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State Enhanced Remedy in New Bedford, South Terminal

Expanded Avian Assessment

Massachusetts Department of Environmental Protection

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EXECUTIVE SUMMARY

The South Terminal CDF project (**Figure 1**) has been developed in order to develop a multi-purpose marine terminal, a primary purpose of which will be to provide critical infrastructure to serve offshore renewable energy facilities. The proposed facility will also be capable of supporting other industries within New Bedford, and will beneficially re-use sand from navigational dredging or the construction of confined aquatic disposal facilities to the extent approved by US EPA.

An assessment of the potential locations for supporting offshore renewable energy facilities has resulted in the conclusion that South Terminal in New Bedford, Massachusetts is the only location that is practicable due to a number of constraints, including: horizontal clearance, jack-up barge access, overhead clearance, total wharf and yard upland area, berthing space, site control/availability, and proximity. Due to the lack of other practicable alternatives, and the avoidance and minimization of impacts to resource areas to the maximum extent practicable, the South Terminal CDF is the Least Environmentally Damaging Practicable Alternative that will meet the primary Project Purpose.

The following assessments have been completed to quantify the resource area impacts that are anticipated from completion of the South Terminal CDF project: a shellfish survey, an essential fish habitat assessment, a functions and values assessment, a neighborhood analysis, an analysis of NOx generation from construction activities, a delineation of wetlands onsite, an avian wildlife assessment, an analysis of secondary impacts from construction and operation of the facility, an analysis of the presence of similar habitats within New Bedford Harbor, and an assessment of potential mitigation options.

Historically, much of the land that will be incorporated into the proposed Facility is former heavy industrial property, the site of an extensive former mill complex. The Potomska Mills, which once stretched from the current intertidal to beyond the western proposed site boundary, was present on the site from the late 1800's until about 1936 (when it was demolished), and encompassed an area of approximately 19 acres, more than half of which was within the footprint of the proposed South Terminal CDF Facility.

The resource areas anticipated to be impacted by completion of this project are as follows: 1.43 acres of intertidal area, 4.73 acres of shallow, near-shore sub-tidal area, and 0.18 acres of salt marsh will be filled by construction of the CDF. 6.65 acres of shallow, near-shore, sub-tidal area will be dredged from -1 to -6 MLLW to -20 MLLW. 2.35 acres of shallow, near-shore, sub-tidal area will be dredged from -1 to -6 MLLW to -30 MLLW. 6.39 acres of deeper sub-tidal area will be dredged from -20 to -25 MLLW to -30 MLLW. The impacts anticipated from the South Terminal CDF represent a small portion of the existing larger resource areas nearby that provide similar functions and values.

Impacts to resources have been avoided and minimized to the maximum extent practicable. To mitigate for the unavoidable impacts, the following mitigation is proposed: Creation/Enhancement of 12.3 acres of intertidal area, Creation/Enhancement of 2 acres of a combination of successional marsh areas, Shellfish seeding, a Tern Mitigation Plan, creation of a natural pilot storm-water filtration project, planned enhancement to approximately 26 acres of subtidal areas, planned enhancement to 16.1 acres of near-shore, shallow, subtidal areas, historic enhancement to 49.5 acres of subtidal areas, and historic enhancement to 18.9 acres of near-shore, shallow, subtidal areas.

1. PROJECT PURPOSE

a. Project Purpose

The purpose of the project is *to develop a multi-purpose marine terminal, as a component of the approved State Enhanced Remedy for New Bedford Harbor, a primary purpose of which will be to provide critical infrastructure to serve offshore renewable energy facilities, and which is also capable of beneficially re-using sand from navigational dredging or the construction of confined aquatic disposal facilities to the extent approved by US EPA.*

The Project Purpose has been defined to meet the primary objective of creating port infrastructure with the capacity to support the development, operation and maintenance of offshore renewable energy facilities, place the project in the context of the state enhanced remedy, and acknowledge the on-going Superfund remediation of the Harbor as context for potential future benefits associated with the facility.

b. Multi-purpose Terminal Capable of Supporting Offshore Renewable Energy Projects

Plans for the development of major offshore wind energy generation are under development in most of the Atlantic coastal states. Projects are expected to be under development in Massachusetts and Rhode Island in the near term, and the states have identified areas in federal waters off their coasts for further evaluation for development in the mid-term, and both states (and many of the Atlantic coastal states) are working closely with the Minerals Management Service to initiate the offshore leasing process. A key component of developing

offshore wind energy generation is the shore-side infrastructure necessary to support construction, assembly and transshipment of foundation and turbine components. Without a well-positioned, marine-industrial terminal to receive store, stage, assemble, and maintain wind turbine components and their supporting infrastructure, the development of off-shore wind facilities cannot be accomplished. As described in detail below, such facilities have specific operational requirements associated primarily with the scale of the turbine and foundation components: factors such as proximity to the offshore facilities, horizontal and vertical clearances, laydown area, and access to deep water navigation constitute 'hard criteria' site requirements. This would also be case for tidal or wave energy projects should those technologies become viable in the long term.

The City also proposes to use the terminal for other cargoes, which may include container, break bulk, and bulk cargo shipping. Additionally, the terminal would facilitate implementation of America's Marine Highway (Short-Sea Shipping) and would also serve as a location to temporarily store sand generated during CAD Cell construction, so as to facilitate reuse of the material.

The anticipated future uses (container shipping, break-bulk cargo shipping, bulk cargo shipping, short-seas shipping and CAD Cell sand storage) each require approximately the same type of facilities: deep water berthing, quae-side loading and unloading area, and upland storage and staging area. Major demands for berthing and upland storage and staging space will be temporary, and will fluctuate based upon the size of the shipments anticipated to arrive or leave. Break-bulk cargo, containers, trucks, or bulk cargo may require temporary storage prior to loading and transport of vessels; however, only a small portion of the site (1-2 acres) would be

required for any one method of transportation with any regularity. Reserving a portion of the site for the storage of CAD Cell sand will therefore not be difficult.

The intent is to use the terminal for the purpose of offshore renewable energy development until late 2012 or early 2013 (the anticipated completion date of the first offshore renewable energy construction project) and, subsequent to that date, utilizing the facility for, other cargoes (until such time as another alternative energy support project requires the use of the site). Thus, the terminal would be constructed to the specifications required for wind energy development but would be designed so as to accommodate a range of future uses described above.

Additionally, the proposed terminal represents an opportunity to beneficially reuse and/or manage material dredged from the harbor as part of the State Enhanced Remedy and ongoing EPA Superfund harbor cleanup activities as described below:

2. WHY SOUTH TERMINAL CDF IS THE LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE THAT MEETS THE PROJECT PURPOSE

a. Proposed Project Description

The proposed South Terminal CDF is a filled structure adjacent to the shoreline, bounded by sheet piling, currently planned to be capped by crushed stone. **Figures 2 and 3** note the anticipated orientation of construction for the facility as well as the plots of land anticipated to be incorporated into the facility. The total estimated size of the facility, including the ancillary southern properties, is currently anticipated to be approximately 28.25 acres.

b. Anticipated Future Uses of South Terminal CDF

Use of the South Terminal CDF for off-shore wind energy support terminal is anticipated to start as early as November 2011 (immediately subsequent to construction of the terminal). Operation of the facility for off-shore wind energy support for the first major off-shore wind energy project is anticipated to last until February of 2013.

Although off-shore wind energy support operations will utilize the entire facility until February of 2013, subsequent to that date, the facility is anticipated to be utilized in a number of non-off-shore wind energy related means, including: as a terminal for container shipping, a terminal for break-bulk cargo shipping, a terminal bulk cargo shipping, and as a location to store sand generated via CAD Cell construction, so as to facilitate reuse of the material.

Existing break-bulk cargo and refrigerated cargo is currently accommodated at State Pier, Maritime Terminal and Bridge Terminal; however, the Route 6 Bridge restriction (limiting vessel width to no greater that approximately 90 feet) and the depth restrictions (current maximum depth is approximately -23 feet MLLW) at the two terminals prevents vessels of a certain size from accessing Marine Terminal and Bridge Terminal, and keeps vessels that can access the terminals from being fully loaded at these locations. Maritime International estimates a significant annualized loss of income from less than fully loaded vessel, and that any availability at the South Terminal CDF would be quickly utilized to expand its break-bulk operations. The increased capacity would allow a significant increase in international cargo vessels with break-bulk cargo to utilize the Port.

South Terminal would also be ideal for shipment of bulk cargo, such as sand, gravel, or other bulk material. Multiple terminals within New Bedford already service bulk cargo. The R.M. Packer facility ships sand, gravel, fuel, modular homes, and "heavy lift" items. Island Barge transports construction materials and scrap to and from Nantucket. D.W. White recently suspended bulk shipment operations from its location at Pope's Island, from which it transported salt, gypsum, cement, and scrap lumber, due to inefficiencies caused by lack of minimum storage space as well as lack of an appropriate bulkhead with sufficient draft for loading and unloading of bulk cargoes. Access to an available South Terminal CDF would allow larger barges, and potential increased shipments for these organizations.

The Port of New Bedford is also in negotiations to set up South Terminal as a major shipping location within America's Marine Highway (Short-Sea Shipping). Short-sea shipping operations

are the diversion of wheeled cargo (truck traffic) from congested highways to the open sea – as well as on inland waterways to absorb a significant part of the future projected growth in highway freight traffic, reduce air pollution, traffic congestion, and shipping costs.

Refrigerated cargo does require refrigerated storage areas; however, refrigerated storage areas are available in other areas of the harbor, and cargo would be transported to refrigerated storage locations after offloading at the facility. Break-bulk cargo will need shelter from the elements; but will be shipped to a warehouse after unloading at the facility. Bulk cargo will need space onsite for temporary storage prior to loading, but will be staged and delivered to limit its footprint at the site. Truck staging will be required for short-seas shipping; but the trucks will only be onsite immediately before and after a short-seas vessel arrives or leaves.

c. Least Environmentally Damaging Practicable Alternative

South Terminal in New Bedford has been determined to be the only practicable alternative for siting of an offshore renewable energy support facility. All other alternatives have been reviewed within the August 25, 2010 document entitled "State Enhanced Remedy in New Bedford, South Terminal" and have been found to not be practicable.

3. IMPACT ASSESSMENT OF PROPOSED PROJECT

a. Summary of Existing Resource Area Assessment and Anticipated Direct and Secondary Impacts

The project as planned will result in the following *Direct Impacts* to existing resource areas as outlined below:

- **Areas of Proposed Filling:**
    - 1.43 acres of intertidal area,
    - 4.73 acres of shallow, near-shore sub-tidal area; and
    - 0.18 acres of salt marsh will be filled during the construction of the facility.

  These areas currently serve as:
    - Essential Fish Habitat for winter flounder, windowpane flounder, scup, and black sea bass,
    - Shellfish habitat,
    - Potential foraging habitat for avian wildlife, and
    - The intertidal area serves as horseshoe crab habitat.
- **Temporary Impacts Associated with Bridge:** 10 Pilings temporarily in place to support the bridge, totaling approximately 50-125 square feet of alteration (assuming 30-48 inch diameter pilings)
- **Areas of Dredging (Existing Depth Between -1 and -6 MLLW):**

- 9.0 acres of near-shore, subtidal area will be dredged to between -20 and -30 MLLW (6.65 acres to -20 MLLW and 2.35 acres to -30 MLLW).

These areas currently serve as:

- Essential Fish Habitat for winter flounder, windowpane flounder, scup, and black sea bass,
- Shellfish habitat, and
- Potential foraging habitat for avian wildlife.

- **Areas of Dredging (Existing Depth between -20 and -25 MLLW):**
  - 6.39 acres of subtidal area will be dredged to -30 MLLW.

These areas currently serve as:

- Essential Fish Habitat for winter flounder, windowpane flounder, scup, and black sea bass, and
- Shellfish habitat.

- **Shellfish Impacts**:
  - It is estimated that approximately 1,019,986 shellfish will be lost during construction of the facility and associated dredging.

The project as planned will also result in the following *Secondary Impacts* to existing resource areas as outlined in previous sections:

- Dredging and Other Construction Related Turbidity;
- Operational Prop Wash Post-Construction;
- Stormwater Runoff;
- Traffic;

- Noise;
- Lighting;
- Bilge Water Management Issues; and
- Sloughing Slopes.

As noted above, these existing resources that will be impacted via construction and dredging are not unique to New Bedford Harbor; many areas within New Bedford Harbor, including some areas very nearby the proposed construction location (for example, Palmer's Island), provide similar functions and values that will remain in place.

The existing resources at the proposed construction site have a severely limited value due to the existence of PCB laden sediment; thus, the capping of this area will help eliminate the exposure pathways from the PCBs to the surrounding environment. The flood storage loss created by the completion of the South Terminal CDF would have a minimal overall impact on New Bedford harbor, as noted within the document entitled Hydrology of Floods, New Bedford Massachusetts, produced by the Hydrologic Engineering Section of the U.S. Army Corps of Engineers in September 1987, due to the enormous flux of harbor water that is able to flush in and out of New Bedford Harbor as it is adjacent to Buzzard's Bay.

As sections of New Bedford Harbor are designated as a Designated Port Area, the area of the project has historically been utilized for industrial purposes. Much of the land consists of fill material that has been transported to this location. Use of the site for water-dependent industrial activity would be in compliance with Commonwealth of Massachusetts Waterways Regulations. Additionally, a CDF would create positive economic benefits to the area by facilitating new water-dependent industrial activity. Although CDF creation represents a change of portions of

the shoreline of New Bedford Harbor, CDF creation has already been vetted through a public process within the New Bedford/Fairhaven Harbor Plan process during 2009.

b. Expanded Avian Wildlife Assessment

An assessment with regard to the potential for usage of the site by avian wildlife for nesting and foraging activities was conducted as a part of this study. The avian wildlife assessment consists of review, analysis, and evaluation of existing data. An independent review of the data evaluation was performed by an independent part, and the resume of the individual is attached Existing data for Southern New England, Bristol County, New Bedford and its Surroundings, and New Bedford Harbor include:

- **New Bedford Harbor** - A bird survey conducted within New Bedford Harbor by USEPA in 1987.
- **Bristol County Data** - Raw bird observations within Bristol County made via the Massachusetts Audubon Society's online "eBird" system,
- **Southern New England Data** - The species prioritization list associated with Bird Conservation Region 30,
- **New Bedford and Its Surrounding Communities** - Information from the Paskamansett Bird Club's 2007 Christmas Bird Count.
- **New Bedford and Its Surrounding Communities** - Specific identifications made by an individual within New Bedford from 2005-2008.
- **New Bedford Harbor** - Observations made for Mass Audubon Society's Breeding Bird Atlas 2.

These data provide a reasonable estimate of the avian wildlife that utilizes the site at any point in time for habitat. Although other avian wildlife could utilize the site as well, it is anticipated that that use would be infrequent, due to the absence of that avian wildlife in the surveys that focus closely on New Bedford Harbor. The following is a description of the evaluation undertaken in order to produce a list of avian wildlife that are anticipated to be present within New Bedford Harbor and utilize the site:

A bird survey for the New Bedford Superfund Site was conducted in the Summer of 1987. This survey was completed in support of a wetland analysis promulgated by the US Army Corps of Engineers. Of particular interest in this document was the comparison of avian wildlife populations present within the survey area (Upper New Bedford Harbor) as compared to the avian wildlife present at a location in Fairhaven in the Outer New Bedford Harbor (immediately to the east and south of the New Bedford Hurricane Barrier). The comparison indicates distinctly different avian wildlife populations within and outside of the Hurricane Barrier. The information associated with this bird survey is included within **Appendix 7**.

Data from the Massachusetts Audubon Society were accumulated between the years 2000 and 2010. This data were collected via an online data collection system utilized by bird watchers associated with the Mass Audubon called "eBird". "eBird" is an easy to use, interactive, computerized database that provides a simple way for bird watchers to keep track of the birds they see, and share that information with Mass Audubon (as well as researchers and other bird watchers). The data from the "eBird" site wwere easy to download into an excel spreadsheet and

to sort by species and sighting frequency; however, the "eBird" data could only be collected on a county-wide basis, and are not immediately representative of New Bedford Harbor. In fact, it may be an inaccurate representation of the actual species located at the project site. Due to restrictions in property access, bird watching is mainly conducted from public areas and not in locations specific to the project area. Therefore, the raw "eBird" data were also combined with a few other sources of more site-specific information. Information on "eBird" is included within **Appendix 2**.

Information regarding "Priority Species" within Bird Conservation Region 30 (New England/Mid-Atlantic Coast) was collected and analyzed. Bird Conservation Regions are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues. Bird Conservation Regions were developed through a mapping team comprised of members from the United States, Mexico, and Canada assembled at the first international North American Bird Conservation Initiative (a forum of governmental agencies, private organizations, and bird initiatives helping partners across the continent to meet their common bird conservation objectives). "Priority Species" within Bird Conservation Region 30 were noted by the Atlantic Coast Joint Venture, a partnership focused on the conservation habitat for native birds in the Atlantic Flyway of the United States from Maine south to Puerto Rico (representing 18 states and commonwealths and key federal and regional habitat conservation agencies and organizations in the joint venture area). The management board of the Atlantic Coast Joint Venture includes the Regional Refuge Chief from Region 4 and the Regional Director of Region 5, of the U.S. Fish and Wildlife Service as well as the Director of the Massachusetts Division of Fisheries & Wildlife. In addition six of the eight staff members listed

on the Atlantic Coast Joint Venture website are noted to be U.S. Fish and Wildlife Service employees. Information on the North American Bird Conservation Initiative and the Atlantic Coast Joint Venture are included within **Appendix 3**.

Each Christmas, the National Audubon Society promulgates a nation-wide bird count. In 2007, the Paskamansett Bird Club 2007 completed its Christmas Bird Count within the greater New Bedford, Acushnet, Fairhaven, Dartmouth and Mattapoisett cities. This information was collected in the winter, and therefore would miss migrating birds; however, it provides some additional information regarding avian wildlife presence in New Bedford and its surrounding communities. More detailed information regarding the 2007 Christmas Bird Count is included within **Appendix 6**.

Information from the postings of an amateur bird watcher were collected from an online web log or "Blog" posted by Mr. Daniel Harper. From August, 2005- September, 2008 Mr. Harper was the minister for the First Unitarian Church of New Bedford. During that time period, Mr. Harper conducted amateur bird watching events, during which he identified a range of birds inhabiting New Bedford Harbor (although not necessarily at the site). Mr. Harper posted the results of his observations, and posted a list at http://www.danielharper.org/blog/?page_id=454. Mr. Harper did not keep detailed records of his observations, and therefore only posted a summary of the birds he viewed, and did not have information on specific dates, times, or weather conditions at which he viewed the birds. Mr. Harper visited locations both within New Bedford and Fairhaven; therefore, the information that he collected is not specifically representative of the

South Terminal area, but is helpful in presenting a range of avian wildlife present in the vicinity of the project area. Information on Mr. Harper's blog are attached as **Appendix 4.**

The Massachusetts Audubon Society is nearing the end of its second effort to collect data on distribution of birds statewide in order to promulgate its Breeding Bird Atlas. The first Atlas was undertaken in the 1970s. Surveyors visit specific quadrants (approximately 10 square miles each) within Massachusetts and record all of the avian species observed. Due to the intense investigation requirements, no more than four quadrants are investigated by any surveyor in any one year. Surveyors conduct their investigations only during breeding periods (typically May 15 – August 1), and spend a minimum of 20 hours surveying for birds in each quadrant. This survey would have been conducted during time periods within which migrating birds would have been present within New Bedford Harbor. The quadrant for New Bedford North 06 encompasses most of the area north of the New Bedford Hurricane Barrier, and is primarily water, and therefore presents an ideal opportunity to record the presence or absence of shore birds within New Bedford Harbor. Information on the Breeding Bird Atlas is included within **Appendix 5**.

Data from the sources listed above, are presented and sorted within **Table 1A** through **Table 1D** contained within **Appendix 1**. The data are presented in raw form (unsorted) within **Table 1A**, and are gradually sorted in steps until a final list is presented within **Table 1D** as follows:

- Table 1A: Unsorted Raw Data

- Table 1B: Only birds observed by one of three field observers (Mr. Dan Harper, 1987 New Bedford Superfund Site Survey, and Mass. Audubon Breeding Bird Atlas Survey).
- Table 1C: Includes only birds observed by surveyors located (at all times) within New Bedford Harbor (1987 New Bedford Superfund Site Survey and Mass. Audubon Breeding Bird Atlas Survey).
- Table 1D: Includes only Bird Conservation Region 30 Priority Species observed by surveyors located (at all times) within New Bedford Harbor (1987 New Bedford Superfund Site Survey and Mass. Audubon Breeding Bird Atlas Survey).

Although Table 1D does not necessarily represent all birds that could utilize the site for habitat, it does represent the "Priority Species" most likely to utilize the site. It is likely that if other species utilize the site, they do so infrequently. The species of concern, therefore, are:

- American Black Duck
- American Oystercatcher
- Baltimore Oriole
- Black-crowned Night-Heron
- Blue-winged Warbler
- Canada Goose
- Chimney Swift
- Eastern Kingbird
- Eastern Towhee
- Gadwall

- Gray Catbird
- Great Crested Flycatcher
- Killdeer
- Least Tern
- Mallard
- Nelson's Sparrow
- Northern Flicker
- Saltmarsh Sparrow
- Snowy Egret
- Spotted Sandpiper
- Willet
- Willow Flycatcher
- Wood Duck

c. Endangered Species Analysis

The site is not located within an area identified as federal critical habitat or state priority habitat for rare or endangered species; however, due to the wide range of avian wildlife habitat use, it is unavoidable that some impacts to shallow-water feeding areas for some rare avian species may occur, but are anticipated to be minimal.

The Roseate Tern and Common Tern are noted to be state-listed as “Endangered” and “Special Concern” species, respectively, within the Commonwealth of Massachusetts. The Roseate Tern

is listed as a Federally "Endangered" species. Common Tern presence is often indicative of the presence of the Roseate Tern, as the Roseate Tern nests within Common Tern colonies and also often forages with Common Terns. Fact sheets regarding these two birds are included within **Appendix 8**.

Common Terns nest generally on sandy or gravelly offshore islands and barrier beaches. Roseate Terns typically nest among Common Tern colonies, but typically choose areas with denser vegetation to use as cover for chicks. Both species prefer to nest on islands to avoid predators and intruders. A variety of predators, including birds, mammals, snakes, ants, and land crabs eat tern eggs, young, and adults. Neither species has ever been known to nest at the project site or elsewhere in New Bedford Harbor.

Common Terns feed mainly on a wide variety of small fish and crustaceans; however, their primary prey in most Atlantic coast breeding areas is the American sand lance. Similarly, the Roseate Tern feeds almost exclusively on small fish. About 70% of its diet consists of sand lance. Both the Roseate Tern and the Common Tern forage by plunge-diving (diving from heights of between 1-12 meters and oven submerging to greater than 50 centimeters. Sand lance occur throughout the water column over sandy substrates into which they burrow. The sand lance burrows for rest and escape from predators; hence much time may be spent within the substrate, isolated from the water column. Due to this specific defense behavior, the sand lance is particularly vulnerable to become contaminated by adjacent contaminated sediment, such as the high levels of PCBs within the contaminated sediment of New Bedford Harbor. It is likely the Common Tern and Roseate Tern's preference for American sand lance is the source of high

levels of PCBs found in chicks found dead at Bird Island in 1970, and increased levels of PCBs within existing Roseate and Common Tern colonies. Additional details with regard to the American sand lance are included within **Appendix 9**.

The information gathered within bird surveys outlined within **Section 3b** above, indicates that Common Terns and Roseate Terns forage within Buzzard's Bay and the outer portions of New Bedford Harbor. Bird surveys that included areas outside of New Bedford Harbor (eBird information and observations completed by Mr. Dan Harper's surveys) noted the Common Tern and/or the Roseate Tern as being identified, while bird surveys conducted solely within the Hurricane Barrier (1987 New Bedford Superfund Site Bird Survey and Mass Audubon Breeding Bird Atlas surveys) did not note the presence of the Common Tern or the Roseate Tern. It should also be noted that the 1987 New Bedford Superfund Site Bird Survey in fact noted the presence of the Common Tern at a control site located outside of the New Bedford Hurricane Barrier. (The Paskamansett Bird Club 2007 Christmas Bird Count was conducted in the winter, when Common Terns and Roseate Terns would have already migrated south for the winter.)

These surveys indicate that the Common and Roseate Terns likely do not travel inside of the New Bedford Hurricane Barrier, and if they do, they do so infrequently and have not been noted within the surveys in question.

It is likely that Common and Roseate Terns do not utilize the area within the New Bedford Hurricane Barrier for the following reasons:

- **Food –** As stated above, the primary food source for the Common or Roseate Tern is the American sand lance, whose protective behavior appears to create a significant vulnerability to contaminated sediment. Therefore, foraging within New Bedford Harbor presents a particular risk to the Common and Roseate Tern, who both selectively forage for this fish. It is likely that, if Common and Roseate Terns ever foraged within New Bedford Harbor historically, that their preference for sand lance resulted in bioaccumulation of PCBs within the birds, perhaps resulting in higher chick mortality rates, such as those found dead at Bird Island in 1970. As a result of this preference, it appears that, at least until PCB contamination is removed from New Bedford Harbor, that areas north of the New Bedford Hurricane barrier represent poor foraging habitat for Common or Roseate Terns.
- **Noise –** New Bedford Harbor is a highly industrialized area, and produces regular noise of human industrial and commercial activity. This includes the operation and repair of over 500 commercial fishing vessels, operation of dozens of fish processing plants, multiple cargo ship receiving facilities, multiple ship-yards, ferry boats, cruise ships, and repair yards. This activity produces a significant quantity of noise, particularly in the spring, summer, and early fall, during which the activity within the harbor is at its peak, and when foraging for the Common or Roseate Tern would be at its peak.
- **Human Activity -** Most areas of New Bedford Harbor contain some level of human activity, be it industrial (ship-building, commercial fishing, cargo transport), commercial (recreational sailing or fishing vessels), or recreational (recreational fishing along the shoreline, recreational boating, mooring, canoeing or rowing). It is likely that this level of activity would be discouraging to the Common or Roseate Tern.

As a result of this analysis, it appears that neither the Common Tern, nor the Roseate Tern are likely to utilize the site for regular foraging. In fact, regular foraging would likely be detrimental to either species within the areas north of the New Bedford Hurricane Barrier, as the tern's foraging patterns make them extremely vulnerable to PCBs in sediment. Therefore, it does not appear that the project as proposed will have a significant impact upon either the Common Tern or the Roseate Tern. In fact, mitigation measures proposed as part of the project, specifically those proposed south of the New Bedford Hurricane Barrier, may be very beneficial to the Common and Roseate Terns, due to enhancement of foraging habitat (see **Section 4** for a discussion of proposed mitigation).

A request for a consultation on the potential impact of the proposed project on the Roseate Tern was filed with the Natural Heritage & Endangered Species Program, resulting in a letter prepared by Dr. Thomas French (Assistant Director), which stated the Roseate Tern and Common Tern (species that could utilize the site as foraging habitat) are state-listed as "Endangered" and "Special Concern" species within the Commonwealth of Massachusetts. The Roseate Tern is also listed as a Federally "Endangered" species. The nearest breeding colony for the Roseate Tern is located at (Bird Island), which is approximately 17 kilometers away from the site (the daily flight radius of the Roseate Tern is approximately 25 km).

The letter from Dr. French states that "It appears that the proposed dredging and terminal extension would only impact a small acreage of shallow-water feeding habitat for terns. Given the relatively small project footprint within mapped tern habitat, it does not appear that the project will result in measurable harm to state-listed species" (see **Appendix 9**). Please note that

since Mr. French's review was completed, that the project has been modified slightly; however, the overall area of impact to avian wildlife habitat has not significantly changed.

d. Oil Spill Analysis

Another potential vulnerability to Avian Wildlife is the potential for increased vessel traffic to result in releases of oil that could then impact foraging birds or their nesting areas (particularly shorebirds). In order to conduct this analysis, existing research into the vessel traffic and the risk of associated oil spills was reviewed. The most up-to-date analysis of the risk posed to coastal communities in Massachusetts by oil spills was prepared by Nuka Research & Planning Group, LLC for the Massachusetts Department of Environmental Protection, titled "Evaluation of Marine Oil Spill Threat to Massachusetts Coastal Communities", dated December 2009 (included as **Appendix 10**).

As stipulated within this report, the main risk of spills in many harbors and ports (not to mention navigable waterways) is the possibility that a vessel will accidentally discharge petroleum through a vessel sinking, grounding, collision, fire or through accidental or illegal discharges from vessel operations, such as bilge pumping, changing engine oil, or refueling. For the purposes of this section, the assumption is made that the larger the size of the fleet of vessels servicing a harbor, the larger the threat of an oil spill from any of these possible sources. To estimate the magnitude of each oil spill threat for the purpose of comparison, a gallons of petroleum exposure measure (GPE) is calculated for each threat within each harbor in Massachusetts. For vessels permanently stationed within a harbor, the total GPE is the volume of petroleum product that could be released at any one point in time (usually the volume of the

fuel tank of the vessel); for vessels in transit, the total GPE is the volume of petroleum product times the number of visits that the vessel makes to that port.

There are two categories of potential risk from vessels that are evaluated below: oil spill risk from vessels within and/or transiting to and from New Bedford Harbor, oil spill risk from increases in bulk oil storage within New Bedford Harbor, and the potential increased risk for oil spills from regional vessel transits. The following outlines the existing Oil Spill Threat in these three categories:

Existing Oil Spill Threat For New Bedford Harbor

The following is a summary of the existing oil spill threat based upon existing traffic (based upon data gathered from 2006) in Gallons of Petroleum Exposure (GPE) for the City of New Bedford, based upon the category of vessel:

- Oil Tanker or Tank Barge Activity – 43,250,000 GPE
- Large Nontank Vessels – 1,725,000,000 GPE
- Recreational and Charter Vessels – 300,000 GPE
- Commercial Fishing Vessel Fleet – 7,500,000 GPE
- Ferry Terminals – 5,500 GPE
- Other Large Vessels (Tugs, Training Vessels) – 84,000 GPE
- Vessels Associated with Shipyard Activity – 900,000 GPE

Total Existing Oil Spill Threat in GPE for Vessels, New Bedford Harbor: **1,777,039,500 GPE**

Existing Oil Spill Threat for Vessel Activity Within Shipping Lanes

The following is a summary of the existing oil spill threat for existing shipping lanes based upon existing traffic (based upon data gathered from 2006) in Gallons of Petroleum Exposure (GPE) for the following areas:

- Regional Transit Vessels (South Coastal/New Bedford) – 1,517,636,000 GPE
- Regional Transit Vessels (Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/ Westport) – 1,562,611,000 GPE
- Cape and Islands – 1,562,611,000 GPE

Increased Vessel Traffic Due to South Terminal CDF Construction

Increased traffic at the South Terminal CDF site is anticipated to include the following vessels during the first year:

- An international vessel (similar to a traditional non-tank vessel), between 140 - 150 meters (460 – 490 feet) in length. The international vessel can only carry components for 6 turbines at one time. Therefore, for constructing an offshore wind energy facility for 130 turbines, 22 separate shipments from international vessels would need to be received at the support facility. These shipments would be anticipated to be receive within the first year of operation of the facility.
- Two installation vessels would be also required at the facility. Offshore renewable energy facility installation ships would consist of jack-up barges that would be

approximately 91 meters (300 feet) in length and 30 meters (100 feet) in width. The vessels would not be powered on their own, and would require a tug to maneuver them out of dock and out to the construction site. It is currently anticipated that each barge would require one tug (each tug is estimated to be approximately 30 meters, or 100 feet in length) to maneuver the vessel out to sea; however, the facility would employ two tugs (one for each installation vessel). Each installation vessel would be capable of delivering components for installation of 2 wind turbines for each trip, resulting in a total of 65 total trips for the vessels during the first year.

In accordance with the categorization system created by Nuka Research & Planning Group, LLC within their report, the anticipated increased oil spill threat for the additional vessels is as follows:

- International Vessels: Nontank Vessels within New Bedford area anticipated to have an average fuel capacity of 75,000 gallons. 22 annual non-tank vessels X 75,000 gallons per vessel equates to 1,650,000 GPE for the international vessels.
- Installation Vessels (and tugs) Within the Port of New Bedford: For commercial tugs between 65 and 100 feet in length, the average fuel capacity is 17,500 gallons. There are anticipated to be two tugs in port at any one time in order to assist in tendering the installation vessels in and out of port. Therefore, the increased oil spill threat due to the additional tugs is: 2 tugs X 17,500 gallons per tug, which equates to an increase of 35,000 GPE.

- Installation Vessels (and tugs) In Transit to the Construction Site: There are anticipated to be one tug that accompanies each installation vessel to the construction site. There are anticipated to be approximately 65 trips to the construction site. Therefore, the increased oil spill threat in transit to the construction site due to the installation vessels is: 65 tugs X 17,500 gallons per tug, which equates to an increase of 1,137,500 GPE.

The total increase in oil spill threat for New Bedford Harbor is: 1,650,000 GPE + 35,000 GPE = **1,685,000 GPE.** As stated earlier, the total existing oil spill risk for the Port of New Bedford is: 1,777,039,500 GPE. Therefore, the construction of the South Terminal CDF will result in a 1,685,000/1,777,039,500 = **0.095%** increase in oil spill risk for the Port of New Bedford, an extremely small increase over current existing conditions.

The total increase in oil spill threat for areas within which the international vessels and installation vessels/tugs will transit is: 1,650,000 GPE + 1,137,500 GPE = **2,787,500 GPE** over the course of a year of installation. As stated earlier, the total existing oil spill risk for areas surrounding the south coast as well as Cape Cod and the Island is:

- Regional Transit Vessels (South Coastal/New Bedford) – 1,517,636,000 GPE
- Regional Transit Vessels (Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/ Westport) – 1,562,611,000 GPE
- Cape and Islands – 1,562,611,000 GPE

Therefore, the relative increase in oil spill risk due to the addition of international vessels and the transit of installation vessels is:

- Regional Transit Vessels (South Coastal/New Bedford) – 2,787,500/1,517,636,000 = **0.18%**
- Regional Transit Vessels (Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/ Westport) – 2,787,500/1,562,611,000 = **0.18%**
- Cape and Islands – 2,787,500/1,562,611,000 = **0.18%**

All of which represent an extremely small increase in oil spill risk over current existing conditions.

Maritime Terminal Operation

After the initial use of the facility as an offshore renewable energy support facility, the facility will serve as a maritime terminal. Increased traffic at the South Terminal CDF site (subsequent to the first year) is anticipated to include the following vessels:

- An average of one cargo vessel per week is currently anticipated at the facility subsequent to the first year. This vessel would likely be similar in size to the above-mentioned international vessel (similar to a traditional non-tank vessel), between 140 - 150 meters (460 – 490 feet) in length. Alternately, several smaller, short-seas shipping barges may service the site, (transmitting a similar quantity of cargo) which could result in an average of approximately four smaller barges (similar in size to the installation vessels) per week. Therefore, the total anticipated traffic increase is an average of 3 vessels per week (approximately 156 vessels per year).

In accordance with the categorization system created by Nuka Research & Planning Group, LLC within their report, the anticipated increased oil spill threat for the additional vessels is as follows:

- Non-Tank Cargo Vessels within New Bedford area anticipated to have an average fuel capacity of 75,000 gallons. 156 annual non-tank vessels X 75,000 gallons per vessel equates to **11,700,000 GPE** for the oil spill threat (after the first year) for cargo vessels. This value would be the same for both vessels within New Bedford Harbor and Vessels in transit to the site.

The total increase in oil spill threat for New Bedford Harbor is: **11,700,000 GPE.** As stated earlier, the total existing oil spill threat for the Port of New Bedford is: 1,777,039,500 GPE. Therefore, the oil spill threat (after the first year) will result in a 11,700,000/1,777,039,500 = **0.65%** increase in oil spill threat for the Port of New Bedford, an extremely small increase over current existing conditions.

The total increase in oil spill threat for areas within which the cargo vessels will transit is: **11,700,000 GPE** over the course of a year. As stated earlier, the total existing oil spill risk for areas surrounding the south coast as well as Cape Cod and the Island is:

- Regional Transit Vessels (South Coastal/New Bedford) – 1,517,636,000 GPE
- Regional Transit Vessels (Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/ Westport) – 1,562,611,000 GPE
- Cape and Islands – 1,562,611,000 GPE

Therefore, the relative increase in oil spill threat after the first year of operation of the new terminal is:

- Regional Transit Vessels (South Coastal/New Bedford) – 11,700,000/1,517,636,000 = **0.77%**
- Regional Transit Vessels (Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/ Westport) – 11,700,000/1,562,611,000 = **0.75%**
- Cape and Islands – 11,700,000/1,562,611,000 = **0.75%**

All of which represent an extremely small increase in oil spill risk over current existing conditions.

4. PROPOSED MITIGATION FOR PROJECT IMPACTS

i. Proposed Compensatory Mitigation For Unavoidable Direct Impacts

In order to compensate for direct impacts resource areas due to construction of the Proposed South Terminal Extension CDF, a number of potential mitigation options have been evaluated. The results of this evaluation were that the following mitigation package is proposed:

- Creation/Enhancement of 11.8 acres of intertidal area via a combination of sites either immediately outside of New Bedford Harbor to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging

area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern, enhancement of shellfish habitat, and enhancement of horseshoe crab habitat (Alternative 3).

- 0.5 acres of intertidal area via a combination of sites either within New Bedford Harbor to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern, enhancement of shellfish habitat, and enhancement of horseshoe crab habitat (Alternative 5).
- Creation/Enhancement of 2 acres of a combination of successional marsh areas (mudflat, low marsh, high marsh, and transitional area) to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern, enhancement of shellfish habitat, and enhancement of horseshoe crab habitat (Alternative 8).
- Shellfish seeding to compensate for shellfish lost during filling and/or dredging operations.
- Creation of a natural pilot storm-water filtration project within New Bedford to compensate for upland wetlands impacted by the upland portion of the project.
- Planned enhancement to approximately 26 acres of subtidal areas via the dredging, removal, and sequestration of PCBs within marine sediments from various locations within New Bedford Harbor during Phase IV of Navigational Dredging to enhance winter flounder, scup, black sea bass and windowpane flounder habitat.

- Planned enhancement to 16.1 acres of near-shore, shallow, subtidal areas via the sequestration of PCBs in sediment outside of the Hurricane Barrier at the OU3 New Bedford Superfund Site location during Phase IV of Navigational Dredging to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern.
- Historic enhancement to 49.5 acres of subtidal areas between 2002 and 2010 via the dredging, removal, and sequestration of PCBs within marine sediments from various locations within New Bedford Harbor during Phase I, Phase II, and Phase III of Navigational Dredging to enhance winter flounder, scup, black sea bass and windowpane flounder habitat.
- Historic enhancement to 18.9 acres of near-shore, shallow, subtidal areas in 2005 via the sequestration of PCBs in sediment outside of the Hurricane Barrier at the OU3 New Bedford Superfund Site location to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern.

A. Intertidal Habitat Creation (Immediately Outside and Within New Bedford Harbor)

In order to provide compensatory mitigation for impact to intertidal area and shallow, near-shore subtidal habitat, 12.3 (11.5 acres at the Hurricane Barrier and 0.5 acres north of Pease Park in Fairhaven) acres of intertidal area is proposed. The following provides a summary of the proposed program:

- Intertidal area would be created in two areas: inside the Hurricane Barrier on the Fairhaven side of the Harbor, and outside the Hurricane Barrier on the New Bedford side of the Bay (see **Figure 8** for the location of the proposed intertidal creation areas). These areas were selected because they were previously intertidal areas that were formerly affected by anthropogenic structures (the Hurricane Barrier and parking lots), and would significantly benefit from created intertidal;
    - 11.8 acres of intertidal area creation at the OU3 Pilot Cap location in the outer Harbor in New Bedford. This proposal is based upon Alternative 3, Capping of OU-3 Between the Hurricane Barrier and Existing OU-3 Cap. The mitigation project would have the dual purpose of creating intertidal area while simultaneously capping and isolating from the environment sediments with a high level (but likely lower than 10 mg/kg) of PCB contamination within them while also utilizing clean sand from CAD Cell construction. This location is not accessible from the shore and is rarely travelled by recreational vessels. As a result, the area that would be created would be relatively isolated from human impacts, and would provide a prime location to enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern, enhance shellfish habitat, and create horseshoe crab spawning habitat;
    - 0.5 acres of intertidal area creation north of Pease Park in Fairhaven, MA. The proposal is based upon Alternative 5, Construction of Beach North of Pease Park,

Fairhaven. The mitigation project will create intertidal area in front of an existing rip-rap wall, similar to that created outside of the hurricane barrier and with similar benefits, while utilizing clean sand from CAD Cell construction. The majority of the new area will be below the high tide line; however, some sand may be placed above the high tide line;

- See **Figure 8** for a Locus Map of the proposed intertidal area creation sites;

- The form of the intertidal area created would be designed to emphasize re-creation of a specific ecological system – namely that of shore bird foraging, Essential Fish Habitat spawning and foraging, shellfish habitat and Horseshoe Crab habitat. The profile created will include a large proportion of intertidal sandy (silt/sand/gravel mixture) area, representing creation of preferential habitat. A cross-sectional diagram of an example beach profile for the proposed created intertidal area is included in **Figure 9**.

B. Successional Marsh Area Restoration/Enhancement

In addition to the intertidal area creation, restoration/enhancement of a 2 acre Salt Marsh and successionary sequence in the drainage swale that exists to the west of the Hurricane Barrier, just to the south of the Gifford Street Boat-ramp parking area is proposed. This proposal is based upon Alternative 8 – Hurricane Barrier Vegetated Swale Rehabilitation and Restoration. The area currently serves as a stormwater runoff channel that runs behind the Hurricane Barrier. The benthic substrate is currently filled with PCB impacted sediment. The western side of the channel is currently a rip-rap slope that has little ecological value. By removing the PCB contaminated sediment and capping the residual impacted sediment, creating drainage channels,

removing the rip-rap slope, and grading into the upland behind the rip-rap slope, approximately 2 acres of mudflat, low marsh, high marsh, and transitional salt marsh area can be created or enhanced. This area is owned by the City of New Bedford. The project will enhance the hydraulic capacity of the drainage ditch to transport stormwater from behind the Hurricane Barrier, and will enhance spawning and foraging areas for winter flounder, scup, black sea bass and windowpane flounder, and enhance foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern,.

Currently, the drainage swale in this location is tidally influenced (it is subtidal), however the quality of the resource is degraded mudflat/drainage ditch. The area of the proposed mitigation is currently characterized by the growth of invasive species and has a large amount of trash evident. The sediments in the drainage swale are contaminated (with PCBs).

The goal of the restoration project at this location would be to create a functioning marsh area in a publically visible area, so as to have both an ecological benefit and an educational benefit. The mitigation project at this location would include four primary elements:

- Removal of PCB and metals contaminated sediments;
- Re-grading of the swale profile to allow for the creation of a successionary sequence of marsh vegetation;
- Planting of high, low, and transitional marsh species within the regarded swale; and
- Installation of a public access walkway/bike path adjacent to the created marsh area with appropriate signage identifying the type and importance of the biota in the restored/created resource area.

The proposed marsh restoration/creation includes the following characteristics:

- Sampling to determine the extent and depth of PCB and metals contaminated sediments;
- Excavation and removal of those sediments and placement of those sediments in the CAD Cell;
- Installation of a layer of clean material across the bottom of swale graded into a topographic succession that will include a deeper flow channel meandering through the middle of the swale and benched sides that will promote high and low marsh vegetation growth as well as transitional vegetation growth.
- Planting of Low Marsh vegetation (such as sp. *spartina alternaflora*) on the lower created benched steps;
- Planting of High Marsh vegetation (such as sp. s*partina patens* and sp. *distichlis spicata*, and possibly some sp. *spartina alternaflora* mixed in to the High Marsh sequence; and
- Planting of Transition Zone vegetation (such as sp. *panicum virgatum*, sp. *iva frutescens*, and some sp. *distichlis spicata and* s*partina patens*, as well as sp. *myrica pensylvanica,* sp. *rosa virginiana,* and sp. *arctostophylos uva-ursi* shrubs);
- Installation of an adjacent public access walkway/bike path and bordering ornamental fence with appropriate signage to inform the public of the restoration/creation project conducted as well as pointing out both the types and importance of the marsh sequences installed.
- A conceptual diagram of the proposed successionary salt marsh creation/restoration project is attached as **Figure 10**.

C. Shellfish Seeding

In order to provide compensatory mitigation for impact to shellfish organisms in the footprint of the proposed South Terminal expansion, a shellfish seeding program is proposed. The Massachusetts Department of Marine Fisheries has indicated in the past that the dollar value recommended for seed purchases to mitigate for shellfish loss during construction projects is often five times the value of the shellfish. A Shellfish Survey (completed in May 2010) identified an approximate shellfish organism count in the to-be-affected area of 1,019,986 shellfish organisms. Mitigation seeding is proposed at a ratio of 5:1 (seed provided to organisms effected), in keeping with generally accepted practice. The following provides a summary of the proposed program:

- A total of 5,099,930 seed stock is proposed, with relative percentage of animal type provided at a ratio that is consistent with the current projected ratio found to be existing in the potential footprint of the proposed Terminal expansion (based upon the 2010 crop survey of the currently proposed affected area):
    - 72 % of the seed = Quahogs;
    - 22% of the seed = Common Oyster;
    - 6 % of the seed = Soft Shell Clam;

- The seed stock will be provided over a period of time (over a five year period):
    - 1,019,986 seed stock (at the organism percentage noted above) will be provided the first year of significant construction at the Site (expected to be 2011);
    - 1,019,986 seed stock (at the organism percentage noted above) will be provided each successive year for a period of 4 years;

- Seed stock will be provided to the New Bedford Shellfish Constable for distribution in accordance with the City shellfish program.

- As a condition of providing seed stock, the project will review the Shellfish Office seeding plan to encourage use of the seed stock in appropriate locations (i.e., not in contaminated areas), and at the appropriate time(s) of the year.

D. Tern Survey Plan

Although it is not currently anticipated that substantial impacts to Common Tern and Roseate Tern habitat will occur due to completion of the South Terminal CDF project, elements of the proposed project mitigation related to creation of intertidal and shallow water subtidal habitat, in conjunction with the removal of PCB-contaminated sediment, is intended to compensate for the impacts to tern foraging habitat that may occur. In addition, a tern survey plan will be implemented in Spring/Summer 2011 to determine the extent of the foraging habitat for the Terns as well as Tern use of the area. Based on consultation with the NHESP (Mostello, pers. comm.), the survey will entail weekly surveys from May through mid-July, peak tern nesting season, to acquire data on the density and abundance of terns using the area on both an east/west and north/south gradient to determine tern abundance and density as a function of proximity to shoreline and distance up the estuary. Outside the hurricane barrier, transects would be roughly east/west (shoreline to shoreline); inside the hurricane barrier one north/south transect would extend from the hurricane barrier as far north as navigability allows. At the recommendation of the NHESP, the surveys will be conducted using methodology consistent with guidance provided in the document titled Towards standardised seabirds at sea census techniques in connection

with environmental impact assessments for offshore wind farms in the U.K. (http://www.offshorewindfarms.co.uk/Assets/1352_bird_survey_phase1_final_04_05_06.pdf), and in consultation with the NHESP and the U.S. Fish and Wildlife Service.

E. Pilot Stormwater Filtration Project

Although not subject to federal jurisdiction, there exists within the proposed footprint of the South Terminal CDF some amount of degraded upland wetland. As noted in the referenced studies, these wetlands have developed on top of urban fill (which includes piles of asphalt, brick, block, and stone debris, cement and other demolition rubble). An Environmental Site Assessment Report (21E Report) for a large proportion of the property indicates that the filled land that the wetlands have developed upon also contains soils contaminated with common industrial contaminants. Non-invasive wetlands plants are noticeably absent from the site, and invasive species (particularly sp. *phragmites austalis*) are dominant. As such, these upland wetlands at the site are in poor condition and do not represent functioning wetland resources. However, it is recognized that as topographic features on the site, these areas play a role in storm-water retention and filtration. In recognition of that, the project proposes to conduct certain activities related to storm-water management and retention, including:

- Conducting a thorough review of storm-water flow and infiltration for the proposed CDF Facility as part of the design activities that will be undertaken. Should the study results indicate that significant storm-water retention and/or discharge issues may be anticipated, the project will incorporate into the Facility design best management practice solutions to the storm-water issues;

- The project will conduct a natural Pilot Storm-water Filtration project within New Bedford in order to assess and demonstrate the effectiveness and importance of designed natural storm-water filtration systems. Such a system (sometimes referred to as a "rain garden") would be constructed on City property or on easement property in an area where storm-water runoff issues are either present or suspected. While the ideal location for such a feature is currently unknown, a study would be undertaken as part of the project that would identify a useful location for such feature (likely to be adjacent to one of the major roadways that cross the Harbor or parts of the Harbor – such as the I-195 crossing of the Acushnet at Washburn Street). It is anticipated the size of the Pilot system that may be installed would be on the order of approximately 0.1 to 0.2 acres. Detailed design of this system would be conducted in concert with appropriate agency and non-governmental organization input.

F. Planned Removal of PCBs from Benthic Habitat Within New Bedford Harbor

The New Bedford Harbor Development Commission plans to dredged, remove, and sequester PCB contaminated sediment from approximately 26 acres of New Bedford Harbor while conducting Phase IV Navigational Dredging. Dredging, removal and sequestration of PCB and heavy metals impacted sediment will remove the sediment from contact with Essential Fish Habitat, shellfish and benthic organisms. It will result in a reduction in the bioavailability of PCBs within Essential Fish, horseshoe crabs and shellfish within New Bedford Harbor, which will subsequently reduce the quantity of PCBs available to avian wildlife when foraging within New Bedford Harbor. Phase IV Navigational Dredging is dependent upon funding.

G. Planned Near-Shore, Shallow Subtidal Enhancement

The New Bedford Harbor Development Commission, working with USEPA, plans to utilized material generated during CAD Cell construction to sequester PCB contamination within an area located immediately outside of the New Bedford Hurricane Barrier. The area, designated by USEPA as OU3, contained sediment with PCB concentrations ranging 94 to 10 mg/kg. It is currently planned to cap a 16.1 acre area. The pre-capping bathymetry within the OU3 area ranges from -7 to -14 MLLW. Post capping bathymetry within the OU3 area will likely range from -4 to -9 MLLW. As a result of this work, not only will PCB contaminated sediments be isolated from the benthic environment, improving Essential Fish Habitat, but relatively deep subtidal areas will be shallowed slightly, creating an area that will be relatively more productive as a shallow near-shore subtidal environment for spawning and foraging areas for Winter Flounder, Scup, Black Sea Bass and Windowpane Flounder, and foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern. This action will serve as a significant enhancement of 16.1 acres of near-shore, shallow subtidal habitat area. Either remediation or capping of the OU-3 area is part of the New Bedford Superfund Record of Decision. Capping this area not only will have significant environmental benefits, but will complete a significant task associated with Superfund Cleanup, and will save significant costs and logistical difficulties for USEPA. Capping of OU-3 will be completed in conjunction with creation of CAD Cell #3, which is dependent upon funding.

H. Historic Removal of PCBs from Benthic Habitat Within New Bedford Harbor

In addition to the above-listed proposed mitigation, the New Bedford Harbor Development Commission has dredged, removed, and sequestered PCB contaminated sediment from 49.5

acres of New Bedford Harbor while conducting Navigational Dredging from 2001 to 2010. The work has been completed in three Phases. Phase I, which began in 2001 and was completed by the end of 2002, removed approximately 75,000 yards of PCB-impacted sediment. Phase II, which began in January 2005 and was completed in January 2006, removed more than 156,000 cubic yards (cy) of PCB-impacted sediment. Phase III, which began in September 2006 and was completed in September 2009, removed more than 189,000 cubic yards (cy) of PCB-impacted sediment.

Dredging, removal and sequestration of PCB and heavy metals impacted sediment has removed the sediment from contact with Essential Fish Habitat, shellfish and benthic organisms. It has resulted in a reduction in the bioavailability of PCBs within Essential Fish, horseshoe crabs and shellfish within New Bedford Harbor, which has subsequently reduced the quantity of PCBs available to avian wildlife when foraging within New Bedford Harbor.

I. Historic (2005) Near-Shore, Shallow Subtidal Enhancement

When constructing CAD Cell #1 during Phase II of Navigational Dredging in 2005, a significant quantity of clean sand (approximately 85,000 cubic yards of material) was generated. Rather than dispose of the material at the Cape Cod Bay Disposal Site, the New Bedford Harbor Development Commission, working with USEPA, utilized the material to sequester PCB contamination within an area located immediately outside of the New Bedford Hurricane Barrier. The area, designated by USEPA as OU3, contained sediment with PCB concentrations ranging 94 to 10 mg/kg. During CAD Cell #1 construction approximately 18.9 acres were sequestered utilizing clean sand. The pre-capping bathymetry within the OU3 area ranged from -7 to -14

MLLW. Post capping bathymetry within the OU3 area ranged from -4 to -9 MLLW. As a result of this work, not only were PCB contaminated sediments isolated from the benthic environment, improving Essential Fish Habitat, but relatively deep subtidal areas were shallowed slightly, creating an area that was relatively more productive spawning and foraging areas for Winter Flounder, Scup, Black Sea Bass and Windowpane Flounder, and foraging area for avian wildlife identified within the resource delineation, including the Common Tern and the Roseate Tern. This action served as a significant enhancement of 18.9 acres of near-shore, shallow subtidal habitat area that was conducted in order to further navigational dredging within New Bedford Harbor and has not been used as mitigation for any project. Either remediation or capping of the OU-3 area is part of the New Bedford Superfund Record of Decision. Capping this area not only had significant environmental benefits, but had complete a significant task associated with Superfund Cleanup, and saved significant costs and logistical difficulties for USEPA.

ii. Proposed Avoidance, Minimization, and Mitigation For Secondary Impacts

A. Traffic

Increases in vessel traffic with in New Bedford Harbor are not anticipated to greatly impact the current operations of the Port. During the construction of the CAD Cell, material being shipped to the South Terminal CDF will likely be incorporated into the normal Port traffic pattern without a major disturbance. During previous dredging project barges would move through the Route 6 swing bridge during its normal openings; additional openings were not required and a similar pattern is anticipated for the construction of the South Terminal CDF. There should be very little commercial vessel traffic through the CAD Cell area or through the South Terminal CDF area. Recreational boat traffic will need to be redirected around the work area, however

this has been normal practice during previous navigational dredging projects completed within the port.

B. Construction Turbidity

The increase in turbidity during the construction of the CDF and CAD Cell will be monitored utilizing existing Performance Standards which are attached as **Appendix 11**. The Performance Standards within **Appendix 11** have been developed through the State Enhanced Remedy process at the New Bedford Superfund Site. The Performance Standards have been developed over two phases of navigational dredging (Phase II, which began in January 2005 and was completed in January 2006 and Phase III, which began in September 2006 and was completed in September 2009). The Performance Standards were developed with the coordination with a number of Federal, State and Local authorities who are represented at the State Enhanced Remedy meetings, including MassDEP, USACE, USEPA, the National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Division of Marine Fisheries (DMF), Massachusetts Coastal Zone Management (MACZM), EOEA, and the Coalition for Buzzards Bay.

In addition to conformance with the Performance Standards, certain Time of Year Restrictions will be observed. Work will be minimized from January 15 to June 15; if unavoidable, work will be completed with the use of silt curtains areas with water depths greater than -5 MLLW. If additional Time of Year restrictions are identified, work will be minimized at those times of year, or silt curtains will be utilized during those times of year, as outlined above.

Environmental dredge buckets will be utilized, as applicable, to contain impacted sediment completely, and reduce turbidity during dredging activities. There will be turbidity monitoring during the deployment of silt curtains. Written contingency plans will be required from the marine contractors working at the facility. Should turbidity monitoring indicate exceedances of Performance Standards, the contractor will be required to implement its contingency plans to reduce the turbidity levels. Possible contingency options include: decrease in the speed of work, the halt of work, fixes to equipment, use of an environmental bucket, use of silt curtains or other potential measures.

C. Noise

Noise from construction of the expansion at South Terminal will be minimized to the extent practical. Work will be completed during permitted work hours. However, the area around the site is within the Designated Port Area of New Bedford Harbor, and fishing vessels enter, offload, and exit New Bedford Harbor at all hours of the day. Navigational dredging (which can be a noisy process) has taken place within the Harbor for multiple events. There have been very few noise complaints during the navigational dredging process, which indicates that noise will likely not be a major problem during construction of the South Terminal CDF. Although noise may frighten wildlife, this may be for the best, as it will keep wildlife from being injured from construction operations at the site.

As stated earlier within the Neighborhood Analysis (**Section 5b**), Map Number 21, Lot Number 45 is adjacent to the residential neighborhood at Cove Street; however, this area would be utilized with much less frequency than other portions of the terminal. This property (as well

as the other, southern ancillary properties) will be utilized primarily for wind blade lay-down. Although 24/7 access is required for the facility, this is anticipated to be required mainly due to issues associated with loading and unloading of vessels and assembly of wind turbines, activities that will not be occurring at the Map Number 21, Lot Number 45; therefore, although some access to the southern portion of that property may occur within a 24/7 timeframe, it will likely be very infrequent. Additionally, due to the anticipated use of the property (lay down of wind blades is anticipated to take place at the far southern end first, and subsequent wind blades are anticipated to be subsequently laid down in a south-to-north fashion as they arrive onsite, and then utilized in a north-to-south fashion), it is currently anticipated that noise caused by operations (when utilized) at this property will be relatively minimal.

D. Stormwater Management

Stormwater management as a part of the construction will be in accordance with standard construction means and methods. Best management practices (use of vegetated swales, stormwater detention basins (where possible), storm-ceptors (where possible), or other methods will be utilized to reduce sediment within stormwater prior to discharge to New Bedford Harbor. The site will be designed to manage stormwater in compliance with the Massachusetts Stormwater Handbook.

Erosion and sedimentation controls will be present at the site during the construction process. A Licensed Site Professional will review the presence of impacts to soil and/or groundwater located within the parcels that are anticipated to be incorporated within the proposed project, evaluate the health and environmental risk posed by the impacted soil and/or groundwater, and

will determine how the project can be designed to prevent and/or minimize erosion of impacted sediment that could be transported into New Bedford Harbor during the design process.

E. Bilge Water Management

Vessels docked at the facility must comply with Section 311 of the Clean Water Act as Amended by the Oil Prevention Act of 1990. Bilge water requiring off load at the facility will be treated prior to discharge to the local POTW or shipped to a certified treatment facility.

F. Sloughing Slopes

To limit slope failures associated with propeller wash in the newly constructed channels a full geotechnical evaluation of the in-situ soils will be completed. Generally speaking native soils in New Bedford Harbor have an angle of repose of approximately 3 feet horizontal per 1foot vertical. The 3:1 slope has been utilized for conceptual design; a full geotechnical evaluation of the site must be completed prior to the establishment of side slopes as it relates to dredging.

G. Lighting

The newly constructed marine terminal in New Bedford will have security lighting as the rest of the City has street lights. When international vessels are at the facility and work is to be completed 24-hours a day temporary lighting will be utilized. Other than prudent management to ensure unnecessary use of lighting, it is unlikely that lighting can be controlled at the site due to the anticipated demand for 24-hour site usage.

H. Operational Prop Wash Post-Construction

In order to manage turbidity that may be generated from prop wash during operation of the facility, low speeds will be utilized by international vessels and installation vessels when approaching, maneuvering at the facility, or leaving the facility. This will also be necessary as there will be a limited amount of available room for the vessels to maneuver. Tugs with relatively shallow drafts will likely be utilized to transport installation vessels in and out of the harbor, which should minimize prop-wash turbidity. Additionally, tugs with shallower drafts than the larger vessels will likely be needed to maneuver the larger, international vessels into berthing at the facility.

iii. General Construction Sequence

The following section highlights the construction sequence and timing of construction activities.

A. Mitigation Construction

Construction of the mitigation will involve the placement of material within the intertidal restoration areas. Particular care will be utilized to ensure that the final grades are correct. It is likely that the material will be placed hydraulically to ensure that the surface is created relatively uniformly.

Creation of the marsh mitigation area will involve re-grading, and may involve the placement of erosion control mat (likely of a biodegradable material, such as coir or jute) and the re-graded slope may utilize one or more erosion control rolls (also made of coir or jute) to help to stabilize

the slope temporarily while vegetation is replanted. Planting of wetlands plants will foster the permanent stabilization of the area. Invasive species removal will also be completed while re-planting occurs.

B. Oversight and Timing

A wetland scientist shall be on-site to monitor construction of the wetland mitigation area(s) to ensure compliance with the mitigation plan and to make adjustments when appropriate to meet mitigation goals.

To reduce the immediate threat and minimize the long-term potential of degradation, the species included on the "Invasive and Other Unacceptable Plant Species" list in Table 4 of the US Army Corps of Engineers New England District Mitigation Plan Guidance shall not be included as planting stock in the overall project. Only plant materials native and indigenous to the region shall be used.

C. Monitoring and Maintenance Plan

The following section provides guidance regarding monitoring and maintenance that will be conducted to ensure success of planned mitigation efforts.

Intertidal Areas and Marsh Area

The intertidal areas and marsh area as depicted on **Figure 8** will be inspected on a monthly basis during the period from April through October for the first 3 years after construction. Subsequent

to the first 3 years, the mitigation areas will be inspected in May and September of each year for an additional 2 years. Inspections shall be completed by a wetland scientist. The general health of the plants within the marsh area shall be determined during each inspection. Invasive species found within the areas will be removed. The entire area will also be inspected for excessive erosion or siltation.

If plants are found to be dead or stressed, they will be replaced. If the erosion control blankets (which may be used with discretion to stabilize planting areas within the marsh restoration area) are found to have been torn or show evidence of tears, eroded material will be replaced and tears in the blanket will be sewn shut. If the coir rolls (which may be utilized to stabilize slopes within the salt mash restoration area) become dislodged, additional tie-downs will be added to secure the coir rolls. If excessive erosion or siltation is noted, grades within the area will be restored to match the final elevations. The coir rolls will be replaced or repaired if plant growth has not been well established before the coir roll has decayed.

Monitoring Reports

The results of the mitigation activities and subsequent inspections will be documented in annual reports that will be submitted to USEPA by December 15th of each year following the completion of the first growing season subsequent to planting.