# Chapter 6: Natural Resources and Water Quality

## A. INTRODUCTION

This chapter addresses the natural resources within the project area, assesses future natural resources and water quality conditions without the proposed project, assesses potential impacts on natural resources and water quality from the proposed project, and, provides a description of the proposed measures designed to reduce the potential impacts on natural resources and water quality during construction and operation of the proposed development.

### PRINCIPAL CONCLUSIONS

This analysis concludes that the proposed project would not result in significant adverse impacts on water quality, terrestrial resources, wetlands, aquatic resources, or endangered or threatened species, or species of special concern during construction or operation of the proposed project. Further, the proposed project may have an overall positive effect on natural resources and environmental conditions on the project site by:

- Removing mixed-fill construction and demolition debris and solid waste from the waterward edge of the existing berm (along the entire perimeter), which would eliminate the existing erosion hazard caused by the unstable slope;
- Removing an estimated 25,900 cubic yards (cy) of solid waste and mixed-fill from the project site;
- Restoring and stabilizing the shoreline by constructing a natural stone rip-rap edge along the entire 1,400 linear-foot project site waterfront;
- Eliminating invasive plant species from the project site, specifically those contained within the area of the perimeter berm, and eliminating areas that may be attractive to invasive plant species;
- Improving the quality and reducing the rate of stormwater runoff by reducing impervious surfaces and installing stormwater filtration devices;
- Creating a shoreline public walkway along the perimeter of the western area of the project site graded with native, upland maritime plant species and adjacent green pervious spaces that will reduce stormwater impacts in Gravesend Bay and create habitat for wildlife species; and
- Incorporating a vegetated “green wall” to the proposed garage as part of the project design.

## B. METHODOLOGY

The methodology for this natural resources analysis involved a combination of review of literature sources, regulatory agency correspondence, and on-site field observation. Literature sources included documents (reports and maps) prepared by the New York State Department of Environmental Conservation (NYSDEC), New York State Department of State (NYSDOS), and

the New York City Department of Environmental Protection (NYCDEP). Regulatory agency correspondence for this analysis included the New York Natural Heritage Program (NYNHP), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), the United States Department of the Interior Fish and Wildlife Services (USFWS) and the United States Army Corps of Engineers (USACE). Materials obtained from NYSDEC included Tidal Wetlands Maps. Materials obtained from NYCDEP included the *New York Harbor Water Quality Report* (NYCDEP 2008). Materials obtained from NYSDOS included the Significant Coastal Fish and Wildlife Habitats Program. Materials also include the New York – New Jersey Harbor Estuary Program's *Regional Sediment Management Plan*, The Interstate Environmental Commission's (IEC) *2008 Annual Report*, and various environmental reports. On-site field observation was conducted by Langan staff in September 2009.

## C. REGULATIONS AND PERMITS

The following section briefly describes the federal and state laws and associated regulations and regulatory programs that may apply to the proposed project with respect to water quality and aquatic and terrestrial resources. The regulations apply to certain activities in coastal areas, coastal erosion hazard areas, surface waters, and floodplains, and to the protection of rare species/species of special concern.

Because some of the state laws and regulatory programs were promulgated under authority of federal laws, the federal laws and regulatory programs are discussed first.

### FEDERAL LAWS AND REGULATORY PROGRAMS

*THE CLEAN WATER ACT (33 USC §§ 1251 TO 1387)*

The Federal Water Pollution Control Act, as amended, commonly referred to as the Clean Water Act (CWA), regulates point and non-point sources of water pollution and is designed to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The sections of the CWA which apply to the proposed project are Sections 401 and 404, which pertain to discharges of fill or dredged material in "Waters of the United States". "Waters of the United States" are defined in 33 Code of Federal Regulations (CFR) 328.3, and includes all waters, currently and previously used for interstate commerce; lakes; rivers; streams; mudflats; sandflats; wetlands; sloughs; prairie potholes; wet meadows; playa lakes; and natural ponds.

Section 401 of the CWA (33 USC 1341) requires any applicant of a federal license or permit for an activity that may result in a discharge into navigable waters to provide a certification from the state in which the discharge would occur, or from an interstate water pollution control agency, that the discharge would comply with CWA Sections 301 (effluent limitations for point source discharges), 302 (water quality-related effluent limitations for a point source or group of point sources to attain or maintain water quality), 303 (setting of water quality standards and implementation plans by each state), 306 (standards for the control of pollutants discharged by certain categories of point sources set on federal level or by each State), and 307 (effluent standards for certain toxic contaminants). Furthermore, Section 401 compliance requires that dredging, or the disposal of dredged material, would not cause the concentrations of chemicals in the water column to exceed state standards.

Section 301 addresses project requirements for a National Pollutant Discharge Elimination System (NPDES) permit for point discharges of pollutants into navigable waters. The NPDES

program is delegated to New York State by the U.S. Environmental Protection Agency (USEPA) and is incorporated in New York's State Pollutant Discharge Elimination System (SPDES) permit system.

CWA Section 404 authorizes the Secretary of the Army, acting through USACE, to issue permits (Regional, Nationwide General or Individual) for the discharge of dredged or permanent and temporary fill material into navigable waters and other waters of the United States. Section 404 permits issued by USACE also require Water Quality Certification (WQC) from the NYSDEC.

For the proposed project, USACE authorized the installation of approximately 1,400-linear feet of bank stabilization with riprap at a slope of 1.5 to 1 (horizontal to vertical) around the entire shoreline of the project site under Nationwide Permit No. 13 (7 May 2009, NAN-2008-00943). The permit is included in Appendix C. Compliance with the conditions of NWP 13 is further discussed in section F of this chapter. WQC is expected to be issued by NYSDEC as part of the Joint Permit Application for the proposed discharge associated with the proposed shoreline stabilization activities. A discussion of NYSDEC regulatory involvement in the Joint Permit Application process for the proposed project is discussed in sections D and F of this chapter.

*RIVERS AND HARBORS APPROPRIATIONS ACT OF 1899*

Section 10 of the Rivers and Harbors Appropriations Act of 1899 requires authorization from the Secretary of the Army, acting through USACE, for the construction of any structure in, under or over any navigable waters of the United States, the excavation from or deposition of material in these waters, or any obstruction or alteration in navigable waters of the United States. The purpose of this Act is to protect navigation and navigable channels.

A Section 10 permit is required for the approximately 1,400-linear feet of bank restoration and stabilization and replacement of approximately 3,000 cubic yards (cy) of existing material below Mean High Water (MHW) in Gravesend Bay. Under Section 10, this activity also qualified for Nationwide Permit No. 13, which was granted by USACE. While the waters of Gravesend Bay and Lower New York Bay are considered navigable, no impact to navigation is expected from implementation of the proposed project. Compliance with Section 10 through the Joint Permit Application process and the issuance of Nationwide Permit No. 13 by USACE is discussed in section F.

*COASTAL ZONE MANAGEMENT ACT OF 1972 (16 USC §§ 1451 TO 1465)*

The Coastal Zone Management Act of 1972 (CZMA) established a voluntary program to encourage coastal states to develop and implement coastal zone management plans to effectively protect and manage development in coastal zones. Federal permits issued in states with an approved coastal management program must be accompanied by a Coastal Zone Consistency Determination that evaluates consistency with each state's coastal zone management plan. New York has a federally approved coastal zone management program that is described in Chapter 2, "Land Use." In New York State, the New York State Department of State (NYSDOS) is responsible for the consistency review. Cities may adopt their own local Waterfront Revitalization Programs (WRPs), which are considered in NYSDOS determinations of consistency. To that end, New York City's revised WRP, consisting of 10 policies, was approved by NYSDOS in August 2002. Chapter 2 assesses the consistency of the proposed project with the State and City WRP policies. As described in that chapter, the proposed project would be consistent with both state and local Coastal Zone Policies.

*MAGNUSON-STEVENS ACT*

Section 305(b)(2)-(4) of the Magnuson-Stevens Act outlines the process for the National Marine Fisheries Service (NMFS) and the Regional Fishery Management Councils (in this case the Mid-Atlantic Fishery Management Council) to comment on activities proposed by federal agencies (issuing permits or funding projects) that may adversely impact areas designated as essential fish habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC 1802(10)). USACE, in its permitting process, must either incorporate NMFS recommendations for minimizing effects to EFH (measures to avoid, minimize, or mitigate), or provide an explanation for not adopting them. Under the Magnuson-Stevens Act, NMFS and eight regional Fishery Management Councils were directed to describe and identify EFH in the fishery management plans developed by each Council to reduce the adverse effects of fishing on EFH and encourage the conservation and enhancement of EFH. A summary of EFH designations in relation to the proposed project is provided in Section D, "Aquatic Biota," and a discussion of the need for an EFH study is discussed in Section F. NMFS and USACE correspondence regarding EFH is included in Appendix C.

*ENDANGERED SPECIES ACT OF 1973 (PL 93-205; 16 USC 1531 ET SEQ.)*

The Endangered Species Act of 1973 recognized that endangered species of wildlife and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. The Act prohibits the importation, exportation, taking, possession, and certain other activities involving species covered under the Act, and certain interstate or foreign commercial activities. The Act also provides for the protection of critical habitats on which endangered or threatened species depend for survival. The USFWS (non-marine plants and animals) and NMFS (marine plants and animals) are responsible for administering the Act. Section 7(a) of the Act requires federal agencies to consult with the Secretary of the Interior (through USFWS and/or NMFS) before project implementation to ensure that the proposed actions will not jeopardize a species, or destroy or adversely modify the designated critical habitat of the species. Threatened, endangered, and species of special concern with the potential to occur in the project area are discussed below in "Existing Conditions" and "Probable Impacts of the Proposed Project."

## NEW YORK STATE LAWS AND REGULATORY PROGRAMS

*USE AND PROTECTION OF WATERS, ARTICLE 15, TITLE 5, ECL, IMPLEMENTING REGULATIONS 6NYCRR PART 608*

New York State's surface waters (rivers, streams, lakes, and ponds) are valuable for sources of drinking water, for bathing, agricultural, commercial and industrial uses, for the fish and wildlife habitat they provide, and for educational and recreational opportunities. It is the state's policy, as set forth in Title 5 of Article 15, ECL to preserve and protect these waters. NYSDEC is responsible for administering the Protection of Waters regulations to prevent undesirable activities on water bodies. Under this regulatory program, all waters of the state are provided a use classification. For saline (marine) surface waters, water use classifications include Class SA, SB, SC, SD and I. According to the NYSDEC, Gravesend Bay, is a Class I saline surface water. The water quality standards of Class I saline surface waters within the project area are discussed later in this chapter.

The Protection of Waters Permit Program regulates five different categories of activities: disturbance of the stream bed or banks of a protected stream or other watercourse; construction, reconstruction, or repair of dams and other impoundment structures; construction, reconstruction, or expansion of docking and mooring facilities; excavation or placement of fill in navigable waters and their adjacent and contiguous wetlands; and Water Quality Certification for placing fill or other activities that result in a discharge to waters of the United States in accordance with Section 401 of the CWA. A Water Quality Certification is required when a federal permit is needed for a discharge to any waters of the United States. In addition, a Protection of Waters permit is required for the construction of the new outfalls into Gravesend Bay.

*STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES), ARTICLE 17 TITLE 8, ECL, IMPLEMENTING REGULATIONS 6NYCRR PARTS 750 THROUGH 757*

Title 8 of Article 17, ECL, *Water Pollution Control*, was enacted to protect and maintain surface and ground water resources and authorized the creation of the SPDES permitting scheme to regulate discharges to the state's waters. This program incorporates requirements of the federal NPDES program delegated by USEPA to New York State. The following activities require SPDES permits: stormwater discharges during construction activities (SPDES General Permit 0-10-001), constructing or using (unless already permitted) an outlet or discharge pipe (point source) that discharges wastewater into surface or ground waters of the state; constructing or operating a disposal system (sewage treatment plant); or discharge of stormwater from certain types of uses. Because construction activities for the proposed project would disturb more than one acre, the SPDES stormwater general permit for construction activities will be required.

*WATERFRONT REVITALIZATION OF COASTAL AREAS AND INLAND WATERWAYS ACT (EXECUTIVE LAW SECTIONS 910-921).*

Under this Act, NYSDOS is responsible for conducting a Coastal Zone Consistency review and administering the Coastal Management Program (CMP) that contains legislatively enacted coastal area policies that must be complied with by New York State agencies. It also authorizes the state to encourage local governments to adopt WRPs that incorporate the state's policies. New York City has a WRP administered by the Department of City Planning (NYCDCP).

The WRP, originally adopted in 1982, included 44 State policies and 12 City policies. It established the City's policies for development and use of the waterfront. A revised WRP, which simplified and clarified the review process, was approved by the City Council in October 1999. The new WRP consists of 10 New York City coastal zone policies. Any activity subject to review under federal, state, and city laws must be assessed with respect to consistency with the state CMP and the state and city policies. A number of the policies deal with protection of water quality and natural resources. The proposed project occurs within the Coastal Zone Boundary. Chapter 2, "Land Use," addresses the consistency of the proposed project with the 10 WRP policies.

NYSDOS has designated 15 Significant Coastal Fish and Wildlife Habitats within New York City. The closest to the project site is known as Breezy Point, located at the western tip of Rockaway Beach, Queens, approximately 4.5 miles southeast of the project site. Because the project site is not situated in this area, this portion of the regulation does not apply to the proposed project.

The WRP designates three Special Natural Waterfront Areas (SNWA): East River and Long Island Sound; Jamaica Bay; and Northwest Staten Island Harbor Herons. None are located near the project site; therefore, this portion of the regulation does not apply to the proposed project.

The WRP also maps Significant Maritime and Industrial Areas (SMIA). The nearest is the Sunset Park SMIA, located approximately 4.0 miles northwest of the project site along the Upper New York Bay, from Owls Head Waterfront Park to the Erie Basin in Brooklyn. This SMIA does not include the project site.

*THE NEW YORK STATE ENVIRONMENTAL QUALITY REVIEW ACT (6NYCRR PART 617, SEQRA)*

Under the New York State Environmental Review Act (SEQRA), local agencies may designate specific geographic areas as Critical Environmental Areas (CEAs). There are no CEAs located within the project area; therefore, this portion of the regulation does not apply to the proposed project.

*FISH AND WILDLIFE ACT, ARTICLE 11, TITLE 20, ECL*

This legislation, enacted in 1997, authorizes the commissioners of NYSDEC, NYSDOS, and the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) to designate areas of state lands and waters that are particularly important to bird conservation. There are no Bird Conservation Areas (BCAs) located in the study area. As such, this portion of the regulation would not apply to the proposed project.

*TIDAL WETLANDS ACT, ARTICLE 25, ECL, IMPLEMENTING REGULATIONS 6NYCRR PART 661*

Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis. They are found along much of the salt-water shore, bays, inlets, canals, and estuaries of Long Island, New York City, and Westchester and Rockland Counties. Tidal wetlands are valuable for marine food production, wildlife habitat, flood, hurricane, and storm control, recreation, absorption of silt and organic material, education and research opportunities, and aesthetic values. The Tidal Wetlands Act sets forth the state's policy that tidal wetlands should be preserved and protected. NYSDEC is responsible for administering the tidal wetlands regulatory program (6 NYCRRR Part 661) and mapping the locations of New York State's regulated tidal wetlands. The tidal wetlands are identified by category based on the types of vegetation and the presence of tide. Each category has restrictions on activities allowed in and adjacent (up to 150 feet inland from wetland boundary within New York City) to wetlands falling under that category. A permit is required for almost any activity that will affect wetlands or the tidal wetland adjacent area (TWAA). The NYSDEC classifies Gravesend Bay as a Littoral Zone (LZ) in the vicinity of the project site and has determined that the TWAA limit on the project site extends to 150 landward of the MHW line. Therefore, a NYSDEC Tidal Wetlands Permit is required for the proposed shoreline restoration and stabilization activities and the proposed waterfront walkway. The permitting process has begun and is discussed in the following sections. Mapped Tidal Wetlands within the project area are described below in "Existing Conditions."

*ENDANGERED AND THREATENED SPECIES OF FISH AND WILDLIFE; SPECIES OF SPECIAL CONCERN, ECL, SECTIONS 11-0535[1]-[2], 11-0536[2], [4], IMPLEMENTING REGULATIONS 6 NYCRR PART 182*

The Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern regulations prohibit the take, import, transport, possession, or sale of any endangered or threatened species of fish or wildlife, or any hide or other part of these species as listed in Section 182.6. Threatened, endangered, and special concern species with the potential to occur in the project area are discussed under "Existing Conditions" and "Probable Impacts of the Proposed Project."

*COASTAL EROSION HAZARD AREAS ACT – ECL, ARTICLE 34; 6 NYCRR PART 505*

The Coastal Erosion Hazard Areas Act established a Coastal Erosion Hazard Area (CEHA) in which activities are regulated to minimize or prevent damage or destruction to structures, buildings, property, natural protective features, and other natural resources, and to protect human life. Permits through the NYSDEC are required for most activities which occur in a designated CEHA. Under the Coastal Erosion Management Program, the NYSDEC regulates setback areas from natural protective features including beaches and bluffs. NYSDEC has established development restrictions for each type of natural protective feature (6 NYCRR 505.8). The NYSDEC has stated that a portion of the project site is located within a CEHA. The permitting process has begun and is discussed in the following sections.

**NEW YORK CITY LAWS AND REGULATORY PROGRAMS**

*LOCAL LAW 33 OF 1988*

In New York City, building in the 100-year floodplain (elevation 13 feet above sea level National Geodetic Vertical Datum (NGVD 29) is governed by Local Law 33 of 1988. This law prohibits the building of habitable structures in the 100-year floodplain unless it is elevated above the floodplain or is flood-proofed. The law requires that roadway and utility construction be designed to minimize or eliminate damage from flooding. Because the project site is located within the 100-year floodplain, this law is applicable to the proposed project. Floodplains are discussed in Section D below.

## D. EXISTING CONDITIONS

The project site is comprised of distinct eastern and western portions. The eastern portion consists of paved parking areas used for bus parking and includes a maintenance and repair garage in the central area. The northern boundary of the eastern portion features a paved entry road that travels the length of the project site along its northern boundary. The western area of the project site (western plateau) extends approximately 600 feet into Gravesend Bay. This area features a vegetated berm along the perimeter. The interior of this area is also paved and used for bus parking. Photographs of the project site are shown in **Figures 6-2** through **6-10**, and **Figure 6-1** provides a photo reference key. Based on the extent of development on-site, natural communities, and thus natural resources are limited.

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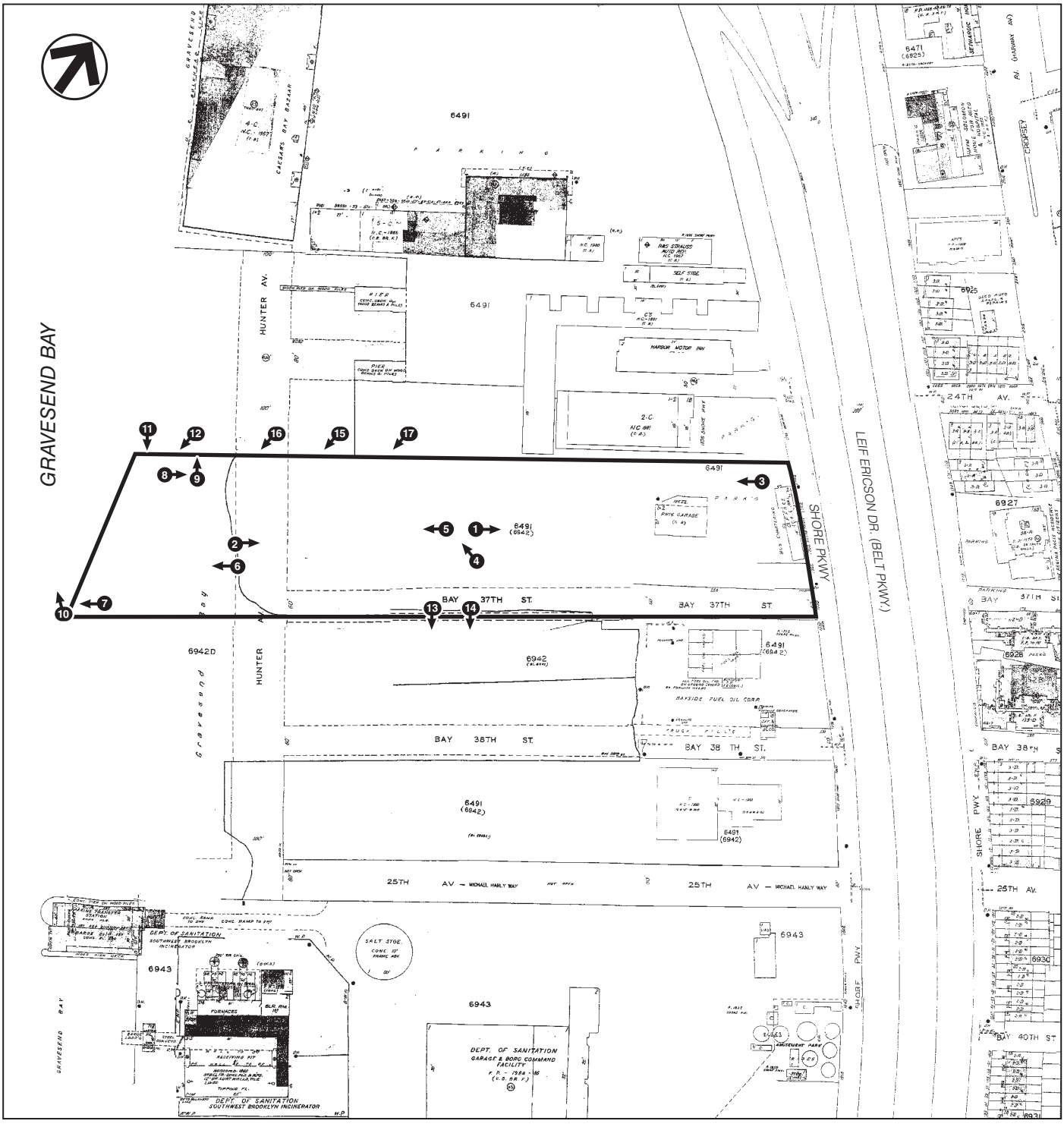


*Project Site Boundary*

*Photograph View Direction and Reference Number*

0 500 FEET

**SCALE**

# Natural Resources
# Site Photograph Locations

**Figure 6-1**

**BROOKLYN BAY CENTER**

Eastern Plateau looking east **1**

Western Plateau looking east **2**

Site Photographs

**Figure 6-2**

Road along north western boundary of project site with heavy invasive species vegetation **3**

Small road connecting Eastern and Western Plateaus looking northwest **4**

Western Plateau looking west showing perimeter berm **5**

Western edge of the Western Plateau showing perimeter berm **6**

Perimeter berm at northwest corner of project site, looking northwest **7**

Looking east along the northern boundary of the wester berm **8**



Site Photographs

**Figure 6-5**

Looking north on the Western Plateau showing perimeter berm on northwestern boundary **9**

Gravesend Bay looking northwest from Western Plateau **10**

Eroding, mixed-fill, solid waste berm on the northwest shoreline of project site **11**

Eroding berm, western shore area **12**

Gravesend Bay, southwestern shore, along Western Plateau. Note: Jellyfish and algae covered rocks **13**

Debris in Gravesend Bay off southwestern shore of project site **14**

Western most area of project site in Gravesend Bay looking southwest **15**

Northern shoreline looking west at Gravesend Bay **16**

Northern shoreline, rip-rap and debris **17**

## TERRESTRIAL RESOURCES

### *SOILS*

According to the New York City Reconnaissance Soil Survey (RSS), soils on-site are classified as LaGuardia-Ebbets-Pavement & buildings, wet substratum complex. Soils in this category are typically located in nearly level to gently sloped areas (0 to 8 percent) and are comprised of a mixture of natural soil materials and construction debris over swamp, tidal marsh, or water; a mixture of anthropogenic soils which vary in coarse fragment content, with 15 to 49 percent of the surface covered by impervious pavement and buildings.

### *VEGETATION*

The project site is almost entirely developed with vegetated areas primarily limited to the perimeter, 1/3-acre, mixed-fill and solid waste berm. Minimal landscaping is located at the entrance along Shore Parkway and on a median located in the central portion of the bus parking lot in the eastern portion of the project site. The berm ranges from elevation 21 feet to elevation 31 feet Brooklyn Borough Datum (BBD) and is approximately eight to ten feet higher than the inland asphalt parking lot which ranges between elevation 13.5 feet and 21 feet BBD. (Unless otherwise indicated, all elevations in this chapter refer to BBD). The existing steep slopes along the waterward edge of the berm are unstable and have resulted in the erosion of the underlying fill material, portions of which have fallen into Gravesend Bay (See site photographs 6-11 and 6-12).

The berm is heavily vegetated with invasive species, including mugwort (*Artemesia vulgaris*), common ragweed (*Ambrosia artemisiifolia*), pokeweed (*Phytolacca americana*), common reed (*Phragmites australis*), Japanese knotweed (*Polygonum cuspidatum*), poison ivy (*Toxicodendron radicans*), black locust (*Robinia pseudoacaia*), American elm (*Ulmus americana*), Norway maple (*Acer platanoides*), and tree-of-heaven (*Ailanthus altissima*).

### *WILDLIFE*

As a developed and disturbed urban site, the project site provides minimal habitat potential for wildlife to exist. Wildlife using the site generally includes species that are tolerant of disturbed, urban conditions. The vegetation along the perimeter of the project site provides limited habitat for small mammals and song birds. The New York Breeding Bird Atlas Block 5749D (2009) was reviewed to determine the potential occurrence of breeding birds within the project site. **Table 6-1** lists birds identified as potentially breeding in urban habitats.

The Herp Atlas Project (2009) was also reviewed to determine the geographic distribution amphibians and reptiles on the project site. **Table 6-2** lists amphibians and reptiles identified as potentially existing within the project site.

**Table 6-1**
**Birds With the Potential to Breed within the Project Site**

| Common Name | Scientific Name |
|---|---|
| Double-crested Cormorant | *Phalacrocorax auritus* |
| Great Egret | *Ardea alba* |
| Snowy Egret | *Egretta thula* |
| Little Blue Heron | *Egretta caerulea* |
| Cattle Egret | *Bubulcus ibis* |
| Black-crowned Night-Heron | *Nycticorax nycticorax* |
| Glossy Ibis | *Plegadis falcinellus* |
| Canada Goose | *Branta canadensis* |
| Herring Gull | *Larus argentatus* |
| Great Black-backed Gull | *Larus marinus* |
| Mourning Dove | *Zenaida macroura* |
| Downy Woodpecker | *Picoides pubescens* |
| Carolina Wren | *Thryothorus ludovicianus* |
| Gray Catbird | *Dumetells carolinensis* |
| Song Sparrow | *Melospiza melodia* |
| Red-winged Blackbird | *Agelaius phoeniceus* |
| House Sparrow | *Passer domesticus* |
| **Sources:** NYSDEC. New York State Breeding Bird Atlas [Internet]. 2009 [cited 2009 October 26]. http.//www.dec.ny.gov/cfmx/extapps/bba/index.cfm?RequestTimeout=250 | |

**Table 6-2**
**Amphibians and Reptiles With the Potential to Exist within the Project Site**

| Common Name | Scientific Name |
|---|---|
| Spotted Salamander | *Ambystoma maculatum* |
| Red-spotted Newt | *Notophthalmus viridescens* |
| Eastern Spadefoot | *Scaphiopus holbrookii* |
| Eastern American Toad | *Bufo americanus* |
| Fowlers Toad | *Bufo fowleri* |
| Gray Treefrog | *Hyla versicolor* |
| Northern Spring Peeper | *Pseudacris crucifer* |
| Bullfrog | *Rana catesbeiana* |
| Green Frog | *Rana clamitans* |
| Wood Frog | *Rana sylvatica* |
| Common Snapping Turtle | *Chelydra serpentina* |
| Eastern Box Turtle | *Terrepene Carolina* |
| Northern Diamondback | *Malaclemys terrapin* |
| Yellowbelly Slider | *Trachemys s. scripta* |
| Red-eared Slider | *Trachemys scripta* |
| Painted Turtle | *Chrysemys picta* |
| Northern Brown Snake | *Storeria dekayi* |
| Common Garter Snake | *Thamnophis sirtalis* |
| Eastern Hognose Snake | *Heterodon platirhinos* |
| Northern Black Racer | *Coluber constrictor* |
| Eastern Milk Snake | *Lampropeltris t. triangulum* |
| **Sources:** NYSDEC. *Herp Atlas Project* [Internet]. 2009 [cited 2009 October 26]. http.//www.dec.ny.gov/animals/7140.html. | |

## WETLANDS

The project site shoreline habitat is man-made, comprised of mixed-fill, construction and demolition debris and solid waste, and features eroded vegetated slopes. The area of Gravesend Bay within the project area is not considered Significant Coastal Fish and Wildlife Habitat by (NYSDOS 2009). The USFWS National Wetland Inventory (NWI) (**Figure 6-11**) classifies

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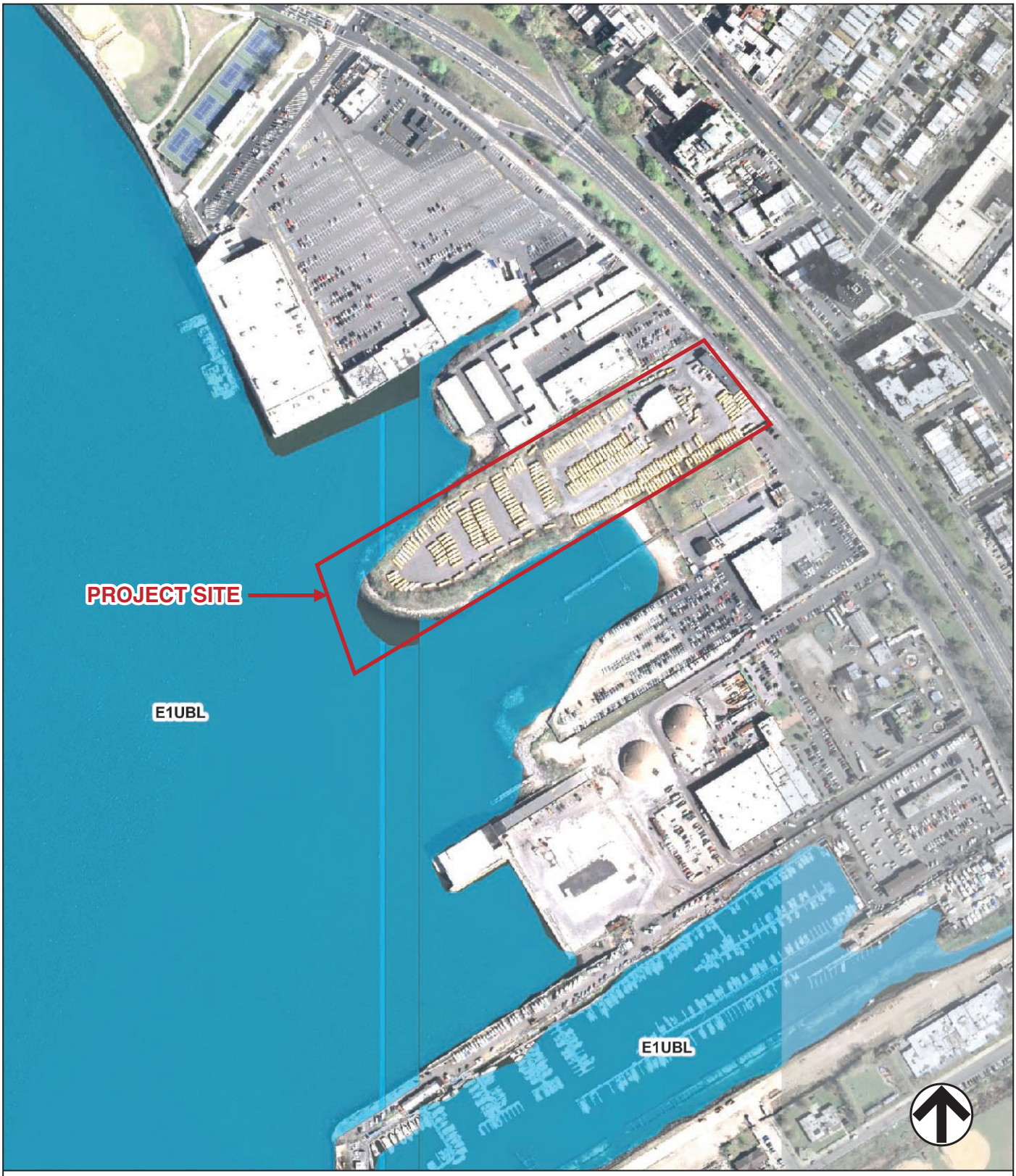



SOURCE: Langan Engineering and Environmental Services

Map Ref.: New York County 2006 Aerial Photographs; USFWS National Wetland Inventory GIS Data

**NWI Wetlands**

*Estuarine and Marine Deepwater (E1UBL)*

0 500 FEET

**SCALE**

**BROOKLYN BAY CENTER**

NWI Wetlands Map

**Figure 6-11**

Gravesend Bay, along the perimeter of the project site, as estuarine marine deepwater, (intertidal aquatic bed algal regularly flooded-E1UBL). Intertidal areas are the areas from extreme low water to extreme high water and associated splash zone. Aquatic beds include wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Algal beds are widespread and diverse in the Marine and Estuarine systems, where they occupy substrates characterized by a wide range of sediment depths and textures. Regularly flooded areas are areas of tidal water that alternately floods and exposes land surfaces at least once daily. While this portion of Gravesend Bay may have been intertidal at the time of aerial photograph for the NWI mapping (prior to the completion of the previous owner's solid waste management and fill activities during the 1970s), the project site shoreline area is currently composed primarily of mixed-fill and solid waste.

The NYSDEC Tidal Wetland Map #584-495 classifies Gravesend Bay as a Littoral Zone (LZ) in the vicinity of the project site (**Figure 6-12**). Tidal Wetland Regulations 6 NYCRR Part 661.4 states the following:

> "Littoral Zone—The tidal wetlands zone designated LZ on an inventory map, that includes all lands under tidal waters which are not included in any other category except as otherwise determined in a specific case as provided in section 661.16. Provided there shall be no littoral zone under waters deeper than six feet at mean low water…"

The tidal waters of Gravesend Bay directly along the site's shoreline are a regulated LZ.

Based on on-site observation, aquatic vegetation in areas within NYSDEC regulatory jurisdiction is limited to algal growth on debris and rocks along the shoreline, as shown in Site Photographs 12 and 17.

As part of the Joint Permit Application process, NYSDEC determined that State-regulated Tidal Wetland boundary is the mean high water (MHW), elevation 0.41 of the Lower New York Bay. NYSDEC has also determined that the Tidal Wetland Adjacent Area (TWAA) limit extends to 150 feet landward of the MHW line on all three sides, terminating at the point where the site was paved prior to the enacting of the 1977 NYSDEC Tidal Wetland jurisdiction regulations. As a result, 3.44 acres, or 93 percent of the approximately 3.69-acre western plateau lies within NYSDEC regulated TWAA. The eastern plateau is outside the TWAA.

## COASTAL EROSION HAZARD AREA

Prior to NYSDEC review of the Joint Permit Application (April 2008), approximately 2.7 acres of the project site was initially mapped within a NYSDEC-regulated CEHA. In addition to the submission of the Joint Permit Application, which in part requested authorization for work within the NYSDEC-regulated tidal wetland (Gravesend Bay) and the TWAA, the Applicant submitted to NYSDEC a Coastal Erosion Hazard Designation Appeal Form (10 May 2007 and amended 8 August 2007) seeking modification of the location of on-site CEHA. The request was predicated on the fact that the location of the CEHA was based on the mean high water line on-site which had not changed in 30 years despite the significant site development and grading changes that occurred during that time. As part of the appeal, the Applicant provided a map showing a revised CEHA location, based on current site conditions, which was the landward limit of the natural protective feature line at the top of the existing riprap, 15 feet landward of the existing mean high water line. Subsequently, Per 7 November 2007 correspondence, the NYSDEC concurred that the project site had changed substantially before the CEHA maps were

3.7.11


SOURCE: Langan Engineering and Environmental Services

Map Ref.: New York County 2006 Aerial Photographs; NYSDEC Tidal Wetlands GIS Data

**NYSDEC Tidal Wetland Boundaries**

*LZ - Littoral Zone*

*SM - Coastal Shoals, Bars, and Mudflats*

0 500 FEET

**SCALE**

**BROOKLYN BAY CENTER**

NYSDEC Tidal Wetlands Map

**Figure 6-12**

finalized (November 11, 1998) and using the boundary and topographical survey provided with the appeal, relocated the CEHA to a point of inflection along the highest contour associated with the seaward face of the berm. Based on this methodology, the NYSDEC established that the current CEHA line is now located 25 feet from the point inflection of the seaward face of the berm. The proposed shore public walkway is located within the CEHA. Work in the CEHA is addressed in the Joint Permit Application and discussed in Section F.

## FLOODPLAIN

The Federal Emergency Management Agency (FEMA) maps and regulates floodplains and floodways for insurance purposes. According to the FEMA Flood Insurance Rate Map for Kings County, New York, the project site is located within the 100-year floodplain (see **Figure 6-13**). The majority of the eastern section of the project site is located within Zone AE, which is at flood elevation 7.44 (shown as elevation 10 NGVD in **Figure 6-14**). The westernmost area of the project site is located within Zone VE, which reaches elevation 10.44. The central and central west areas of the project site are located within Zone X (Other Areas), which includes areas determined to be outside the 0.2 percent annual chance floodplain. A small portion of the project site, along the northern border and in the central area, are located within Zone X (Other Flood Areas), which includes areas that have a 0.2 percent annual chance flood, areas of 1 percent annual chance flood with average depths of less than one foot or with drainage areas less than one square mile.

The western site plateau ranges from approximate elevation 12 to 20. The eastern site plateau ranges from approximate elevation 6 to 11. The sidewalk fronting the site, along Shore Parkway, is approximately elevation 9. Therefore, a portion of the eastern plateau is currently 1.44 feet below the 100-year flood elevation. The purpose of the regulations and mapping is to minimize losses to life and property. A municipality that becomes part of the program is required to promulgate and enact regulations to prevent inappropriate development in floodplains and floodways. Proposed project impacts on Floodplains are discussed in Section F below.

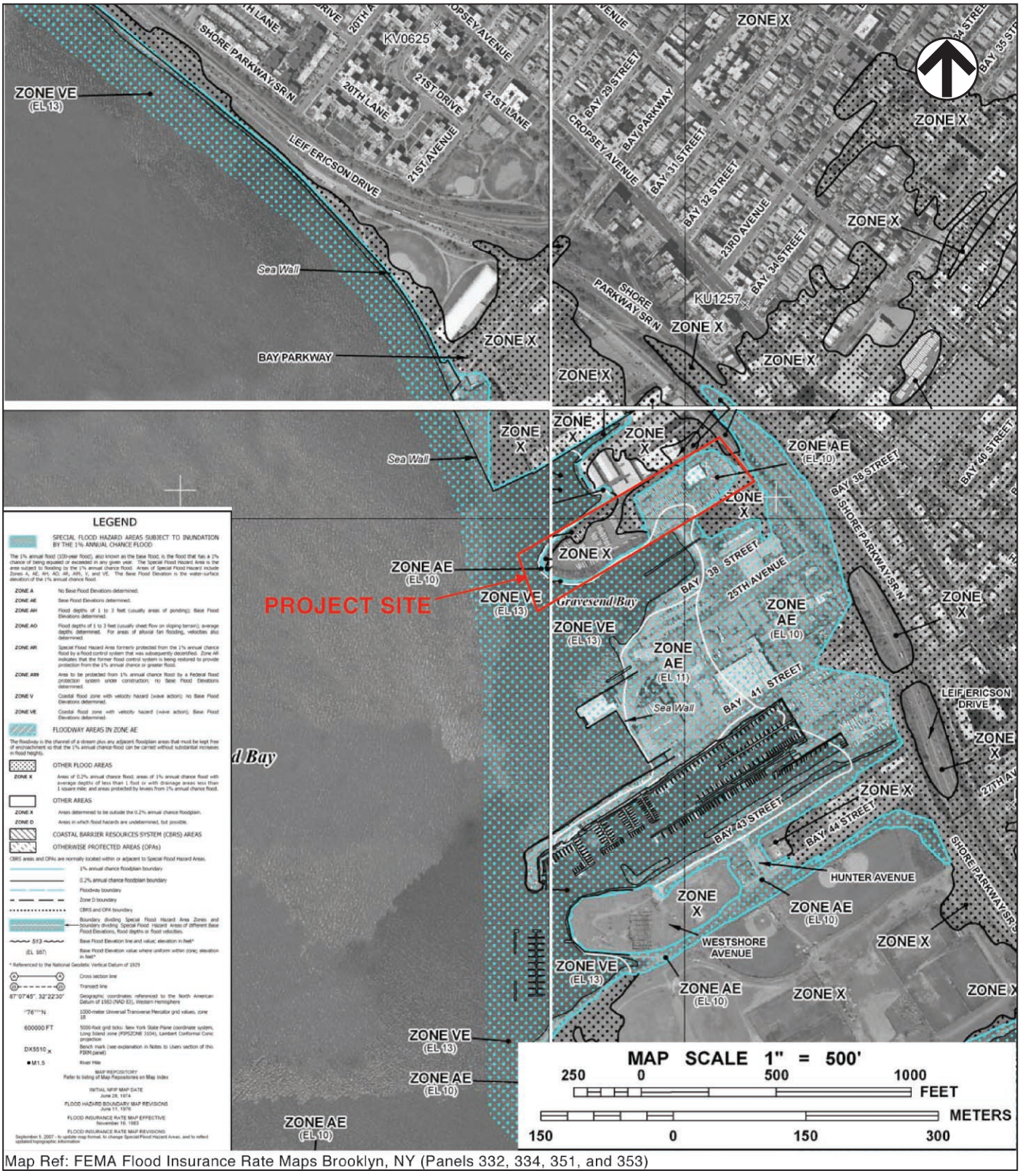
## AQUATIC RESOURCES

The project area is adjacent to Gravesend Bay, in Lower New York Bay - Raritan Bay (LNYB-RB) in the New York Harbor area. Gravesend Bay extends along the coast of the southwestern area of Brooklyn from the northwestern border of Coney Island to approximately the Verrazano-Narrows Bridge. Lower New York Bay opens directly to the Atlantic Ocean south of Gravesend Bay area. Gravesend Bay is also part of the Hudson River Estuary.

### *REGIONAL HYDROLOGY*

The Harbor Estuary system, which includes LNYB-RB, is a complex hydrological and hydraulic system that is influenced by the following factors:

- Connection to Long Island Sound through the East River in Upper New York Harbor and through the Harlem River that connects the Lower Hudson River to the East River;
- Its connection to the Atlantic Ocean in the Lower New York Harbor;
- Discharges from the Lower Hudson River which provides approximately 87 percent of the total riverine flow into New York Harbor;
- Discharges from other rivers, sewage treatment plants and Combined Sewer Outflow (CSO);




Map Ref: FEMA Flood Insurance Rate Maps Brooklyn, NY (Panels 332, 334, 351, and 353)

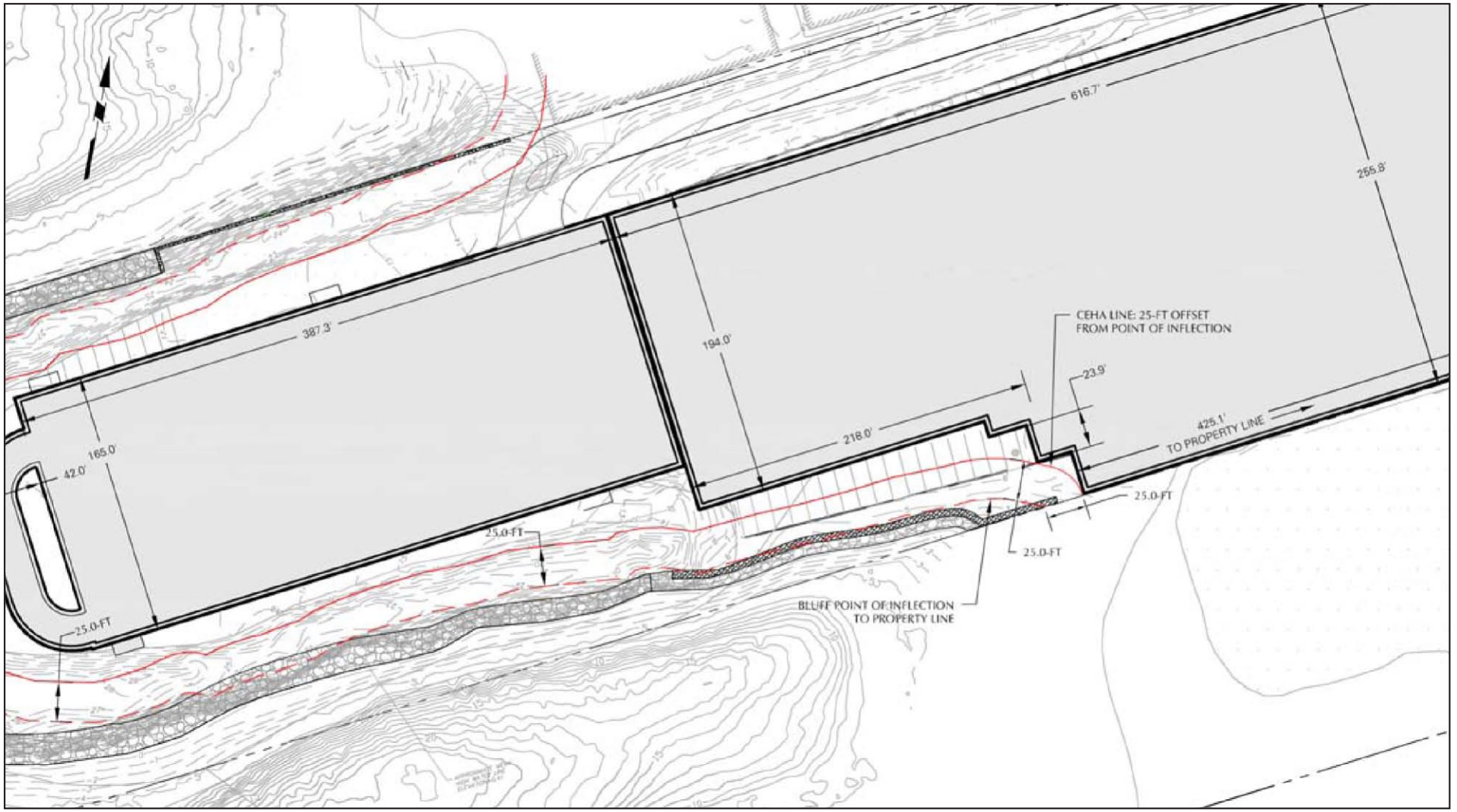
SOURCE: Langan Engineering and Environmental Services

FEMA Flood Insurance Rate Map

**BROOKLYN BAY CENTER**

**Figure 6-13**

3.7.11




*SOURCE: Langan Engineering and Environmental Services*

**BROOKLYN BAY CENTER**

CEHA Map
**Figure 6-14**

- The westward flowing Kill van Kull, which branches north to Newark Bay and south toward Arthur Kill, located along the western boundary of Staten Island; and
- The southward flowing Arthur Kill that connects Newark Bay and the Upper Hudson Bay to the north with Raritan Bay to the south.

*EXISTING WATER QUALITY CONDITIONS*

Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 703 includes surface water standards for each use class of fresh and saline waters found within New York City. Because Gravesend Bay is saline water, this chapter addresses saline water use classifications. For saline surface waters, NYSDEC water use classifications include Class SA, SB, SC, SD and I. The best uses for Class I saline surface waters are secondary contact recreation and fishing. These waters are suitable for fish, shellfish, and wildlife propagation and survival (NYSDEC 2009). The Gravesend Bay section of the Lower New York Bay is use classification Class I. **Table 6-3** presents the standards for the use classification (Class I).

**Table 6-3**
**NYSDEC Standards for Fresh and Saline Waters Found Within New York City**

| Class | Definition | Fecal Coliform | Dissolved Oxygen (never less than) | pH |
|---|---|---|---|---|
| I | Suitability for fish survival and propagation. Best uses are secondary contact recreation and fishing. | Monthly geometric mean (5 examinations) shall not exceed 2,000 cells per milliliter. | 4.0 milligrams per liter (mg/L) | The normal range shall not be extended by more than 0.1 of a pH unit. |

**Source:** NYSDEC 2009

The Interstate Environmental Commission (IEC), a water and air pollution control agency comprised of the states of New York, New Jersey and Connecticut, has given water designations to the Interstate Environmental District (IED), which includes all tidal waters of greater New York City. The IEC also develops and enforces waterbody classifications and effluent standards to protect waterbody uses within the IED. The applied classifications and effluent standards are intended to be consistent with those of all the states included in the IEC. According to the IEC, Gravesend Bay is in the B-1 Classification. **Table 6-4** shows the water quality standards of Class B-1 waterbodies as defined by IEC.

**Table 6-4**
**Interstate Environmental Commission Numeric Water Quality Standards**

| Class | Usage | Dissolved Oxygen (mg/L) | Waterbodies |
|---|---|---|---|
| B-1 | Fishing and secondary contact recreation, growth and maintenance of fish and other forms of marine life naturally occurring therein, but may not be suitable for fish propagation | ≥ 4.0 | Hudson River south of confluence with Harlem River; upper New York Harbor; East River from the Batter to the Whitestone Bridge; Harlem River; Arthur Kill between Raritan Bay and Outerbridge Crossing. |

**Source:** IEC 2009

The City of New York has monitored New York Harbor water quality and conducted an annual survey (Harbor Survey) for 99 years. NYCDEP conducts the survey by collecting water samples at 35 stations located within open waters of New York Harbor and an additional 12 stations located in smaller tributaries within the City. The open water stations are located in four sections, each delineating a geographic region within the harbor, including the Inner Harbor Area, Upper East River-Western Long Island Sound, Lower New York Bay - Raritan Bay

(LNYB-RB), and Jamaica Bay. The project site is located in the LNYB-RB region. NYCDEP produces an annual report which summarizes the results of the current survey and identifies harbor water quality trends using four water quality parameters including fecal coliform (FC) counts, chlorophyll *a*, dissolved oxygen (DO), and Secchi transparency.

The results of the 2008 Harbor Survey, conducted by the NYSDEP, show that water quality of New York Harbor has improved dramatically over the past decade, to the extent that the many waterways are now utilized for recreation and commerce throughout the year. Infrastructure improvements and the capture and treatment of virtually all dry weather sewage that was previously discharged into New York Harbor are the primary reasons for the improvement. These measures include reducing illegal discharges, increasing the capture of wet-weather related floatables, and reducing the toxic metals loadings from industrial sources by 95 percent.

*SALINITY*

Salinity values vary at any given point within the New York Harbor depending on the amount of freshwater flow. As the most oceanic portion of New York Harbor, average salinity values are highest in the LNYB-RB area, where the project site is located, and decrease moving up-estuary to the Upper New York Harbor, the Lower Hudson River, and the Lower East River. Salinity in the Lower Hudson River Estuary varies daily with tidal cycles and seasonally with freshwater volumes entering from upriver. The Lower Hudson River Estuary is classified as polyhaline in late summer and autumn with salinity varying from 18 to 30 parts per thousand (ppt). In spring and early summer, the Lower Hudson River Estuary is classified as mesohaline with salinity varying from 5 to 18 ppt (LMDC 2004).

The following provides a summary of the water quality conditions in LNYB-RB, which includes Gravesend Bay, according to the NYSDEC Harbor Study.

The presence of fecal coliform (FC) bacteria in surface waters indicates potential health impacts from human or animal waste and sewage-related pollution, and elevated levels of coliform can result in the closing of bathing beaches and shellfish beds. FC are a group of bacteria primarily found in human and animal intestines and are associated with waste sewage. These bacteria are widely used as indicator organisms to show the presence of such wastes in water and possible presence of pathogen (disease-causing) bacteria. Temporary increases in FC concentrations may occur during wet weather due to increased FC loadings following a rain event. According to the 2008 New York Harbor Water Quality Report, sanitary water quality as estimated by FC had the lowest values in the LNYB-RB, as compared to other waterbodies in New York City. Summer averages for FC numbers show waters of the LNYB-RB meet and surpass NYS Standards for this area. All five water quality monitoring stations in the area indicated geometric means less than 20 cells/100ml. FC concentrations for this area show a significant decline from the mid-1980s to the present time. While FC concentrations for surface waters were always below 200 cells/100ml, recent average FC levels reached a low of 3 cells/100ml in 1999. The levels have remained at or below 10/100ml since that time.

Dissolved oxygen (DO) in the water column is necessary for respiration by all aerobic forms of life, including fish and such invertebrates as crabs, clams, and zooplankton. The bacterial breakdown of high organic loads from various sources can deplete DO to low levels, and persistently low DO can degrade habitat and cause a variety of sublethal or, in extreme cases, lethal effects. Consequently, DO is one of the most universal indicators of overall water quality in aquatic systems.

DO values for top and bottom waters in LNYB-RB complied with the NYS DO standard of 5.0 mg/L for bathing waters during the summer of 2008, except for one violation in surface water and four in bottom waters. The five readings were within 4.1 – 4.9 mg/L and all were found at Raritan Bay, near the entrance of the Arthur Kills, southwest of Staten Island. Summer average DO values in this area have been highest among the harbor area since 2006. The average DO measurements were 8.3 mg/L in surface waters and 7.8 mg/L in bottom waters, which increased from 7.4 mg/L and 6.7 mg/L in 2007 (NYCDEP 2008). Since 1970, average DO concentrations have increased from 6.1 to 8.3 mg/L for surface waters and from 5.2 to 7.8 mg/L for bottom waters.

Chlorophyll 'a' is a green pigment found in most macro-algae and phytoplankton. It is vital for photosynthesis, which allows plants to obtain energy from light. Chlorophyll 'a' found in phytoplankton can be used as an indicator of primary productivity, which is the necessary base of the food chain in the water. These organisms respond quickly to environmental changes, and their abundance may serve as a measure of water and ecosystem quality. Overgrowth of primary producers can cause eutrophication. Chlorophyll 'a' levels above 20 ug/L are considered indicative of enriched, eutrophic conditions. Eutrophication is common phenomenon in marine coastal waters where human activities that fertilize water bodies with nitrogen and phosphorus often lead to adverse changes in animal and plant populations and degradation of water and habitat quality. In contrast to freshwater systems, nitrogen is more commonly the key to limiting nutrient of marine waters; thus, nitrogen levels have a greater importance to understanding eutrophication problems in salt water.

The three water quality stations on the eastern side of the LNYB-RB area (Verrazano Narrows, Coney Island, and Rockway Inlet) typically have low average chlorophyll 'a' concentrations (less than 7.3 ug/L). Waters in this area are among the clearest in the City.

Secchi Transparency estimates the clarity of surface waters. High Secchi transparency (greater than 5.0 feet) is indicative of clear water, with declines in transparency typically due to high suspended solids concentrations or plankton blooms. Low Secchi readings (less than 3.0 feet) are typically associated with degraded waters. These conditions are indicative of light limiting conditions, which in turn affect primary productivity and nutrient cycling.

According to the recent Survey, the average Secchi reading for the LNYB-RB stations was 6.5 feet. The highest average value of 9.6 feet was located at Rockaway Inlet, southeast of the project site. However, as the most oceanic of the Harbor Survey's monitoring stations, Rockaway Inlet commonly experiences the widest range in Secchi values. In this region, 26 out of 80 Secchi readings were below 5.0 feet. The lowest readings of 3.0 feet were recorded at stations located far west of the projects site, southeast and southwest of Staten Island respectively. Averages of Secchi transparency in this region have remained above 5.0 feet since 1986, with the exceptions of 1995 and 1996.

*SEDIMENT QUALITY*

Sediments of the New York Harbor Estuary are a key component of the estuarine ecosystem and are a major factor in determining the environmental, economic and public health conditions of the region. New York Harbor Estuary, including Gravesend Bay, is located at a hydrological terminus of one of the oldest industrialized watersheds in North America and one of the most densely populated areas of the United States. Therefore, New York Harbor Estuary sediments are often contaminated due to historical industrial uses (NY-NJ Harbor Estuary Program). Contaminants found throughout the New York Harbor Estuary include metals such as mercury

and copper, and various polycyclic aromatic hydrocarbons. Adams et al. (1998) found the mean sediment contaminant concentration for 50 of 59 chemicals measured to be statistically higher in the Harbor Estuary than other coastal areas on the East Coast. While the sediments of the New York Harbor Estuary are contaminated, the levels of most sediment contaminants have decreased on average by an order of magnitude over the past 30 years (Steinberg et al. 2002).

*GENERAL HABITAT DESCRIPTION*

The New York Harbor Estuary supports a diverse and productive aquatic community of over 100 species of finfish and more than 100 different invertebrates. Aquatic organisms of commercial or recreational importance found within the Harbor Estuary include striped bass, winter flounder, blue crab, and the northern quahog or hard clam.

Gravesend Bay is a deepwater habitat, with depths of 31 feet in the area around the project site (USGS) and ranging from 14 to 26 feet at mean low water near Coney Island Creek, approximately two miles south of the project site (NYCDEP, 2009). The project site shoreline slopes into Gravesend Bay to approximately elevation -4.0 feet. The mean high water line is at elevation 0.41 feet. The submerged portion of the shoreline consists mostly of riprap (See Site Photographs 7-13 through 7-17).

*AQUATIC BIOTA*

The descriptions are largely drawn from existing information on the New York Harbor's resources prepared by the USFWS and NYCDEP. In addition, NMFS has determined that anadramous and resident fish, forage and benthic species may be present in the project area. Primary Producers

*Phytoplankton*

Phytoplankton are microscopic plants whose movements within the system are largely governed by prevailing tides and currents. Several species can obtain larger sizes as chains or in colonial forms. Light penetration, turbidity and nutrient concentrations are important factors in determining phytoplankton productivity and biomass. While nutrient concentrations in most areas of New York Harbor are very high, low light penetration has often precluded the occurrence of phytoplankton blooms.

Resident times of phytoplankton species within New York Harbor are short and species move quickly through the system. Species found in the Harbor would also likely be present within the project area. In a 1993 survey of New York Harbor, 29 taxa of phytoplankton were identified, with the diatom *Skeletonema costatum* and the green algae *Nannochlorus atomus* determined to be the most abundant species at the monitored sites (Brosnan and O'Shea 1995). The average summer cell counts in that year ranged from 6,300 to 97,000 cells/ml.

Submerged Aquatic Vegetation and Benthic Algae. Submerged aquatic vegetation (SAV) are rooted aquatic plants that are often found in shallow areas of estuaries; these organisms are important because they provide nursery and refuge habitat for fish. Benthic algae can be large multicellular algae that are important primary producers in the aquatic environment. They are often seen on rocks, jetties, pilings, and sandy or muddy bottoms. Since these organisms require sunlight as their primary source of energy, the limited light penetration of New York Harbor limits their distribution to shallow areas. Submerged aquatic vegetation does not occur at the project site. Macroalgae was observed on the intertidal "hard surfaces" (e.g. riprap and construction debris) during on-site field investigation.

*Zooplankton*

Zooplankton are another integral component of aquatic food web. They are primary grazers on phytoplankton and detritus material, and are themselves used by organisms of higher trophic levels as food. The higher-level consumers of zooplankton typically include forage fish, such as bay anchovy, as well as commercially and recreationally important species, such as striped bass and white perch, during their early life stages.

Zooplankton include life stages of organisms such as fish eggs and larvae, decapod larvae, copepods, rotifers, barnacle larvae, cumaceans, mysid shrimp, and amphipods (Stepien et al. 1981; USACE and USDOT 1984). Zooplankton studies conducted in New York Harbor found crustacean taxa to be the most prevalent form of zooplankton in collected samples. The most dominant species include the copepods *Acartia tonsa, Acartia hudsonica, Eurytemora affinis,* and *Temora longicornis*, with each species being prevalent in certain seasons.

*Benthic Invertebrates*

Invertebrate organisms that inhabit sediments at the bottom of Gravesend Bay as well as surfaces of submerged objects (such as rocks, pilings, or debris) are commonly referred to as benthic invertebrates. These organisms are important to an ecosystem's energy flow because they convert detrital and suspended organic material into biomass, and are also integral components of the diets of ecologically and commercially important fish and waterfowl species. Benthic invertebrates also promote the exchange of nutrients between the sediment and water column. They include those that can be retained on a 0.5 mm screen (macroinvertebrates) as well as smaller forms retained on 0.04 - 0.2 mm sieves called meiofauna. Some of these animals live on top of the substratum (epifauna) and some within the substratum (infauna). Substrate type (rocks, pilings, sediment grain size, etc.), salinity, and dissolved oxygen levels are the primary factors influencing benthic invertebrate communities; secondary factors include currents, wave action, predation, succession, and disturbance.

Common infaunal macroinvertebrates collected within the New York Harbor system include aquatic earthworms, segmented worms, snails, bivalves and soft shell clams, barnacles, cumaceans, amphipods, isopods, crabs and shrimp (EEA 1988; EA Engineering, Science and Technology 1990; NJDEP 1984; Princeton Aqua Science 1985a & 1985b; LMS 1980 & 1984). Epifauna include hydrozoans, sea anemones, flatworms, oligochaete worms, polychaetes, bivalve, barnacles, gammaridean and caprellid amphipods, isopods, sea squirts, hermit crabs, rock crabs, grass shrimp, sand shrimp, blue crabs, mud dog whelks, mud crabs, horseshoe crabs, blue mussels, softshell clams, and sea slugs (EEA 1988; EA Engineering, Science and Technology 1990; Able et al. 1995; NYCDPR 1994).

*Fish*

A mixture of habitats in Gravesend Bay supports marine, estuarine, anadromous, and catadromous fish. Gravesend Bay serves as a major migratory route for certain species from the Hudson River to the Atlantic Ocean. Winter flounder, striped bass, scup, bluefish, Atlantic silverside, striped killifish, common killifish, striped bass, tomcod, members of the herring family, and American eel are among the species seasonally present in Gravesend Bay.

EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity and "waters" include aquatic areas that are used by fish and may include aquatic areas that were historically used by fish where appropriate. Mapped information provided as part of the "Guide to Essential Fish Habitat Designations in the Northeastern United

States" shows that there is EFH identified for a total of 24 federally managed fish and skate species that have been designated in the 10 foot by 10 foot square of latitude and longitude that includes the project site (**Table 6-5**). This area includes Atlantic Ocean waters within the Hudson River Estuary affecting the following: western Rockaway Beach, western Jamaica Bay, Rockaway Inlet, Barren Island, Coney Island except for Norton Point, Peardegat Basin, Mill Basin, southwest of Howard Beach, Ruffle Bar, and many smaller islands. The project has been approved by USACE for coverage under general permits; therefore no further EFH study is required.

**Table 6-5**
**Summary of Essential Fish Habitat (EFH) Designations**

| Species | Eggs | Larvae | Juveniles | Adults |
|---|---|---|---|---|
| Whiting (Merluccius bilinearis) | X | X | X | |
| Red hake (Urophycis chuss) | X | X | X | |
| Redfish (Sebastes fasciatus) | N/A | | | |
| Winter flounder (Pleuronectes americanus) | X | X | X | X |
| Windowpane flounder (Scopthalmus aquosus) | X | X | X | X |
| Atlantic sea herring (Clupea harengus) | | | X | X |
| Monkfish (Lophius americanus) | X | X | | |
| Bluefish (Pomatomus saltatrix) | | | X | X |
| Long finned squid (Loligo pealei) | N/A | N/A | | |
| Short finned squid (Illes illecebrosus) | N/A | N/A | | |
| Atlantic butterfish (Peprilus triacanthus) | | X | X | X |
| Atlantic mackerel (Scomber scombrus) | | | X | X |
| Summer flounder (Paralicthys dentatus) | | X | X | X |
| Scup (Stenotomus chrysops) | X | X | X | X |
| Black sea bass (Centropristus striata) | N/A | | X | X |
| Surf clam (Spisula solidissma) | N/A | N/A | | |
| Ocean quahog (Artica islandica) | N/A | N/A | | |
| Spiny dogfish (Squalus acanthias) | N/A | N/A | | |
| King mackerel (Scomberomorus cavalla) | X | X | X | X |
| Spanish mackerel (Scomberomorus maculatus) | X | X | X | X |
| Cobia (Rachycentron canadum) | X | X | X | X |
| Sand tiger shark (Odontaspis taurus) | | X | | |
| Dusky shark (Charcharinus obsurus) | | X | | |
| Sandbar shark (Charcharinus plumbeus) | | X | X | X |

**Sources:** NMFS, 2009

*ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES*

Requests for information on rare, threatened or endangered species within the immediate vicinity of the project area were submitted to the NYNHP, NMFS, and the USFWS (Appendix C). NYNHP, a joint venture of NYSDEC and The Nature Conservancy (TNC) since 1985, maintains an ongoing, systematic, scientific inventory on rare plants and animals native to New York State. The NYNHP database is updated continuously to incorporate new records and changes in the status of rare plants or animals. The NMFS provides information regarding federally listed threatened or endangered marine organisms. The USFWS maintains information for federally listed threatened or endangered freshwater and terrestrial plants and animals.

The NYNHP has determined that there are no known occurrences of threatened or endangered species and there are no areas within the project area that are considered "critical habitat." The

NMFS has determined that the shortnose sturgeon (*Acipenser brevirostrum*), an endangered species, may be present within Gravesend Bay, and that the project vicinity has been designated as EFH for one or more species. Further, the USFWS has determined that shortnose sturgeon may be present within Gravesend Bay. Under Endangered Species General Condition 17 of Nationwide Permit No. 13 issued by USACE for the proposed project, no activity is authorized which may affect a listed species or critical habitat under Section 7 of the Endangered Species Act. By issuing Nationwide Permit No. 13, USACE has determined that the proposed project had "no affect" to listed species and an EFH study was not necessary.

## E. THE FUTURE WITHOUT THE PROPOSED PROJECT

There would be minimal changes to the use of the project site in the future without the proposed project. The project site would remain a developed industrial waterfront site featuring buildings, paved parking areas, with extensive invasive vegetation and minimal natural resources. In the future without the proposed project the propagation of invasive vegetation would likely increase along the perimeter of the project site and the nearly vertical shoreline of the site would continue to erode, causing fill material, construction and demolition debris and solid waste to fall into Gravesend Bay.

Elements of the New York/New Jersey Harbor Estuary Program (HEP), USEPA's Combined Sewer Overflow Control Policy, and other programs that are specifically directed at improving biological resources and habitats in the project area are briefly described below. These projects and initiatives are expected to continue through the construction and full operation of the proposed project.

### NEW YORK/NEW JERSEY HARBOR ESTUARY PROGRAM PROJECTS

The HEP Final Comprehensive Conservation and Management Plan (CCMP) includes a number of goals to improve water quality and aquatic resources throughout the Harbor. To meet these goals, the CCMP outlines objectives for the management of toxic contamination, dredged material, pathogenic contamination, floatable debris, nutrients and organic enrichment, and rainfall-induced discharges. Most of these objectives aim to increase knowledge of the nature and extent of various forms of pollution (e.g., toxic chemicals, sewage overflows, and floatables), reduce inputs of these pollutants, and increase the habitat and human use potential of the Harbor area. The floatables action plan of the New York/New Jersey HEP aims to reduce the amount of debris in the states' waters. It includes marine debris survey collection programs, improved street cleaning, combined sewer overflow (CSO) and stormwater abatement, enforcement of solid waste transfer regulations, shoreline cleanup programs, and public education.

The HEP 2008 Regional Sediment Management Plan (RSM) addresses issues related to sediment quality, sediment quantity and dredged material management and is published to increase public and governmental awareness of the physical, biological, social and economic linkages between all parts of the watershed and the Harbor Estuary. The RSM Plan is a long-term plan with anticipated near-term economic returns. HEP estimates that achieving the goal of clean sediments throughout the harbor could save at least $25 million annually in the costs of maintaining local water transportation infrastructure (HEP 2009).

The HEP Habitat Workgroup developed watershed-based priorities for acquisition, protection, and restoration. The USACE New York District began a feasibility study in 2001 to assess

potential sites for habitat restoration in New York Harbor. In December 2007 the Regional Plan Association (RPA) issued the Hudson-Raritan Estuary Restoration Study which identified needs and opportunities for environmental restoration in four locations within the Estuary. These sites are not within the project study area (the closest being Arthur Kills and Raritan-Bay/Sandy Hook, located west and southwest respectively) but involve the preservation and enhancement of tidal wetlands that will provide improved habitat for fish and macroinvertebrates as well as the birds, mammals, and reptiles that depend on these habitats.

New York Bight Floatables Action Plan – The New York Bight Floatable Action Plan is part of an interagency effort, led by the USEPA Region 2, comprised of Federal, State and local agencies including USEPA, USACE, NOAA, New York State Department of Health (NYSDOH), NYCDEP and the IEC to address the impacts of floating debris washing up on New York and New Jersey recreational bathing beaches. The primary objectives of the plan are to conduct surveillance of the New York/New Jersey Harbor area for debris, communication of effective cleanup of floatable debris observed in the Harbor area and for the effective communication and notification of State and local authorities of impending debris wash-ups (USEPA 2009).

## NEW YORK CITY PROJECTS

The CSO national priority strategy, implemented by the USEPA aims to achieve maximum compliance with environmental regulations in order to protect human health and the environment. Overflows of excess wastewater directly into waterbodies caused by capacity exceedences of combined sewer systems (CSSs) may violate water quality standards. In addition to stormwater, these overflows contain untreated human and industrial waste, toxic materials and debris. USEPA's 1994 Combined Sewer Overflow Control Policy (CSO Policy) is a comprehensive national strategy designed to ensure that CSO communities, NPDES permit authorities, water quality standard authorities, the EPA, and the public engage in a coordinated planning effort to achieve cost-effective CSO controls that meet the requirements of the CWA. Under the CSO Policy, CSO communities are expected to develop and implement long-term control plans that include measures to provide for attainment of water quality standards. Nationally, annual untreated discharges from CSOs are estimated to be 850 billion gallons (USEPA 2009). When full implementation of the measures described in the CSO Policy are achieved, the Office of Water estimates that approximately 160 billion gallons of untreated CSOs would be discharged annually from combined sewer systems (CSC) (USEPA 2009). National CSO Policy requires states to eliminate dry weather overflows of sewers, meet federal and state water quality standards for wastewater discharges, and minimize impacts on water quality, plant and animal life, and human health. New York City committed $1.5 billion for construction of CSO abatement facilities over the period 1998-2008. This should result in some future improvement in coliform, DO, and floatables levels in the Harbor Area. The City also recently completed improvements to its wastewater treatment plants, which should lead to further decreases in coliform counts and floatables levels.

# F. PROBABLE IMPACTS OF THE PROPOSED PROJECT

## CONSTRUCTION IMPACTS

*TERRESTRIAL RESOURCES*

The project site provides minimal wildlife habitat other than what may be used by urban wildlife which typically occur in highly developed, disturbed urban sites. These species include pigeons, starlings, house sparrows, and rodents. The vegetated berm at the perimeter of the project site provides foraging and cover habitat for these types of species. During construction of the proposed project, the berm around the perimeter of the western plateau and the inclusive invasive species would be removed. (Chapter 9, "Solid Waste and Sanitation," addresses the removal of solid waste from the project site). The shoreline would be stabilized and the interior portion of the western peninsula would be re-vegetated with native plant species. Therefore, the proposed project would have a temporary impact during construction, however, long term benefits resulting from the removal of solid waste and shoreline restoration would provide easier access for wildlife to and from the waters edge, and the re-vegetated areas would provide higher habitat values for wildlife. Therefore, construction of the proposed project would not result in significant adverse impacts on the limited terrestrial natural resources occurring on the site.

*WETLANDS/WATERS OF THE UNITED STATES*

The existing site features a riprap shoreline with eroding vertical banks consisting of mix-fill and solid waste and overgrown with invasive species. The proposed work within the regulated wetland and adjacent area includes:

- The installation of approximately 1,400 linear feet of an engineered riprap slope for shoreline restoration and bank stabilization;
- The re-grading of the western plateau and removal of the mixed-fill and solid waste berm.

The proposed new riprap will begin at the mean high water line and be constructed at a 1.5:1 (horizontal/vertical) slope. In addition, approximately 3,000 cy of existing material below MHW will be replaced to existing grades with geotextile fabric, bedding stone and riprap to ensure bank stabilization. Since the existing slope is steeper, approximately 1:1, the proposed project will result in a net decrease in the amount of fill in the TWAA.

The proposed project also includes the installation of two new 36-inch storm outfalls which will discharge stormwater runoff from the proposed building and parking garage into Gravesend Bay. The proposed outfalls would be installed above the high tide line in the sloped shoreline of the north central and southeastern areas of the project site. Installation of the two proposed outfalls has the potential to result in temporary impacts on fish and benthic macroinvertebrates due to temporary increases in suspended sediment and noise associated with in-water construction activities. However, these effects would be short-term and localized and would not be expected to result in significant adverse impacts on aquatic biota in the project area. In authorizing Nationwide Permit No. 13, USACE has determined that the subject activity would not have a significant effect on the aquatic environment.

Further, the proposed project will also result in a 17.3 percent reduction in existing impervious coverage within the wetland area from 57.9 percent to 40.6 percent, thereby, improving the quality, and reducing the rate of stormwater runoff entering Gravesend Bay.

According to NYSDEC Tidal Wetland Regulations (6NYCRR Part 661.6) impervious coverage for new structures is limited to 20 percent of the TWAA. Where practical difficulties exist or in the judgment of the department, strict application of the provisions of the regulations in Part 661.6 would be contrary to the purposes of its tidal wetlands regulations, NYSDEC may grant variances to certain development restrictions. As such, despite the reduction in impervious coverage, the project tidal wetlands application includes a variance request because the final coverage in the TWAA exceeds the 20 percent limit. Because the project site is located on a narrow peninsula and significant quantities of solid waste would be removed to address historic solid waste issues, the proposed project reflects the maximum extent to which on-site impervious surfaces can be minimized in order to achieve its principal development and environmental goals. According to ~~July 29, 2009~~ written correspondence from NYSDEC, as of July 29, 2009 the project is being reviewed pursuant to the New York State Environmental Quality Review Act (SEQRA); at that time, NYSDEC had no further technical issues, but required that the DEIS be accepted by the City Planning Commission (CPC) as lead agency before the Joint Permit application could be deemed complete for review. The Joint Permit Application (including the impervious coverage variance request) and the CEHA authorization (including the variance request to construct shore public walkway) was deemed complete following the issuance of the Notice of Completion of the CEQR DEIS by CPC on March 11, 2011, and the NYSDEC review process is underway in accordance with 6NYCRR Part 621.7. On July 27, 2011 NYSDEC determined that the Joint Permit Application was complete and published the Notice of Completed Application in the Environmental Notice Bulletin. ~~review of the Joint Permit Application (including the impervious coverage variance request) and the CEHA authorization (including the variance request to construct shore public walkway), has been completed, and NYSDEC had no further technical comments. In addition, NYSDEC stated it would commence the public notice process for the Joint Permit Application pending issuance of this DEIS.~~

As mentioned previously, USACE authorized Nationwide Permit No. 13 for the proposed bank stabilization and restoration activities (See Appendix C). Based on the authorization, USACE has determined that the subject activity would not have a significant effect on the Waters of the United States.

Based on this information, the proposed project would not result in any significant adverse construction impacts on wetlands and Waters of the United States.

*COASTAL EROSION HAZARD AREA*

NYSDEC indicated that the CEHA is located 25-feet landward of the point of inflection of the existing, perimeter bluff (berm). During the review of the Joint Permit Application, NYSDEC indicated that the post-construction CEHA line would be located 25-feet landward of the top of the proposed engineered slope.

The proposed project would conform with NYSDEC CEHA regulations as the proposed development of the site would create a protective shoreline that would be engineered to resist erosion. Further, the NYSDEC has recognized that the project site is a man-made feature created by filling activities which occurred during the mid to late 20th century and that the perimeter berm is comprised of fill and solid waste, and by removing this material, the proposed project would comply with the NYSDEC goals of protecting areas within the CEHA.

The proposed retail and garage structures associated with the proposed project would be located outside the CEHA. The proposed shore public walkway (pavers) and associated features

(benches, lights, etc.) would be located within the CEHA. A formal variance request was included in the Joint Permit Application (in accordance with 6 NYCRR Part 505), due to the hardship condition complying with New York City Zoning Resolution requirements for a 40-foot wide shore public walkway and associated features.

Based on correspondence from the NYSDEC ~~with the project Applicant,~~ as of July 29 2009 the project is being reviewed pursuant to the New York State Environmental Quality Review Act (SEQRA); at that time, NYSDEC had no further technical issues, but required that the DEIS be accepted by CPC as lead agency before the Joint Permit application could be deemed complete for review. The Joint Permit Application (including the CEHA variance request) was deemed complete following the issuance of the Notice of Completion of the CEQR DEIS by CPC on March 11, 2011, and the NYSDEC review process is underway in accordance with 6NYCRR Part 621.7. On July 27, 2011 NYSDEC determined that the Joint Permit Application was complete and published the Notice of Completed Application in the Environmental Notice Bulletin. ~~NYSDEC has completed its review of the Joint Permit Application (including the CEHA variance request) and has no further comments. The NYSDEC stated that it would commence the public notice process for the Joint Permit Application pending issuance of this DEIS.~~

Based on the described actions, the proposed project meets the goals of the CEHA regulations and is not expected to result in any adverse construction impacts within the on-site CEHA.

*FLOODPLAIN*

The proposed shore public walkway, the top of the shoreline slope, and the new building's first floor are all proposed to be constructed significantly above the 100-year flood plan, and approximately at elevation 13.0. The building will be constructed in compliance with New York City Building Code and Local Law 33 of 1988.

Therefore, the proposed project is not expected to result in any significant adverse floodplain impacts.

*AQUATIC RESOURCES*

Activities which could result in potential temporary water quality impacts include:

- Construction of approximately 1,400 linear feet of engineered riprap as part of shoreline restoration and stabilization activities;
- Removal of mixed-fill, solid waste berm; and
- Installation of two 36-inch stormwater outfalls.

The potential impacts would be associated with:

- Localized increases in suspended sediment during construction; and
- Stormwater runoff.

Water quality changes associated with increases in suspended sediment and re-suspension of sediments from shoreline construction activities described above would be minimal and are expected to dissipate shortly after the outfall is installed. Best Management Practices (BMPs) will be employed to the maximum extent practicable to minimize migration of sediments and other adverse environmental impacts on aquatic resources. These include, but are not limited to, the use of silt booms, hay bales, silt fences and other temporary erosion control measures to be

implemented during construction. Construction activities will be staged from upland areas of the project site to minimize potential impacts on aquatic resources.

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared for the proposed project in accordance with established engineering practices as part of the SPDES permitting process for General Permit 0-10-001. Chapter 8, "Water and Sewer Infrastructure," includes a detailed discussion of stormwater management issues, including implementation of the erosion and sediment control BMPs described in the SWPPP that would minimize potential adverse impacts on water quality resulting from the discharge of stormwater during proposed project construction activities.

Installation of the proposed two new outfalls has the potential to result in temporary impacts on fish and benthic macroinvertebrates due to temporary increases in suspended sediment and noise associated with in-water construction activities. However, these effects would be localized and temporary and would not be expected to result in significant adverse impacts on aquatic biota in the project area. Further, the proposed construction to install the new outfalls is not expected to disturb benthic habitat because the outfalls will be installed at an elevation two fee above the mean high water line. In conclusion, disturbance to benthic communities during construction would be minimal and is not expected to result in significant adverse impacts on the food supply for fish foraging in the area.

Life stages of estuarine-dependent and anadromous fish species, bivalves, and other macroinvertebrates have developed behavioral and physiological mechanisms for dealing with variable concentrations of suspended sediment, and thus are fairly tolerant of elevated suspended sediment concentrations (Birtwell et al. 1987; Dunford 1975; Levy and Northcote 1982 and Gregory 1990 in Nightingale and Simenstad 2001; LaSalle et al. 1991). Fish are mobile and generally avoid unsuitable conditions such as increases in suspended sediment and noise (Clarke and Wilber 2000), and also have the ability to expel materials that may clog their gills when they return to cleaner, less sediment-laden waters. Most shellfish are adapted to naturally turbid estuarine conditions and can tolerate short-term exposures by closing valves or reducing pumping activity. More mobile benthic invertebrates that occur in estuaries have been found to be tolerant of elevated suspended sediment concentrations.

Based on the authorization of Nationwide Permit No. 13, USACE has determined that the subject activity would not have a significant effect on the aquatic environment.

Therefore, the proposed project is not expected to result in significant adverse construction impacts on aquatic resources.

*ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES*

NYNHP has determined that there are no known occurrences of threatened or endangered species and there are no areas within the project area that are considered "critical habitat." USFWS has determined that shortnose sturgeon (*Acipenser brevirostrum*) may be present within Gravesend Bay. NMFS has determined that shortnose sturgeon, an endangered species, may be present within the Gravesend Bay, and that the project vicinity has been designated as EFH for one or more species. In a 21 September 2009 email to Langan, USACE stated that issuance of the nationwide permit approval resulted in "no affect" to listed species (Appendix C). Furthermore, as mentioned previously, the proposed project would employ best management practices, including the use of silt booms, hay bales, silt fences and other temporary erosion control measures to be implemented during construction to minimize potential disturbances from

all work below mean high water (riprap installation), and, therefore no significant adverse impacts on endangered, threatened, and special concern species would be expected during construction activities.

*EROSION AND STORMWATER MANAGEMENT*

Construction activities might temporarily increase the potential for on-site erosion and sedimentation along the shoreline area where the new riprap and solid waste removal is proposed to occur. As described above, a detailed SWPPP would be prepared under SPDES permitting requirements and would be implemented during construction. Stormwater management plans would be developed as part of the design process, with implementation to be carried out by the contractor under supervision of the owner, construction manager, and the SPDES permitting and enforcement program administered by NYSDEC. See Chapter 8, "Water and Sewer Infrastructure," for a further discussion of erosion and stormwater management.

The SWPPP would contain appropriate requirements for erosion and sedimentation controls to be used during construction. These controls, or best management practices (BMPs), include structural and vegetative practices such as silt booms, hay bales, silt fencing, vegetative covers, temporary seeding, and slope and soil stabilization blankets. The erosion and sediment control devices would designed in accordance with NYSDEC requirements and included in the SPDES General Permit 0-10-001 and SWPPP.

The post-construction development condition will significantly improve aquatic resources by undertaking stormwater management, solid waste removal, and shoreline stabilization activities that will result in reduced erosion, improved erosion control, decreased impervious coverage, and improved stormwater runoff quality. The project site owner will obtain a SPDES permit for the proposed post-construction stormwater discharge and will meet the requirements for water quality treatment standards. The project will include surface swales known as "rain gardens" that will serve as natural means of bio-filtration, as well as hydro-dynamic separation devices to capture suspended solids. The proposed rain gardens will feature overflows which will connect to the site storm system, and will pass through hydro-dynamic separator prior to discharging to the bay. Proposed devices will be implemented in compliance with the NYSDEC Stormwater Management Design Manual and SPDES General Permit 0-10-001.

Therefore, the proposed project is not expected to result in significant adverse erosion or stormwater management impacts during or after construction activities.

## OPERATIONAL IMPACTS

*TERRESTRIAL RESOURCES*

The removal of the mixed-fill, solid waste berm and invasive species from the project site is expected to result in beneficial environmental impacts on the limited terrestrial resources in the project area by encouraging the propagation of native species and increasing the potential for habitat opportunities on-site. Further, the construction of a shore public walkway featuring open space, and appropriate native, salt-resistant plants is expected to provide a limited habitat for the types of species which occur on the project site. Therefore, the proposed project is not expected to result in significant adverse impacts on terrestrial resources.

*WETLANDS*

The proposed shoreline restoration and stabilization including the installation of approximately 1,400-linear-feet of engineered riprap, the removal of the eroding solid waste berm, installation of two new stormwater outfalls and water filtration devices, and the proposed increased in on-site pervious surfaces are expected to result in beneficial environmental impacts on existing conditions and water quality in Gravesend Bay. Based on the authorization of Nationwide Permit No. 13, USACE has determined that the proposed project would not have a significant impact on Waters of the United States. It is anticipated that the NYSDEC will issue a Tidal Wetlands Permit and WQC upon the completion of the CEQR process. Therefore, the proposed project is not expected to result in any significant adverse impacts on wetlands in the project area.

*COASTAL EROSION HAZARD AREA*

Operation of the proposed project complies with the NYSDEC goals of protecting areas within the CEHA. The Joint Permit application that NYSEC has effectively approved will allow construction and maintenance of a shore public walkway and other non-structural features within the CEHA. Based on the described actions, operation of the proposed project is not expected to result in any adverse CEHA impacts.

*FLOODPLAIN*

As previously discussed, the site would be constructed at approximately elevation 13, thereby complying with Local Law 33 of 1988. For flood insurance (operational) purposes, the site owner may file with FEMA for a map revision as a result of the site grading. Operation of the proposed project would not be expected to result in significant adverse impacts on floodplains.

*AQUATIC RESOURCES*

The proposed increase in landscaped, pervious areas and reduction of impervious surfaces on the project site are expected to result in a significant reduction in runoff rate and discharge into Gravesend Bay. These activities in combination with the installation of new stormwater outfalls and increased pervious surfaces on-site should result in improved water quality in Gravesend Bay and Lower New York Bay. In addition, the removal of solid waste and debris that is currently eroding along the perimeter of the project site is also expected to result in a positive environmental impact on aquatic resources in the project area. Therefore, the proposed project is not expected to result in significant adverse environmental impacts on aquatic resources during operation.

*ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES*

As noted previously, NYNHP has determined that there are no known occurrences of threatened or endangered species and there are no areas within the project area that are considered "critical habitat." USFWS has determined that shortnose sturgeon may be present within Gravesend Bay. NMFS has determined that that shortnose sturgeon may be present within the Gravesend Bay and that the project vicinity has been designated as EFH for one or more species.

The USACE, in its issuance of Nationwide Permit No. 13, has indicated that the proposed project would not result in any significant adverse impacts on listed species. In addition, the Joint Permit Application was deemed complete on July 27, 2011 following the issuance of the

Notice of Completion of the CEQR DEIS by CPC on March 11, 2011, and the NYSDEC review process is underway in accordance with 6NYCRR Part 621.7.~~the NYSDEC has completed its technical review of the Joint Permit Application and has no further comments. It is expected to approve the Joint Permit Application upon DCP certification of this DEIS.~~

Therefore no significant adverse impacts would be expected on endangered, threatened and special concern species within the project area during operation of the proposed project.

*EROSION AND STORMWATER MANAGEMENT*

The operation of this project is expected to provide improved erosion and stormwater management conditions.

The proposed project would replace an eroding berm with a stable slope of engineered riprap and stabilized plantings at the top of the berm. The result is the beneficial environmental effect of a reduction of erosion into the Gravesend Bay. The permanent operation of maintaining a vegetated and stabilized waterfront esplanade will greatly reduce the potential for erosion compared to the existing condition.

The proposed project would install stormwater management system where there currently is none. The proposed project would significantly improve the quality of stormwater discharged from the site, with the permanent installation and operation of a collection and conveyance system, two new outfalls, and stormwater quality treatment devices.

The erosion control and stormwater management systems are described in further detail in construction impact section above, as well as in Chapter 8, "Water and Sewer Infrastructure."

Further, the proposed project would also result in a 17.3 percent reduction in impervious coverage within the TWAA from 57.9 percent to 40.6 percent. Based on the improvements described above, the operation of the proposed project would significantly reduce erosion, improve the quality and reduce the quantity of stormwater runoff on-site. Therefore, the proposed project is not expected to result in significant adverse erosion and stormwater management impacts during operation.

*SUSTAINABLE DESIGN COMPONENTS*

The proposed project will incorporate a 7,600-square-foot "green wall" on the proposed building to be located just outside of the NYSDEC TWAA. The green wall would be designed to protect the building structure by lessening temperature fluctuations and exposure to ultra-violet rays; thereby reducing cracking and increasing durability. These systems encourage additional evapo-transpiration and have been shown to reduce ambient temperature and reduce the "heat island effect" of asphalt or concrete surfaces. The shore public walkway and adjacent green pervious spaces are expected to provide public access and passive recreational opportunities not currently available on the project site. In addition, these green areas will be engineered with interconnecting swales and landscaped to reduce stormwater runoff rate while at the same time creating a potential habitat for shore species.

## G. MEASURES TO MINIMIZE IMPACTS

The proposed project would result in significantly improved environmental conditions and quality, public use, and commercial use of the project site. The proposed project includes a number of mitigation measures that are expected to reduce environmental impacts on-site and

improve conditions in Gravesend Bay. These measures, which are described in detail in this chapter, are summarized below.

- Removal of the mixed-fill and solid waste berm, and restoration and stabilization of the eroding slope and shoreline;
- A reduction of existing impervious surface area and stormwater runoff velocities;
- Installation of two new stormwater outfalls and various water treatment devices that will improve stormwater control, biofiltration and quality of post-construction stormwater entering Gravesend Bay;
- Installation of BMPs and SWPPP that will mitigate soil erosion and sediment in stormwater during construction;
- Creation of new open space, including a shore public walkway with native and salt-resistant plants that will provide habitat for species on the project site; and
- Green walls on the proposed structures facing the shoreline, and engineered "rain gardens" located throughout the project site.

With the implementation of these measures, the proposed project would not result in any significant adverse impacts on natural resources. ✷