildlife habitat related ARARs and ARARs for the preservation of historical and archeological data were met and to protect against storm damage and control flooding. Some unavoidable interference with public access would temporarily occur during construction and filling of the CDFs. However, once CDFs are permanently capped, access across CDFs is feasible.

Consistent with the 1998 ROD, PCB-contaminated sediment above EPA's clean up levels must be handled and disposed of in accordance with 40 CFR 761.61(c) of TSCA, which requires that the methods used will not pose an unreasonable risk of injury to health or the environment. CDFs would be constructed to meet the substantive requirements for remedy implementation, including TSCA PCB disposal requirements, TSCA chemical waste landfill standards, the CWA and CAA, and Massachusetts hazardous waste regulations. The conceptual CDF design includes groundwater, surface water and air emission monitoring during operation, closure and post closure requirements, and erosion and stormwater drainage controls. Substantive standards of all applicable TSCA decontamination requirements would be followed.

3.2.1.2 Primary Balancing Criteria

Criteria 3: Long-Term Effectiveness

Dredging and disposal of contaminated sediment above the cleanup levels and effective disposal of dredged sediment in CDFs would remove a substantial mass of PCBs from the Harbor. Remediation and disposal of sediments in constructed CDFs would result in significant and consistent reduction of PCB flux and water column PCB concentrations. These improvements would be reflected in biota over time. Following dredging and disposal in CDFs, naturally occurring sedimentation within the Harbor should assist in lowering PCB levels further over time. Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood.

The effectiveness of disposal in CDFs depends on the design, construction, operation, and management of the facility. In order to achieve long-term effectiveness, CDFs would require adequate long-term operation, maintenance, and monitoring. Disposal of sediment containing PCBs in CDFs is not expected to present long-term risks to human health or the environment. The concentration of PCBs or other contaminants in any leachate generated is expected to be minimal. Placement of a cap on the CDF would reduce the potential for leachate generation due to infiltration of precipitation and surface runoff. Long-term monitoring and maintenance of the CDF cover and monitoring of the CDF dike would be necessary to assess leachate migration and contamination concentration.

Criteria 4: Reduction in Mobility, Toxicity, and Volume

CDFs as a disposal alternative do not employ sediment treatment, so no reduction in toxicity of contaminants would be achieved through treatment. However, disposal of the contaminated sediment in the CDFs is expected to significantly reduce the potential migration of PCBs thereby reducing mobility of contaminants. Further, water decanted from the sediment would reduce the volume of the contaminated sediment to be disposed, and decanted water would be treated to meet site-specific discharge standards before being discharged back into the harbor.

Criteria 5: Short-Term Effectiveness

At the time of the OU1 ROD, disposal in CDFs was considered to present minimal short-term risks to the community because the CDFs were located in commercial/industrial zones. CDFs were located "near industrial areas to avoid potential impacts of CDF construction and operation (e.g., truck traffic, noise, air quality) on residential areas." Use of fencing and other security measures were planned to preclude unauthorized entry and protect the public from direct contact. However, in the 15 years since the issuance of the OU1 ROD, redevelopment along the river has included significant repurposing of industrial mill buildings to residential and commercial properties. Further, the City of New Bedford is in the process of designing a shoreline "Riverwalk," envisioned as a passive recreational walkway to reconnect the community with the view-scape and environmental resource that the river represents. Significant habitat restoration is planned as part of the Riverwalk.

As such, there could be significant short-term impacts to the community to facilitate the construction of these proposed shoreline facilities, as they are conceptually planned for construction adjacent to what is now active residential and commercial properties. Further, there would be additional significant short-term impacts to the community and potential restrictions on use of adjacent shoreline properties during the transport of the dewatered sediment to the CDF facility for disposal. However, once capped, CDFs could accommodate passive recreational use.

Workers on-site during remedial activities would use personal protective equipment as needed to prevent exposure to contaminants. CDF construction and filling operations may pose some short-term worker risks (e.g., spills, accidents). However, these are mitigated by worker safety and health programs and the use of proper pollution controls.

The CDF construction and permanent location of the CDF facilities would cause environmental impacts, as the biota and subtidal resource within the footprint of the CDFs would be permanently destroyed. However, consistent with ARARs, EPA would mitigate these impacts.

Design, construction and filling of the CDFs would likely take on the order of 5 or more years, with interim and then final capping likely adding 1-2 years. Operation, maintenance and monitoring of the CDFs would need to be performed in perpetuity.

<u>Criteria 6: Implementability</u>

CDFs are considered a demonstrated technology. Experience gained by the construction of the pilot CDF demonstrated the site-specific application of this technology. However, since the time of the OU1 ROD, EPA has determined that there are significant technical feasibility concerns with construction of CDFs at this Site.

CDF D was eliminated under ESD2 as a result of cost and engineering concerns. The primary constructability concern was the presence of soft, fine-grained sediment, which from a geotechnical and structural standpoint, would be an unsuitable base or foundation for any wall/dike design of the CDF. Other engineering challenges citied in ESD2 were managing a complex, in-water construction and filling project in a busy harbor, dewatering the CDF prior to filling with filter cake, and controlling air emissions from within the large CDF footprint. Many of these same challenges would be implementability issues for other CDF locations at the Site.

Constructing shoreline CDFs requires a thorough evaluation of complex engineering and design considerations, including the geotechnical suitability of the material in the footprint of the CDF in order to assess structural integrity. The complex design and construction considerations make CDFs challenging to implement and represent design and construction risks. Long-term performance of the CDFs would be assessed through a long-term monitoring program. However, data collected from the pilot CDF do not indicate any movement of contaminants from the Site.

Site preparation and land acquisition would be the initial activities necessary for the development of the shoreline disposal sites. Complex legal and real estate issues would need to be addressed with the adjacent shoreline property owners to facilitate CDF construction.

Due to the size and complexity of this Site, remedy implementation would require significant coordination of the dredging efforts, material handling activities, and CDFs planning, design and construction logistics. Coordination between EPA, the Corps, the City of New Bedford, the Towns of Fairhaven and Acushnet, and the Commonwealth of Massachusetts would be important.

In addition to these technical, legal, regulatory and real estate implementability concerns, there may be administrative implementability issues due to changing land uses. Redevelopment and recreational uses are now planned along the New Bedford Harbor shoreline where CDFs are conceptually planned. These implementability concerns could impact cleanup costs and schedule.

All activities and technologies associated with this alternative, including dredging equipment and land-based heavy construction equipment for construction of CDFs, are readily available. Vendors and contractors specializing in marine construction can provide the equipment and personnel to conduct the remediation and construction activities.

Criteria 7: Cost

For the purpose of this FFE, the cost estimate provided is only for the CDF disposal component of the remedy. The cost of disposal in CDFs has significantly increased since the time of the OU1 ROD. To develop a conservative cost estimate for the purpose of the FFE, EPA assumed that one CDF facility would be constructed with a capacity of 145,000 cy to accommodate the disposal of the 175,000 cy of *in situ* sediment and capping material. The present worth cost estimate for construction of the CDF facility, transportation and disposal of the stabilized vegetated sediment and dewatered sediment into the CDF, capping, and O&M is approximately $56 million. The cost estimate does not include the costs associated with excavation or dredging and processing of the *in situ* sediment to produce the sand, dewatered sediment filter cake, and stabilized vegetated sediment for disposal. These elements of the remedy are already in place and are not being modified and are the same preceding operations for either disposal alternative. A summary of the cost estimate is included in Table 2. If construction of two or three CDFs was necessary, the cost estimate would need to be increased. Land acquisition costs are not included, but could be significant. The costs for constructing CDFs were derived from past CDF construction experience in similar conditions and costs that were incurred for the construction of the pilot CDF.

3.2.2 Alternative 2 – Off-Site Transportation and Disposal

See Section 2.1.3 for a description of this alternative. This subsection presents the individual analysis of the off-site transportation and disposal component, as an element of the overall remedial approach. A summary of the analysis is presented in Table 3.

3.2.2.1 Threshold Criteria

Criteria 1: Overall Protection of Human Health and the Environment

Contaminated sediment above cleanup goals that drives the unacceptable risks would be removed through dredging and excavation and would be permanently isolated in off-site permitted disposal facilities. Dredging of contaminated sediment and off-site disposal would effectively reduce the potential for direct contact exposure and limit the source of PCB contamination in surface water and biota. Exposure pathways would be eliminated or addressed through the implementation of institutional controls and long-term monitoring to ensure that the remedy remains protective of human health and the environment.

Management and off-site disposal of dredged material would comply with the requirements of RCRA, TSCA, and with the Off-Site Rule, which requires that CERCLA wastes be placed in a facility operating in compliance with RCRA or other applicable Federal or State requirements. The long-term effectiveness is assured as the material is disposed at a facility that is permitted to manage and dispose of PCB-contaminated materials and this facility is operated and maintained to ensure long-term protectiveness under the RCRA and TSCA regulatory programs.

Criteria 2: Compliance with ARARs

Section XII and Table 8 of the OU1 ROD provided a detailed discussion and listing of ARARs for the New Bedford Harbor Superfund Site. The ARARs table (Table 8) from the OU1 ROD is reproduced herein as Attachment A. Section IV of ESD2 provides a detailed discussion of ARARs for off-site disposal; however, no new ARARs were added in ESD2 or the other ESDs, so the OU1 ROD ARARs Table still serves as the complete listing of ARARs for the remedy. However, former regulations that incorporated requirements of Executive Orders 11988 (Management of Floodplain) and 11990 (Protection of Wetlands) at 40 CFR Part 6, Appendix A, as cited in the 1998 ROD, no longer exist. Federal Emergency Management Agency (FEMA) regulations at 44 CFR § 9, which set forth the policy, procedure and responsibilities to implement and enforce these Executive Orders, are considered relevant and appropriate.

The goal of the remedy, including the disposal component, is to reduce health risks due to consumption of PCB-contaminated local seafood, as well as reduce health risks due to contact with or incidental ingestion of PCB-contaminated shoreline sediment and improve the severely degraded ecosystem. This will be accomplished by dredging and containing PCB-contaminated sediment in order to lower PCB concentrations in sediment and in the water column. The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.

Consistent with the 1998 ROD, PCB-contaminated sediment above EPA’s clean up levels must be handled and disposed of in accordance with 40 CFR 761.61(c) of TSCA, which requires that the methods used will not pose an unreasonable risk of injury to health or the environment.

Off-site disposal would meet any applicable requirements, such as TSCA PCB disposal requirements.

3.2.2.2 Primary Balancing Criteria

<u>Criteria 3: Long-Term Effectiveness</u>

Dredging and off-site disposal of contaminated sediment above the cleanup levels would remove a substantial mass of PCBs from the Harbor. Remediation and off-site disposal at a permitted facility would result in significant and consistent reduction of PCB flux and water column PCB concentrations. These improvements would be reflected in biota over time. Following dredging and off-site disposal of contaminated sediments, naturally occurring sedimentation within the Harbor should assist in lowering PCB levels further over time. Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood.

Off-site transportation and disposal at a TSCA-permitted facility is an effective disposal alternative in the long-term. Off-site transportation and disposal of sand and dewatered sediment filter cake are currently being implemented as part of the ongoing cleanup efforts. The infrastructure and equipment is in place and operational. The long-term effectiveness is assured as the material is disposed at a facility that is permitted to manage and dispose of PCB-contaminated materials, and this facility is operated and maintained to ensure long-term protectiveness under the RCRA and TSCA regulatory programs.

<u>Criteria 4: Reduction in Mobility, Toxicity, and Volume</u>

Since this disposal alternative does not employ sediment treatment, no reduction in toxicity of contaminants would be achieved through treatment. However, disposal of the contaminated sediment at permitted off-site disposal facilities is expected to reduce the potential migration of PCBs thereby reducing mobility of contaminants. Further, water decanted from the sediment would reduce the volume of sediment for disposal, and water would be treated to meet site-specific discharge standards before being discharged back into the harbor.

<u>Criteria 5: Short-Term Effectiveness</u>

Transport of contaminated sediment to off-site disposal facilities could pose some short-term impacts to the community from increased truck traffic, accidents or spills in the community between the Area C Sawyer Street facility or Area D and the highway. Rail transport generally presents fewer risks than road transport. This disposal alternative would utilize transportation by rail of the dewatered sediment filter cake to the maximum extent practicable, thereby significantly reducing any short-term impacts.

Workers on-site during remedial activities would use personal protective equipment as needed to prevent exposure to contaminants. Loading operations may pose some short-term worker risks (e.g., spills, accidents). However, these are mitigated by worker safety and health programs and the use of proper pollution controls.

Off-site transportation and disposal is currently ongoing for disposal of sand and dewatered sediment filter cake for approximately 425,000 cy of *in situ* contaminated sediment in accordance with the current OU1 remedy, and would continue with this off-site disposal alternative for the approximately 175,000 cy of *in situ* contaminated sediment currently slated to be disposed of in CDFs A, B and modified-C. Under this disposal alternative, there would be no delay to cleanup operations, as the facilities and equipment to transport and dispose of off-site sand and dewatered sediment filter cake is already in place and operational.

<u>Criteria 6: Implementability</u>

Off-site transportation and disposal is readily implementable, as it is currently being implemented as part of the ongoing cleanup efforts. At the time of the 1990 FS, off-site disposal was eliminated from the detailed analysis of alternatives because there was not adequate capacity at permitted facilities to accommodate the dredged material slated for disposal. However, permitted capacity has been approved since the time of the FS, and there is now adequate capacity at existing TSCA-permitted disposal facilities to accommodate the potential additional PCB-contaminated sediments.

Due to the size and complexity of this Site, remedy implementation would require significant coordination of the dredging efforts, material handling activities, and off-site transportation logistics. Coordination between EPA, the Corps, the City of New Bedford, the Towns of Fairhaven and Acushnet, the Commonwealth of Massachusetts would be important.

All activities and technologies associated with off-site transportation equipment to accommodate truck- or rail-transport are readily available and in place. Vendors and contractors specializing in marine construction and off-site transportation can provide the equipment and personnel to conduct the transportation and disposal operations.

<u>Criteria 7: Cost</u>

The estimated present worth cost for off-site transportation and disposal of approximately 137,000 cy of stabilized vegetated sediment, sand and dewatered sediment filter cake is approximately $33 million. The cost estimates does not include the costs associated with excavation and stabilization of vegetated sediment or dredging and processing of the *in situ* subtidal sediment to produce the sand and dewatered sediment filter cake for disposal. These elements of the remedy are already in place and are not being modified and are the same preceding operations for either disposal alternative. A summary of the cost estimate is provided in Table 4. Since the costs supporting the off-site transportation and disposal cost estimates are based on actual current costs, this cost estimate is considered more accurate than the -30 percent to +50 percent accuracy range for feasibility study cost estimates.

3.3 Comparative Analysis of Disposal Alternatives

As detailed in Section 1.4, the purpose of this FFE is to offer a "focused" evaluation of disposal of contaminated sediments in CDFs versus off-site disposal. Therefore, the NCP's nine evaluation criteria are discussed below in the comparative analysis for CDFs and off-site transportation and disposal, as elements of the overall remedial approach. The analysis compares disposal of the approximately 175,000 cy of *in situ* contaminated sediment in the CDFs under the selected remedial approach versus off-site transportation and disposal of this volume of contaminated sediment.

Table 5 presents a summary of the comparative analysis.

3.3.1 Threshold Criteria

Disposal via CDFs or off-site disposal are both equally protective of human health and the environment, because under either disposal scenario the contaminated sediment driving the unacceptable risks would be removed and exposure pathways would be eliminated or controlled. In addition, both disposal alternatives are equally compliant with ARARs already included in the OU1 ROD and ESD2. As such, both disposal in CDFs and off-site disposal meet the two threshold criteria. Further, construction of CDFs A, B and modified-C would require filling of on the order of 10 acres of intertidal and subtidal areas. Off-site disposal would eliminate this filling activity, but would require dredging in the areas where the CDFs were conceptually planned. In accordance with Section 404 of the Clean Water Act and 40 CFR Part 230, EPA would need to determine that off-site disposal for the approximately 175,000 cubic yards of *in situ* PCB-contaminated sediment previously slated for disposal in CDFs A, B and modified-C would be the least environmentally damaging practicable alternative for addressing these PCB-contaminated sediments at the Site with respect to potential impacts to federal jurisdictional wetlands and aquatic habitats.

3.3.2 Primary Balancing Criteria

3.3.2.1 Effectiveness

Regardless of whether disposal is via CDFs or off-site, the overall remedy relies on institutional controls to minimize ingestion of local PCB-contaminated seafood.

The effectiveness of disposal in CDFs depends on the design, construction, operation, and management of the facility. Institutional controls would be required for CDF properties to ensure the integrity of the caps over time and restrict property uses that could damage the caps and structures. Effectiveness of off-site transportation and disposal at a TSCA-permitted facility is assured as the material is disposed at a facility that is permitted to manage and dispose of PCB-contaminated materials.

There would be significant short-term impacts to facilitate the construction of CDFs, as they are conceptually planned adjacent to now active residential and commercial properties. For off-site disposal, road transport by truck can result in short-term impacts to the community. Rail transport generally presents fewer risks than road transport. The off-site disposal alternative would utilize transportation by rail of the dewatered sediment filter cake to the maximum extent practicable, thereby significantly reducing any short-term impacts.

Under either disposal alternative, workers would use personal protective equipment or pollution controls would be installed as needed to prevent worker exposure to workplace hazards.

Under either disposal alternative, there would be short-term impacts to the environment from dredging operations. However, the CDF construction and permanent location of the CDF facilities would cause further environmental impacts, as the biota and intertidal and subtidal resource within the footprint of the CDFs would be permanently destroyed. However, any wetland habitat impacted by the remedial efforts would be restored or mitigated. Off-site transport and disposal would result in minimal short term and sustained environmental impacts as compared to CDFs.

Design, construction and filling of the CDFs would likely take on the order of 5 or more years, with interim and then final capping likely adding another 1-2 years. Operation, maintenance and monitoring of the CDFs would need to be performed in perpetuity. Off-site transportation and disposal is currently ongoing for disposal of sand and dewatered sediment filter cake for approximately 425,000 cy of *in situ* contaminated sediment in accordance with the current OU1 remedy, and would continue with this off-site disposal alternative for the approximately 175,000 cy of *in situ* contaminated sediment currently slated to be disposed of in CDFs A, B and modified-C. There would be no delay to cleanup operations for off-site disposal.

3.3.2.2 Implementability

Dredging, desanding, dewatering, and water treatment operations are common to either disposal alternative and are readily implementable operations.

CDFs are considered a demonstrated technology. However, there are significant technical feasibility concerns with construction of CDFs at this Site. Constructing shoreline facilities requires a thorough evaluation of complex engineering and design considerations, including the geotechnical suitability of the material in the footprint of the CDF in order to assess structural integrity. Complex legal and real estate issues would need to be addressed with the adjacent shoreline properties to facilitate CDF construction. Changes in land use since the issuance of the OU1 ROD along the New Bedford Harbor shoreline where CDFs are conceptually planned would make the administrative feasibility of constructing CDFs challenging. Disposal in CDFs has short-term effectiveness impacts and complex engineering and administrative implementability issues.

Off-site transportation and disposal is readily implementable. There is adequate capacity at existing TSCA-permitted disposal facilities to accommodate the additional PCB-contaminated sediment. Since this disposal alternative is currently being used for the approximately 425,000 cy of *in situ* contaminated sediment, there are no significant technical or administrative implementability issues expected.

All activities and technologies associated with either disposal alternative are readily available.

3.3.2.3 Cost

The cost estimates discussed herein do not include the costs associated with excavation or dredging and processing of the *in situ* sediment to produce the sand, dewatered sediment filter cake, and stabilized vegetated sediment for disposal. These elements of the remedy are already in place and are not being modified and are the same preceding operations for either disposal alternative.

The present worth cost of disposal in CDFs is estimated as $56 million. Whereas the present worth cost of disposal via off-site transportation and disposal is estimated as $33 million. Disposal via off-site transportation and disposal at a TSCA-permitted facility would save approximately $23 million over CDF construction and disposal in shoreline CDFs. The actual cost savings is likely greater since the CDF cost estimate was conservatively calculated assuming one CDF when two or three CDFs could be necessary, and since the cost estimate did not include land acquisition costs.

3.3.3 Modifying Criteria

Following issuance of this FFE, if EPA proposes to change the disposal of the approximately 175,000 cy of *in situ* PCB-contaminated sediment from CDFs A, B and modified-C to off-site disposal, then EPA intends to issue a draft ESD to propose such change. The basis for the modification of the OU1 remedy would include the analysis performed in this FFE. EPA will accept comments on the draft ESD during a formal public comment period.

In its final selection of a disposal alternative, EPA will consider comments the State may provide on the draft ESD and ultimately whether the State concurs with or opposes the remedy modification proposed. State comments or other information received from the State may result in the choice of an alternative other than the preferred alternative.

In the Final ESD, EPA will also respond to comments it has received from the public on the draft ESD. EPA may modify or choose an alternative other than the preferred alternative based on comments or other information it receives from the public.

4.0 References

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USEPA, 2010. Third Explanation of Significant Differences, New Bedford Harbor Superfund Site Operable Unit #1, New Bedford, MA. March 2010.

USEPA, 2011. Forth Explanation of Significant Differences for Use of a Lower Harbor CAD Cell (LHCC), New Bedford Harbor Superfund Site Operable Unit #1, New Bedford, MA. March 2011.

USEPA, 2013. Supplemental Consent Decree with Defendant AVX Corporation. September 2013.

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FIGURES

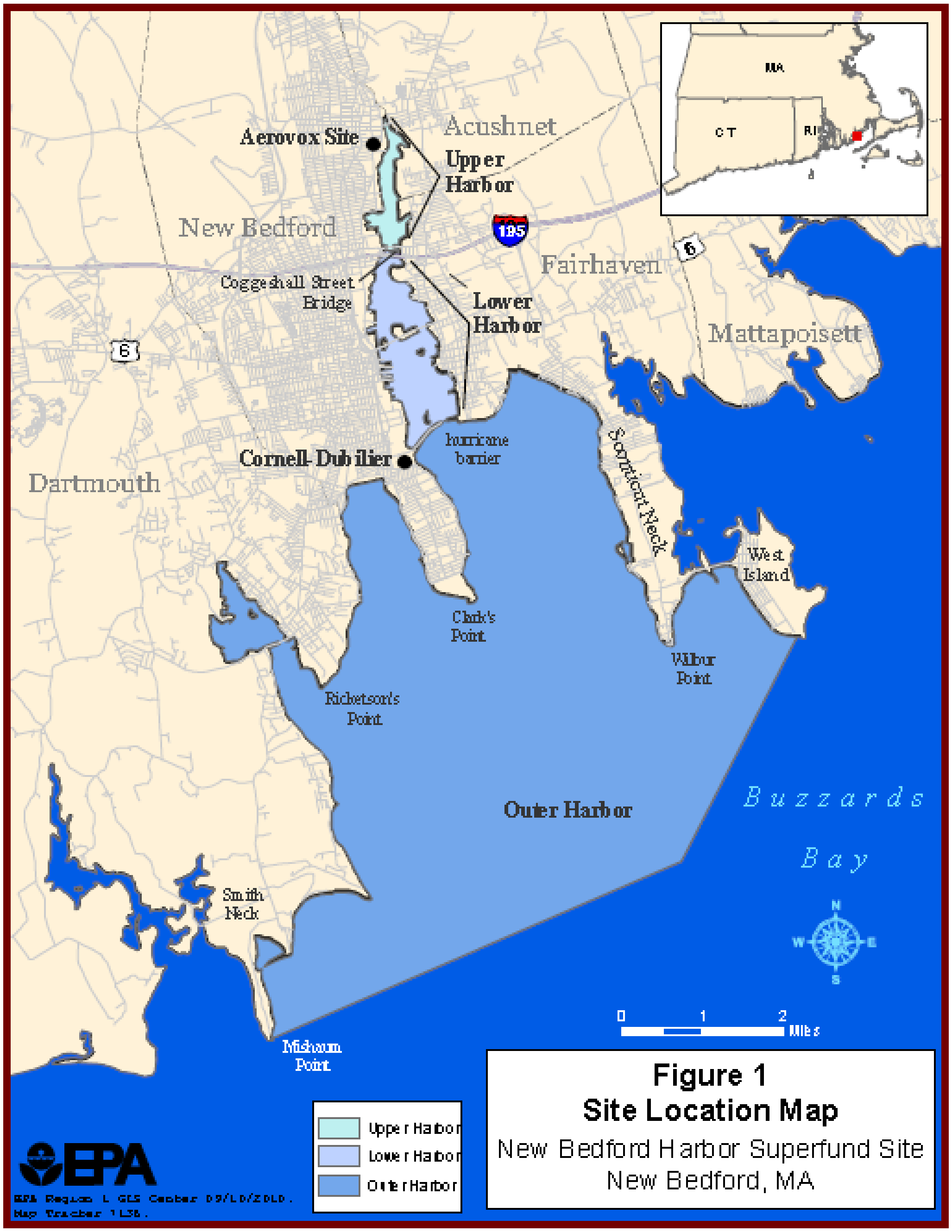
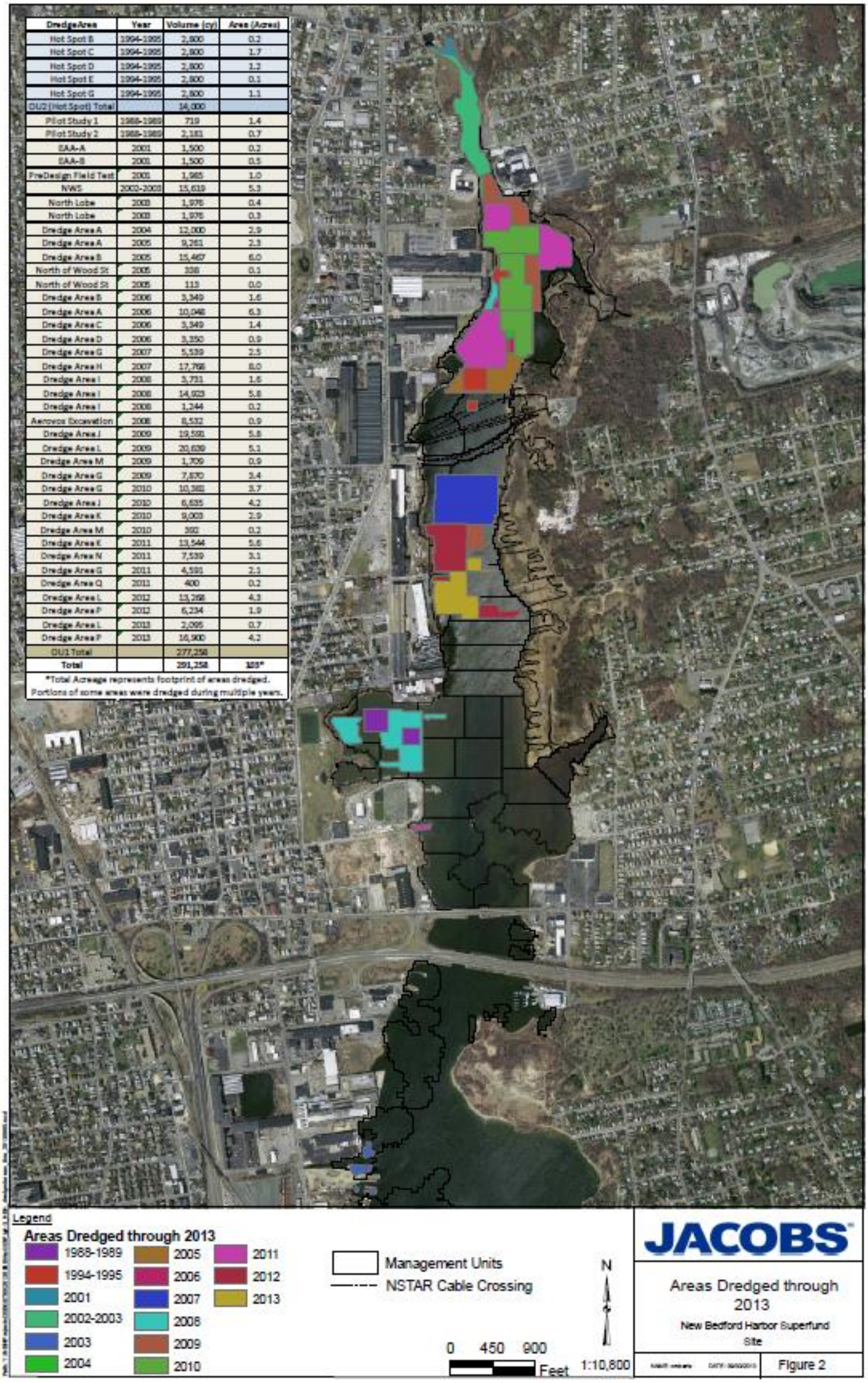
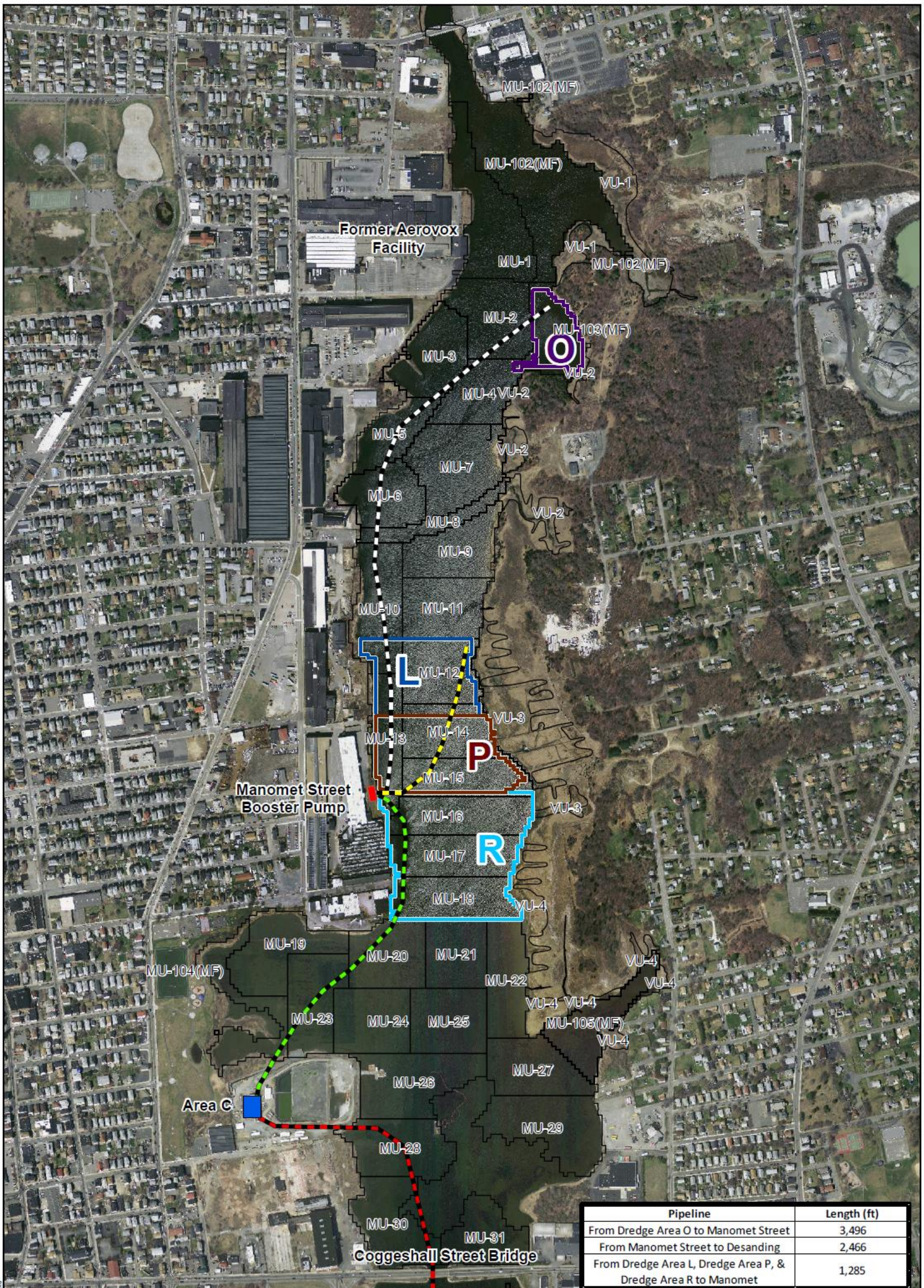


Figure 1
Site Location Map
New Bedford Harbor Superfund Site
New Bedford, MA



DredgeArea	Year	Volume (cy)	Area (Acres)
Hot Spot B	1994-1995	2,800	0.2
Hot Spot C	1994-1995	2,800	1.7
Hot Spot D	1994-1995	2,800	1.2
Hot Spot E	1994-1995	2,800	0.1
Hot Spot G	1994-1995	2,800	1.1
OU2 (Hot Spot) Total		14,000	
Pilot Study 1	1988-1989	719	1.4
Pilot Study 2	1988-1989	2,181	0.7
EAA-A	2001	1,500	0.2
EAA-B	2001	1,500	0.5
PreDesign Field Test	2001	1,985	1.0
NWS	2002-2003	15,619	5.3
North Lobe	2003	1,976	0.4
North Lobe	2003	1,976	0.3
Dredge Area A	2004	12,000	2.9
Dredge Area A	2005	9,261	2.3
Dredge Area B	2005	15,467	6.0
North of Wood St	2005	338	0.1
North of Wood St	2005	113	0.0
Dredge Area B	2006	3,349	1.6
Dredge Area A	2006	10,048	6.3
Dredge Area C	2006	3,349	1.4
Dredge Area D	2006	3,350	0.9
Dredge Area G	2007	5,539	2.5
Dredge Area H	2007	17,768	8.0
Dredge Area I	2008	3,731	1.6
Dredge Area I	2008	14,923	5.8
Dredge Area I	2008	1,244	0.2
Aerovox Excavation	2008	8,532	0.9
Dredge Area J	2009	19,591	5.8
Dredge Area L	2009	20,639	5.1
Dredge Area M	2009	1,709	0.9
Dredge Area G	2009	7,870	3.4
Dredge Area G	2010	10,381	3.7
Dredge Area J	2010	6,635	4.2
Dredge Area K	2010	9,003	2.9
Dredge Area M	2010	392	0.2
Dredge Area K	2011	13,544	5.6
Dredge Area N	2011	7,539	3.1
Dredge Area G	2011	4,591	2.1
Dredge Area Q	2011	400	0.2
Dredge Area L	2012	13,268	4.3
Dredge Area P	2012	6,234	1.9
Dredge Area L	2013	2,095	0.7
Dredge Area P	2013	16,900	4.2
OU1 Total		277,258	
Total		291,258	103*

*Total Acreage represents footprint of areas dredged. Portions of some areas were dredged during multiple years.



Pipeline	Length (ft)
From Dredge Area O to Manomet Street	3,496
From Manomet Street to Desanding	2,466
From Dredge Area L, Dredge Area P, & Dredge Area R to Manomet	1,285

Legend

- Pipeline from Dredge Area O to Manomet Street Booster Pump
- Pipeline from Dredge Areas L, P, & R to Manomet Street Booster Pump
- Pipeline to Desanding Building
- Pipeline from Area C to Area D
- Manomet Street Booster Pump
- 2014 Dredge Area O
- 2014 Dredge Area L
- 2014 Dredge Area P
- 2014 Dredge Area R
- Management Units

N

0 300 600 Feet

1:7,200

JACOBS

Dredge Areas Scheduled for 2014 Dredge Season

New Bedford Harbor Superfund Site

NAME: croberts DATE: 01/17/2014

Figure 3

FIGURE 4: CONCEPTUAL LOCATIONS OF CDFS A, B AND C

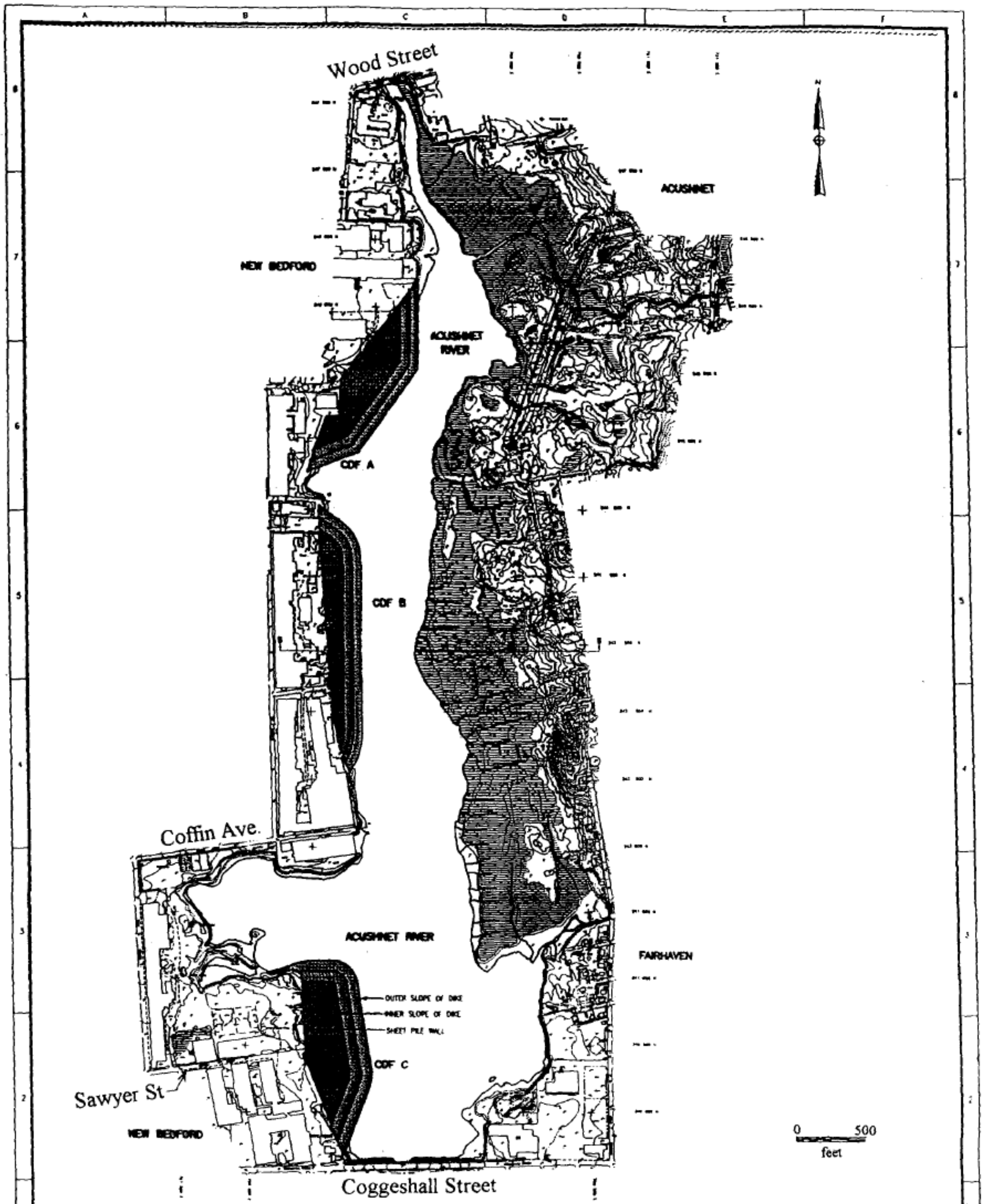


Figure 21a - Conceptual locations of upper harbor CDFs A, B and C
New Bedford Harbor Superfund Site, ROD 2

FIGURE 5: CONCEPTUAL LOCATION OF CDF D

Figure 21b - Conceptual location of the lower harbor CDF D
New Bedford Harbor Superfund Site, ROD 2

TABLES

TABLE 1: DETAILED ANALYSIS OF ALTERNATIVE 1 – CONFINED DISPOSAL FACILITIES (CDFS)

EVALUATION CRITERIA	
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	
HUMAN HEALTH AND ENVIRONMENT PROTECTION	Contaminated sediment above cleanup goals that drive unacceptable risks would be removed through dredging and permanently isolated in CDFs. Dredging of contaminated sediment and disposal in shoreline CDFs would effectively reduce the potential for direct contact exposure and limit the source of PCB contamination in surface water and biota. Exposure pathways would be eliminated or addressed through the implementation of institutional controls and long-term monitoring to ensure that the remedy remains protective of human health and the environment.
COMPLIANCE WITH ARARS	
CHEMICAL-SPECIFIC	The goal of the remedy, including the disposal component, is to reduce health risks due to consumption of PCB-contaminated local seafood, as well as reduce health risks due to contact with or incidental ingestion of PCB-contaminated shoreline sediment and improve the severely degraded ecosystem. The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.
LOCATION-SPECIFIC	CDFs would be designed and constructed to ensure that wetlands, fish and wildlife habitat related ARARs and ARARs for the preservation of historical and archeological data were met and to protect against storm damage and control flooding. The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.
ACTION-SPECIFIC	CDFs would be designed to meet the substantive requirements for remedy implementation, including TSCA PCB disposal requirements, TSCA chemical waste landfill standards, the CWA and CAA, and Massachusetts hazardous waste regulations. The conceptual CDF design includes groundwater, surface water and air emission monitoring during operation, closure and post closure, and erosion and stormwater drainage controls. Substantive standards of all applicable TSCA decontamination requirements would be followed.
LONG-TERM EFFECTIVENESS AND PERMANENCE	
MAGNITUDE OF RESIDUAL RISK REMAINING	Dredging of contaminated sediment above the cleanup levels and effective disposal of dredged sediment in CDFs would remove a substantial mass of PCBs from the Harbor and result in significant and consistent reduction of PCB flux and water column PCB concentrations. These improvements would be reflected in biota over time. Naturally occurring sedimentation within the harbor should assist in lowering PCB levels further over time. Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood.
ADEQUACY AND RELIABILITY OF CONTROLS	The effectiveness of disposal in CDFs depends on the design, construction, operation, and management of the facility. For long-term effectiveness, CDFs would require adequate long-term operation, maintenance, and monitoring. Institutional controls would be required

	for CDF properties to ensure the integrity of the caps over time and restrict property uses that could damage the caps and structures.
REDUCTION OF TOXICITY, MOBILITY OR VOLUME	
TREATMENT PROCESS USED AND MATERIALS TREATED	CDFs as a disposal alternative does not employ sediment treatment. However, disposal of the contaminated sediment in the CDFs is expected to reduce the potential migration of PCBs thereby reducing mobility of contaminants. Water decanted from the sediment is treated to meet discharge standards.
AMOUNT DESTROYED OR TREATED	Since this alternative does not employ sediment treatment, no reduction in mobility, toxicity, or volume of contaminants would be achieved through treatment.
DEGREE OF EXPECTED REDUCTIONS OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT	Effluent discharged to the river from the water treatment processes will meet discharge criteria.
DEGREE TO WHICH TREATMENT IS IRREVERSIBLE	Water treatment processes are irreversible.
TYPE AND QUANTITY OF RESIDUALS REMAINING AFTER TREATMENT	PCB residuals removed during water treatment would be disposed consistent with ROD requirements.
SHORT-TERM EFFECTIVENESS	
PROTECTION OF COMMUNITY DURING REMEDIAL ACTION	There could be significant short-term impacts to the community to facilitate the construction of these proposed shoreline facilities, as they are conceptually planned for construction adjacent to what is now active residential and commercial properties. Further, there would be additional significant short-term impacts to the community and potential restrictions on use of adjacent shoreline properties during the transport of the dewatered sediment to the CDF facility for disposal.
PROTECTION OF WORKERS DURING REMEDIAL ACTION	Workers on-site during remedial activities would use personal protective equipment as needed to prevent exposure to contaminants.
ENVIRONMENTAL IMPACTS	The CDF construction and permanent location of the CDF facilities would cause environmental impacts, as the biota and subtidal resource within the footprint of the CDFs would be permanently destroyed. However, consistent with ARARs, EPA would mitigate these impacts.
TIME UNTIL REMEDIAL ACTION OBJECTIVES ARE ACHIEVED	Design, construction and filling of the CDFs would likely take on the order of 5 or more years, with interim and then final capping likely adding another 1-2 years. Operation, maintenance and monitoring of the CDFs would need to be performed in perpetuity.
IMPLEMENTABILITY	
TECHNICAL FEASIBILITY	CDFs are considered a demonstrated technology. Experience gained by the construction of the pilot CDF demonstrated the site-specific application of this technology. However, since the time of the OU1 ROD, EPA has determined that there are significant technical feasibility concerns with construction of CDFs at this Site. Constructing shoreline facilities requires a thorough evaluation of complex engineering and design considerations including the geotechnical suitability of the material in the footprint of the CDF in order to assess structural integrity. Complex legal and real estate issues would need to be addressed with the adjacent shoreline properties to facilitate CDF construction.

ADMINISTRATIVE FEASIBILITY	Redevelopment and recreational uses now planned along the New Bedford Harbor shoreline where CDFs are conceptually planned will make the administrative feasibility of planning and constructing CDFs challenging. Coordination between EPA, the Corps, the City of New Bedford, the Towns of Fairhaven and Acushnet, and the Commonwealth of Massachusetts would be important.
AVAILABILITY OF SERVICES AND MATERIALS	All activities and technologies associated with this alternative, including dredging equipment and land-based heavy construction equipment for construction of CDFs, are readily available. Vendors and contractors specializing in marine construction can provide the equipment and personnel to conduct the remediation and construction activities.
COST	
ESTIMATED CAPITAL COST (PRESENT WORTH)	$54,672,973
ESTIMATED O&M COSTS (PRESENT WORTH)	$1,184,817
TOTAL ESTIMATED COSTS	$55,857,790

TABLE 2: SUMMARY OF THE COST OF CDF DISPOSAL ALTERNATIVE

ITEM		**COST ESTIMATE**
BUILD CDF		
CDF CONSTRUCTION	$42,527,416	
STORMWATER MANAGEMENT	$153,482	
MONITORING WELLS	$60,904	
SUBTOTAL		$42,741,802
FILL CDF		
TRANSFER MATERIALS	$10,709,631	
TRUCK DECONTAMINATION	$279,946	
AIR MONITORING	$167,813	
STORMWATER MANAGEMENT	$501,199	
SUBTOTAL		$11,658,589
CAP CDF		
INTERIM CAP	$701,614	
FINAL CAP	$3,642,239	
SUBTOTAL		$4,343,853
TOTAL CAPITAL COST		$58,744,244
TOTAL CAPITAL COST (PRESENT WORTH)		**$54,672,973**
CDF O&M		
GW MONITORING ANNUAL	$47,860	
CAP MAINTENANCE ANNUAL	$65,405	
TOTAL ANNUAL COST	$113,265	
30 YEARS O&M		$1,235,280
TOTAL O&M (PRESENT WORTH)		**$1,184,817**
TOTAL PRESENT WORTH COST		**$55,857,790**

TABLE 3: DETAILED ANALYSIS OF ALTERNATIVE 2 – OFF-SITE TRANSPORTATION AND DISPOSAL

EVALUATION CRITERIA	
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	
HUMAN HEALTH AND ENVIRONMENT PROTECTION	Contaminated sediment above cleanup goals that drive unacceptable risks would be removed through dredging and permanently isolated at off-site permitted facilities. Dredging of contaminated sediment and off-site disposal would effectively reduce the potential for direct contact exposure and limit the source of PCB contamination in surface water and biota. Exposure pathways would be eliminated or addressed through the implementation of institutional controls and long-term monitoring to ensure that the remedy remains protective of human health and the environment.
COMPLIANCE WITH ARARS	
CHEMICAL-SPECIFIC	The goal of the remedy, including the disposal component, is to reduce health risks due to consumption of PCB-contaminated local seafood, as well as reduce health risks due to contact with or incidental ingestion of PCB-contaminated shoreline sediment and improve the severely degraded ecosystem. The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.
LOCATION-SPECIFIC	The State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood.
ACTION-SPECIFIC	PCB-contaminated sediment above EPA's clean up levels would be handled and disposed of in accordance with 40 CFR 761.61(c) of TSCA, which requires that the methods used will not pose an unreasonable risk of injury to health or the environment. Off-site disposal would meet any applicable requirements, such as TSCA PCB disposal requirements.
LONG-TERM EFFECTIVENESS AND PERMANENCE	
MAGNITUDE OF RESIDUAL RISK REMAINING	Dredging of contaminated sediment above the cleanup levels and effective off-site disposal of dredged sediment would remove a substantial mass of PCBs from the Harbor and would result in significant and consistent reduction of PCB flux and water column PCB concentrations. These improvements would be reflected in biota over time. Naturally occurring sedimentation within the harbor should assist in lowering PCB levels further over time. Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood.
ADEQUACY AND RELIABILITY OF CONTROLS	Off-site transportation and disposal at a TSCA-permitted facility is an effective disposal alternative in the long-term. Off-site transportation and disposal is currently being implemented as part of the ongoing cleanup efforts. The long-term effectiveness is assured as the material is disposed at a facility that is permitted to manage and dispose of PCB-contaminated materials and this facility is operated and maintained to ensure long-term protectiveness under the RCRA and TSCA regulatory program.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME	
TREATMENT PROCESS USED AND MATERIALS TREATED	The off-site disposal alternative does not employ sediment treatment. However, disposal of the contaminated sediment at permitted off-site disposal facilities is expected to reduce the potential migration of PCBs thereby reducing mobility of contaminants. Water decanted from the sediment is treated to meet discharge standards.
AMOUNT DESTROYED OR TREATED	Since this alternative does not employ sediment treatment, no reduction in mobility, toxicity, or volume of contaminants would be achieved through treatment.
DEGREE OF EXPECTED REDUCTIONS OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT	Effluent discharged to the river from the water treatment processes will meet discharge criteria.
DEGREE TO WHICH TREATMENT IS IRREVERSIBLE	Water treatment processes are irreversible.
TYPE AND QUANTITY OF RESIDUALS REMAINING AFTER TREATMENT	PCB residuals removed during water treatment would be disposed consistent with ROD requirements.
SHORT-TERM EFFECTIVENESS	
PROTECTION OF COMMUNITY DURING REMEDIAL ACTION	Although transportation by truck can result in short-term impacts to the community, the OU1 remedy provides for transportation by rail of the dewatered sediment significantly reducing any short-term impacts.
PROTECTION OF WORKERS DURING REMEDIAL ACTION	Workers on-site during remedial activities would use personal protective equipment as needed to prevent exposure to contaminants.
ENVIRONMENTAL IMPACTS	Off-site transport and disposal would result in minimal sustained environmental impacts.
TIME UNTIL REMEDIAL ACTION OBJECTIVES ARE ACHIEVED	Off-site transportation and disposal is currently ongoing for disposal of sand and dewatered sediment filter cake and would continue with this alternative. There would be no delay to cleanup operations.
IMPLEMENTABILITY	
TECHNICAL FEASIBILITY	Off-site transportation and disposal is readily implementable, as it is currently being implemented as part of the ongoing cleanup efforts. Although at the time of the 1990 FS, off-site disposal was eliminated from the detailed analysis of alternatives because there was not adequate capacity at permitted facilities to accommodate the dredged material slated for disposal, there is now adequate capacity at existing TSCA-permitted disposal facilities to accommodate the potential additional PCB-contaminated sediments.
ADMINISTRATIVE FEASIBILITY	Coordination between EPA, the Corps, the City of New Bedford, the Towns of Fairhaven and Acushnet, the Commonwealth of Massachusetts would be important.
AVAILABILITY OF SERVICES AND MATERIALS	All activities and technologies associated with this alternative, including dredging equipment and off-site transportation equipment to accommodate truck- or rail-transport, are readily available. Vendors and contractors specializing in marine construction and off-site transportation can provide the equipment and personnel to conduct the remediation, transportation and disposal operations.

Cost	
Estimated Capital Cost (Present Worth)	$33,008,084
Estimated O&M Costs (Present Worth)	$0
Total Estimated Costs	$33,008,084

TABLE 4: SUMMARY OF THE COST FOR OFF-SITE TRANSPORTATION AND DISPOSAL

ITEM	**ESTIMATED QUANTITY (CYs OF MATERIAL FOR TRANSPORT & DISPOSAL)**	**COST ESTIMATE**
PROJECT YEAR 1		
FILTER CAKE	34,925	$8,570,176
SAND	6,350	$1,000,444
VEGETATED MATERIAL	27,000	$7,222,103
PROJECT YEAR 2		
FILTER CAKE	34,925	$8,862,341
SAND	6,350	$1,035,858
VEGETATED MATERIAL	27,000	$7,448,976
TOTAL COST		**$34,139,898**
TOTAL PRESENT WORTH COST		**$33,008,084**

TABLE 5: COMPARATIVE ANALYSIS OF ALTERNATIVES

ASSESSMENT FACTORS	ALTERNATIVE 1 – CDFS	ALTERNATIVE 3 – OFF-SITE DISPOSAL
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	Protection of human health and the environment is achieved by a combination of remedial action and institutional controls. Exposure pathways will be eliminated or addressed through implementation of institutional controls and long-term monitoring to ensure that the remedy remains protective of human health and the environment.	Same as Alternative 1.
COMPLIANCE WITH ARARS	All ARARs will be met.	Same as Alternative 1.
LONG-TERM EFFECTIVENESS AND PERMANENCE - MAGNITUDE OF RESIDUAL RISK REMAINING - ADEQUACY AND RELIABILITY OF CONTROLS	Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood. The effectiveness of disposal in CDFs depends on the design, construction, operation and management of the facility. Institutional controls would be required for CDF properties to ensure the integrity of the caps over time and restrict property uses that could damage the caps and structures.	Until PCB levels in seafood reach the risk-based site-specific threshold of 0.02 ppm, the remedy will include institutional controls to minimize ingestion of local PCB-contaminated seafood. Off-site transportation and disposal at a TSCA-permitted facility is an effective disposal alternative in the long-term. The long-term effectiveness is assured as the material is disposed at a facility that is permitted to manage and dispose of PCB-contaminated materials.
REDUCTION OF TOXICITY, MOBILITY OR VOLUME	Since this alternative does not employ sediment treatment, no reduction in mobility, toxicity, or volume of contaminants would be achieved through treatment. However, disposal of the contaminated sediment in the CDFs is expected to reduce the potential migration of PCBs. Water decanted from the sediment is treated to meet discharge standards.	Since this alternative does not employ sediment treatment, no reduction in mobility, toxicity, or volume of contaminants would be achieved through treatment. However, disposal of the contaminated sediment at permitted off-site disposal facilities is expected to reduce the potential migration of PCBs. Water decanted from the sediment is treated to meet discharge standards.

SHORT-TERM EFFECTIVENESS - PROTECTION OF COMMUNITY DURING REMEDIAL ACTION - PROTECTION OF WORKERS DURING REMEDIAL ACTION - ENVIRONMENTAL IMPACTS - TIME UNTIL REMEDIAL ACTION OBJECTIVES ARE ACHIEVED	There could be significant short-term impacts to facilitate the construction of CDFs, as they are conceptually planned adjacent to active residential and commercial properties. Workers would use personal protective equipment as needed to prevent exposure to contaminants. The CDF construction and permanent location of the CDF facilities would cause environmental impacts, as the biota within the footprint of the CDFs would be permanently destroyed. Design, construction and filling of the CDFs would likely take on the order of 5 or more years, with interim and then final capping likely adding another 1-2 years. Operation, maintenance and monitoring of the CDFs would need to be performed in perpetuity.	Although transportation by truck can result in short-term impacts to the community, the OU1 remedy provides for transportation by rail of the dewatered sediment significantly reducing any short-term impacts. Workers would use personal protective equipment as needed to prevent exposure to contaminants. Off-site transport and disposal would result in minimal sustained environmental impacts. Off-site transportation and disposal is currently ongoing and would continue with this alternative. There would be no delay to cleanup operations.
IMPLEMENTABILITY - TECHNICAL FEASIBILITY - ADMINISTRATIVE FEASIBILITY - AVAILABILITY OF SERVICES AND MATERIALS	CDFs are considered a demonstrated technology. However, there are significant technical feasibility concerns with construction of CDFs at this Site. Constructing shoreline facilities requires a thorough evaluation of complex engineering and design considerations. Complex legal and real estate issues would need to be addressed with the adjacent shoreline properties to facilitate CDF construction. Redevelopment and recreational uses now planned along the New Bedford Harbor shoreline where CDFs are conceptually planned will make the administrative feasibility of planning and constructing CDFs challenging. All activities and technologies associated with this alternative, including dredging equipment and land-based heavy construction equipment for construction of CDFs, are readily available.	Off-site transportation and disposal is readily implementable. There is adequate capacity at existing TSCA-permitted disposal facilities to accommodate the potential additional PCB-contaminated sediments. All activities and technologies associated with this alternative, including dredging equipment and off-site transportation equipment to accommodate truck- or rail-transport, are readily available.
COST (PRESENT WORTH)	$55,857,790	$33,008,084

ATTACHMENT A

1998 ROD ARARS TABLE

Note: In the attached reproduced tables from the 1998 ROD, the table column titles are unreadable. For Chemical-Specific ARARs, the 5 Column titles in order are: Requirement; Citation; Status; Requirement Synopsis; and, Actions to be Taken to Attain ARARs. For Location-Specific ARARs, the 5 Column titles in order are: Requirement; Citation; Status; Requirement Synopsis; and, Actions to be Taken to Attain ARARs. For Action-Specific ARARs, the 5 Column titles in order are: Medium/Authority; Citation; Status; Requirement Synopsis; and, Actions to be Taken to Attain ARARs.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Chemical Specific ARARS

Requirement	Citation	Status	Requirement Synopsis	Action To Be Taken To Attain ARARS
Federal				
Cancer Slope Factors (CSFs)		To Be Considered	These are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	Dredging and containment of PCB contaminated sediments in CDFs will minimize exposure to potential receptors.
Reference Doses (RfDs)		To Be Considered	These are guidance values used to evaluate the potential non-carcinogenic hazard caused by exposure to contaminants.	Dredging and containment of PCB contaminated sediments in CDFs will minimize exposure to potential receptors.
PCBs: Cancer Dose -- Response Assessment and Application to Environmental Mixtures	EPA/600/P-96/001F, September, 1996	To Be Considered	Guidance as to Agency's reassessment of the carcinogenicity of PCBs. It includes revised slope factors for PCBs based on the pathway of exposure.	Dredging and containment of PCB contaminated sediments in CDFs will minimize exposure to potential receptors.
Federal Food, Drug and Cosmetic Act	21 USC 331, 342, 346; 21 CFR 109.30	Relevant and Appropriate	Prohibits the introduction of adulterated food into interstate commerce. Fish or shellfish containing greater than 2 ppm PCB concentration in tissue is considered adulterated. State fishing ban incorporates FDA level.	State fishing ban will continue, along with other institutional controls, to minimize consumption of local seafood. FDA level is waived pursuant to CERCLA Section 121(d)(4)(B).
Clean Water Act (CWA), Water Quality Criteria	33 USC 1313, 1314	Relevant and Appropriate	Federal surface water quality standards are incorporated into Massachusetts Surface Water Quality Standards	
Massachusetts				
Surface Water Quality Standards	21 MGL 27; 314 CMR 4. 04(1),(2); 4. 05(4)(a-b),(5)	Relevant and Appropriate	MADEP surface water quality standards incorporate the federal AWQC as standards for surface waters of the state. Standards establish acute and chronic effects on aquatic life for contaminants including PCBs, cadmium, chromium, copper, and lead.	AWQC are used as a measure of long-term performance and effectiveness of the remedy.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Location Specific ARARs

Requirement	Citation	Status	Requirement Synopsis	Actions To Be Taken to Attain ARARs
Federal				
Floodplain Management - Executive Order 11988	40 CFR Part 6, Appendix A	Applicable	Federal agencies are required to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	The remedy will occur within the 100-year coastal floodplain as there is no practical acceptable alternative location. The CDFs will be constructed to minimize potential harm to the floodplain and will be built in accordance with flood protection measures.
Wetland Protection - Executive Order 11990	40 CFR Part 6, Appendix A	Applicable	Federal agencies are required to avoid adversely impacting wetlands whenever possible, minimize wetland destruction and preserve the value of wetlands.	This is the best practical alternative for remediating the Harbor. The Agency will minimize the destruction, loss and degradation of wetlands as much as possible given the extent and location of contaminated sediment. Where ever possible, higher target cleanup levels were set in wetlands to minimize destruction. Replanting of dredged wetlands will occur.
Fish and Wildlife Coordination Act	16 USC Part 661 et seq.; 40 CFR 6. 302(g)	Applicable	Requires consultation with appropriate agencies to protect fish and wildlife when federal actions may alter waterways. Must develop measures to prevent and mitigate potential loss to the maximum extent possible.	Appropriate agencies will be consulted prior to implementation to find ways to minimize adverse effects to fish and wildlife from harbor dredging and from construction and maintenance of CDFs.
Endangered Species Act	16 USC Part 1531 et. seq.; 40 CFR 6. 302(h)	Applicable	Requires consultation with appropriate agencies if a threatened or listed species or their habitat may be affected by a federal action.	EPA will consult with appropriate agencies to consider mitigation measures for remedial activities affecting the identified feeding grounds for roseate tern.
Preservation of Historical and Archeological Data Act of 1974	16 USC 469 et. seq.	Applicable	Requires recovering and preserving significant historical or archeological data when such data is threatened by a federal action or federally licensed action which alters any terrain where such data is located.	An assessment of the Harbor for potential locations of historical or archeological data will be conducted. Located objects will be recovered in accordance with the substantive requirements.
Coastal Zone Management Act	16 USC Parts 1451 et seq.	Applicable	Requires that any actions must be conducted in a manner consistent with state approved management programs.	The entire site is located in a coastal zone management area. The remedy is consistent with the state coastal zone management program to the maximum extent possible.
Massachusetts				
Wetlands Protection Act	131 MGL 40; 310 CMR 10	Applicable	Standards regulate dredging, filling, altering, or polluting of coastal and inland wetland resource areas. Protected resource areas within and adjacent to the site include: Land Subject to Coastal Storm Flowage 10. 02(1)(d); Coastal Wetlands 10.24(7)(b), (c)(6); Land Under Ocean 10.25(5)(6); Designated Port Area 10. 26(3)(4); Coastal Beaches (including tidal flats) 10.27(6); Coastal Banks 10.30(6-7); Salt Marshes 10.32(5); Land Containing Shellfish 10.34(5)(7);	Best available measures will be used to minimize adverse effects on identified resource areas and associated 100 foot buffer zones during design and implementation of remedy. Dredged salt marshes will be replanted. DMF will be consulted for activities affecting fish and shellfish habitat..
Wetlands Protection Act (continued)			Banks..Land Under...Fish Runs 10.35 (3-4); and Riverfront Area 10.58(4)(a),(c)(1and3),(d)(2),(d)(5)(a-b and f-g).	
Coastal Zone Management	301 CMR 21. 00	Applicable	Requires that any actions must be conducted in a manner consistent with state approved management programs.	The entire site is located in a coastal zone management area. Actions taken will be consistent with substantive portions of identified policies of CZM.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Location Specific ARARs

Requirement	Citation	Status	Requirement Synopsis	Actions To Be Taken To Attain ARARS
Coastal Zone Management Policies	MCZM	To Be Considered	Statements of the state environmental policy for coastal zone areas which are implemented through identified ARARs, particularly the Wetlands Protection Act and the Waterways Law. Policies to be considered are Habitat 1; Water Quality 1; Coastal Hazard 2,3; Ports1, 2,3; Ports Management Principle 1; Protected Areas 3; Public Access1; Public Access Management Principle 2, 4; and Growth Management Principle 1.	These policies will be considered throughout construction, dredging and operation and maintenance of the remedy. Compliance with the identified substantive portions of the State ARARs will meet the intent of these policies.
Administration of Waterways Licenses Law	91 MGL 1.00 et. seq.; 301 CMR 9.00	Applicable	Criteria for work within flowed and filled tidelands. Focus on long term viability of marine uses and protecting public rights in tidelands. Applicable provisions are Restrictions on Fill and Structures 9.32(1)(a)(2,3)(b)(3,4); Preserving Water-Related Public Rights 9.35(1),(2)(a)(1 and 3 (a and b); Protecting Water-Dependent Uses 9.36 (2)(3)(4)(5)(a)(1,2)(5)(b); Engineering and Construction Standards 9.37(1)(c), (3)(a),(b)(4); and Dredging and Dredged Material Disposal 9.40(2),(3)(e).	Temporary unavoidable impacts to public access rights to water and to water dependent users will occur. Alternate access will be available. CDFs will be designed to accommodate future uses, subject to institutional controls, such as parks, sports fields, and in designated port areas, marinas.
Prohibition Against Certain Fishing in New Bedford Harbor	111 MGL 5 and 6; 94 MGL 186 and 192; 30A MGL 2; 105 CMR 260.005	Applicable	Prohibits taking or selling of contaminated lobsters and certain fish in designated areas of New Bedford Harbor.	State fishing ban in Areas I, II, and III will be incorporated into the remedy as an existing institutional control for protection of human health. State remains as enforcement authority.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Action Specific ARARs

Medium/Authority	Citation	Status	Requirement Synopsis	Actions to be Taken to Attain ARARs
Federal				
Toxic Substances Control Act (TSCA), PCB Disposal Requirements	15 USC 2601-2692; 40 CFR 761.50(a)(3); (b)(3)(i)(A)	Applicable	General PCB Disposal requirements for all actions and provides jurisdiction for EPA cleanup.	Discharges from water treatment plants will meet PCB AWQC through phased TMDL approach. The Regional Administrator finds the site poses an unreasonable risk to health and the environment and requires remediation.
TSCA PCB Remediation Waste	40 CFR 761.61(c)	Applicable	Provides for a risk-based disposal method which will not pose an unreasonable risk of injury to human health or the environment.	Disposal of the contaminated dredged sediments in CDFs will not pose unreasonable risk and is approved by the Regional Administrator through issuance of the ROD.
TSCA Chemical Waste Landfill Standards	40 CFR 761.75. See synopsis for specific citations.	Applicable	Standards for the construction, operation, and monitoring of facilities used to dispose of PCB's, unless a waiver is granted under Sec. 761.75(c)(4). Appropriate sections are 761.75(b)(1) soils; (b)(2) liner; (b)(4)(i) flood protection; (b)(5) topography; (b)(6) monitoring; (b)(8)(i) operations; (b)(9) supporting facilities; and (c)(4) waivers.	CDFs will be constructed, operated and maintained to satisfy the substantive requirements. TSCA waivers required for specific requirements regarding soil (soil underlying CDFs will meet permeability standard of 10E-07 cm/sec); synthetic bottom liner (CDFs will have synthetic side liner); hydrogeologic conditions; and leachate collection. Regional Administrator finds CDFs will not present unreasonable risk of injury to health or the environment and approves of remedy without these specific features.
TSCA Decontamination	40 CFR 761.79	Applicable	Sets decontamination standards for removal of PCBs from water, organic liquids, non-porous surfaces, concrete and nonporous surfaces covered with a porous surface. Allows for alternative methods of decontamination.	Equipment and personal protective gear will be decontaminated in accordance with these substantive requirements.
TSCA PCB Spill Cleanup Policy	40 CFR 761.120 - .135	To Be Considered	Establishes criteria to determine adequacy of the cleanup of spills (occurring after 5/4/87) from the release of materials with > 50 ppm PCBs.	Although this policy is directed at electrical equipment-type spills, it will be considered to address any PCB leakage or spillage from the CDF.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Action Specific ARARs

Medium/Authority	Citation	Status	Requirement Synopsis	Actions to be Taken to Attain ARARs
Clean Water Act (CWA), Section 402, National Pollutant Discharge Elimination System (NPDES)	33 USC 1342; 40 CFR 122-125, 131	Applicable	These standards govern discharge of water into surface waters. Due to the degraded nature of New Bedford Harbor waters, discharges of Cu and PCBs into the waterway must meet ambient water quality criteria (AWQC) at the discharge point.	Discharge from the water treatment plants associated with the remedial dredging will meet AWQC for Cd, Cr and Pb. Copper and PCBs will meet AWQC through a phased Total Maximum Daily Load (TMDL) approach.
CWA, Section 402, NPDES, Prohibitions	40 CFR 122. 4(i)	Applicable	Prohibits new discharges into waters that do not meet applicable water quality criteria (AWQC) unless certain conditions are met.	Meeting this requirement will result in greater risk to human health and the environment since compliance would prevent cleanup of the Site until the Harbor waters reach water quality standards or until other conditions in the standard are met, neither of which can be accomplished in a reasonable time frame. Regulation is waived pursuant to CERCLA Section 121(d)(4)(B).
Total Maximum Daily Load (TMDL) Program Supplemental Guidance: The TMDL Concept	USEPA Draft 12/12/94	To Be Considered	Guidance clarifies TMDL concept's scope and flexibility.	TMDL guidance considered in phased TMDL approach to meeting AWQC for copper and PCB discharges from site treatment plants.
CWA, Section 404, Dredge and Fill Activities	40 CFR 230	Applicable	Control discharges of dredged or fill material in order to restore and maintain the chemical, physical and biological integrity of waters of the United States.	EPA finds that the remedy is the least damaging alternative to remediating the Harbor. Dredging of sediments and filling CDFs will be implemented so as to minimize to the maximum extent possible any adverse environmental impacts through engineering controls such as type of dredge used, rate of dredging, varying target cleanup levels in wetlands, and salt marsh revegetation.
Rivers and Harbors Act	33 USC 401-426m	Applicable	Requires coordination and approval of U.S. Army Corps of Engineers for dredging and for construction and future use of CDFs in navigable waters of the United States.	All dredging activities and remedial design, construction and future use decisons concerning the CDFs will comply with substantive requirements of this chapter that apply to the remedy. Remedy will be coordinated with and carried out with the approval and participation of the USACE.
Clean Air Act (CAA), National Emissions Standards for Hazardous Air Pollutants (NESHAPS)	42 USC 7401 et seq.; 40 CFR Part 63	Relevant and Appropriate	NESHAPS are a set of air emissions standards for specific chemicals, including PCBs, from specific production activities.	Monitoring of air emission from the CDFs during dredging and during temporary and final closure will be performed to assess compliance with these standards. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Action Specific ARARs

Medium/Authority	Citation	Status	Requirement Synopsis	Actions to be Taken to Attain ARARs
Guidance on Remedial Actions for Superfund Sites with PCB Contamination	OSWER Dir. 9355.4-01 (August 1990)	To Be Considered	Describes the recommended approach for evaluating and remediating CERCLA sites with PCB contamination.	This guidance was considered when setting remedial objectives and target cleanup levels and will be considered during remedial design and when implmenting long term management controls of the CDFs.
Massachusetts				
Hazardous Waste Management - Identification and Listing	21C MGL 4 and 6; 310 CMR 30.100	Applicable	Establishes standards for identifying and listing hazardous waste.	Testing as appropriate will assess whether hazardous wastes are present in discharges, process wastes or in material generated from cable or CSO relocation projects.
Hazardous Waste Management - Requirements for Generators of Hazardous Waste	21C MGL 4 and 6; 310 CMR 30.300	Applicable	Establishes standards for various classes of generators.	Any hazardous waste generated from the cable and CSO relocation projects or hazardous process wastes will be managed in accordance with the substantive requirements of these regulations and sent offsite to a hazardous waste disposal facility.
Hazardous Waste Management - Management Standards for all Hazardous Waste Facilities	21C MGL 4 and 6, 310 CMR 30 et. seq.	Applicable	Establishes standards for treatment, storage and disposal of hazardous waste. Sec. 30.501(3)(a) exempts facilities which treat, dispose or store hazardous waste containing 50 ppm or more of PCBs if they are adequately regulated under TSCA, 40 CFR 761.	Any hazardous waste generated from the cable and CSO relocation projects or hazardous process wastes will be managed in accordance with the substantive requirements of this section.
Supplemental Requirements for Hazardous Waste Management Facilities	21 MGL 27(12), 34 and 43; 314 CMR 8.03	Relevant and Appropriate	This regulation outlines the additional requirements that must be satisfied in order for a RCRA facility to comply with the NPDES regulation.	The water treatment facilities will meet these regulations through a monitoring program and engineering controls if necessary.
Solid Waste Management	21A MGL 2 and 8; 310 CMR 19.110-118; 19.130; 19.132-133; 19.143.	Relevant and Appropriate	Establishes rules and requirements for solid waste facilities; including cover systems; surface water and groundwater protection; monitoring and post-closure.	Disposal of sediments will meet the substantive requirements of these provisions if more stringent than TSCA regulations.
Surface Water Discharge	21 MGL 23(12) and 34; 314 CMR 3. 10(3)(4-6); (9) (a);(19)(3-6), (10),(12)(a-b); (13)	Applicable	This section outlines the requirements for obtaining a National Pollutant Discharge Elimination System (NPDES) permit in Massachusetts. The waters of New Bedford Harbor adjacent to the site are Classified as SB.	Discharge from waste treatment facilities will meet stringent effluent limitations. Discharges will be monitored in accordance with Site monitoring plans. Plants shall be properly operated and maintained; discharge will be reduced or halted if plants fail to function properly while corrective action undertaken.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Action Specific ARARs

Medium/Authority	Citation	Status	Requirement Synopsis	Actions to be Taken to Attain ARARs
Surface Water Quality Standards	27 MGL 27; 314 CMR 4. 03(1)(3)(c); 4. 04 (1)(2)(4)(6) ; 4.05(4)(a-b), (5)	Applicable	MADEP surface water quality standards incorporate the federal AWQC as standards for surface waters of the state. Standards establish acute and chronic effects on aquatic life for contaminants including PCBs, cadmium, chromium, copper, and lead.	Effluent discharged to the River from the water treatment plants shall meet ambient water quality criteria for cadmium, chromium and lead. Copper and PCB discharges will be at or below background pursuant to a phased Total Maximum Daily Load (TMDL) approach.
Rules for the Prevention and Control of Oil Pollution in the Waters of the Commonwealth	21 MGL 26-53; 314 CMR 15.03 (1),(3-5) ; 15.06(1-5)	Applicable	Regulates the discharge of oil or sewage, industrial waste or other material containing oil into waters of the Commonwealth. PCBs contain oil, some of which floats on surface water.	The remedy will comply with the substantive requirements of the provisions.
Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers	21 MGL 27(12 - 34; 314 CMR 12. 03(8); 12. 04(2), (3),(5), (8-12); 12. 05(1),(6),(12); 12.06(1-3)	Relevant and Appropriate	Establishes operation and maintenance standards for treatment works.	Water treatment facilities, although not "treatment works", will not allow waste to bypass system, will have an alarm system in place, and will be maintained properly and safely with adequate tools, equipment, parts, personnel, etc. Sampling and analysis will be conducted according to the site plan.
Certification for Dredging, Dredged Material Disposal and Filling in Waters	21 MGL 26-53; 314 CMR 9.06(1-2)	Applicable	Establishes procedures and criteria for the administration of Section 401 of the federal Clean Water Act for the discharge of dredged or fill material in waters of the United States within the Commonwealth.	The remedy represents the best practicable alternative for remediating the Harbor. Any adverse impacts will be minimized; replanting will occur where necessary.
Massachusetts Water Quality Standards Implementation Policy of Toxic Pollutants in Surface Waters (2/23/90)		To Be Considered	Recommends surface water quality standards for specified contaminants and implementation measures to achieve standards	This implementation policy and appropriate standards will be considered when evaluating impacts to surface water quality from the remedy.
Ambient Air Quality Standards	111 MGL 142D; 310 CMR 6.04(2)	Applicable	Establishes ambient air level for contaminants and particulates.	Emissions during construction and operation of CDFs will meet the particulate standard. Dust suppression will be used to reduce particulate emissions. Air monitoring is part of the site long-term monitoring plan.

Table 8 -- New Bedford Harbor Upper and Lower Harbor ROD -- Action Specific ARARs

Medium/Authority	Citation	Status	Requirement Synopsis	Actions to be Taken to Attain ARARs
Air Pollution Control	111 MGL 142A-J, 310 CMR 7.09(1-4); 7.10(1-2)	Applicable	Standards for, among other things, dust, odor and noise at construction sites. Pollution abatement controls may be required.	Dredging and CDF construction will be implmented so as to avoid air pollution. Engineering controls will be used as necessary.
MADEP - Recommended Threshold Effect Exposure Limits (TELs) and Allowable Ambient Limits (AALs)		To Be Considered	Establishes exposure concentrations for air contaminants developed and recommended by the Office of Research and Standards to protect public health	Evaluation of air emissions will consider the TELs and AALs.
Allowable Sound Emissions	DAQC policy 90-001; 2/1/90	To Be Considered	Establishes guideline where source of new noise should not emit more than 10 decibels above the existing (background) level.	Site operations noise level will be minimized and will follow the suggested noise limit to the extent practicable.