CHAPTER 9: NATURAL RESOURCES

A. INTRODUCTION

This chapter examines the potential impacts of the Proposed Actions on terrestrial and aquatic natural resources and floodplains. The *CEQR Technical Manual* defines a natural resource as the City's biodiversity (plants, wildlife and other organisms); any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability. Such resources include groundwater, soils, and geologic features; numerous types of natural and human-created aquatic and terrestrial habitats (including wetlands, dunes, beaches, grasslands, woodlands, landscaped areas, gardens, parks, and built structures); as well as any areas used by wildlife. In accordance with the *CEQR Technical Manual*, this chapter describes:

- The regulatory programs that encompass groundwater, floodplains, wildlife, threatened or endangered species, aquatic resources, and/or other natural resources within the Project Area;
- The existing groundwater, floodplains, and natural resources within the Project Area and Study Area, as defined in Section D, as well as water quality, aquatic and terrestrial biota, and threatened or endangered species and species of special concern;
- The groundwater, floodplains, water quality, and natural resources conditions in the Future Without the Proposed Actions (the No-Action Condition); and
- The potential effects of the (Proposed Actions on the groundwater, floodplains, water quality, and natural resources (the With-Action Condition).

B. PRINCIPAL CONCLUSIONS

Based on the preliminary assessment presented in this chapter, the Proposed Actions would not result in significant adverse impacts to groundwater, floodplains, water quality, aquatic biota, wetlands, terrestrial natural resources, or threatened or endangered species within or near the Study Area. The Study Area comprises a predominantly urbanized area of Staten Island that contains limited natural resources. However, wooded corridors and occasional vacant wooded lots are found in some areas along the Staten Island Railroad (SIR) tracks, Tappen Park on Bay Street, Tompkinsville Park on Victory Boulevard, and along the west side of Canal Street. In addition, the Stapleton waterfront includes tidal wetlands. All of these areas could provide habitat for aquatic and/or terrestrial organisms, including, but not limited to, birds, small mammals, fish, and native plants. Wildlife that occupies land within the Study Area would be expected either to remain after future development or to move to adjacent similar habitats. The Proposed Actions are not anticipated to result in any significant adverse impacts to natural resources, and would not diminish the Upper New York Bay area's current ability to provide critical ecological functions and values or recreational and scenic resource values.

C. SUMMARY OF PREVIOUS FINDINGS

2006 NEW STAPLETON WATERFRONT DEVELOPMENT PLAN FEIS

The *2006 New Stapleton Waterfront Development Plan Final Environmental Impact Statement (FEIS)* and subsequent technical memorandum analyzed the potential for significant adverse impacts on natural resources resulting from the New Stapleton Waterfront Development Plan. The 2006 FEIS and a subsequent technical memorandum concluded that the proposed development plan would not result in any significant adverse impacts on natural resources.

D. METHODOLOGY

STUDY AREA

According to the *CEQR Technical Manual,* the study area should include the project area and resources (including surrounding adjacent areas with land use descriptions, as applicable) that may be directly or indirectly affected by activities on the project site. The Project Area comprises the Bay Street Corridor Project Area, Canal Street Corridor Project Area, Stapleton Waterfront Phase III Sites, and the City Disposition Sites. In addition, natural resources were evaluated for a distance of 500 feet from the Project Area (the "Study Area").

FIELD VISITS

Field visits were conducted in September 2016 to assess the general land use and existing vegetation throughout the Study Area.

EXISTING CONDITIONS

Existing conditions within the Study Area were summarized from:

- Existing information identified in literature and obtained from governmental and nongovernmental sources, such as the New York City Department of Environmental Protection (DEP) Harbor Water Quality Survey data; New York Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper (ERM); U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, and Information, Planning, and Conservation System (IPaC) list of federal threatened and endangered species for New York, Queens, Bronx, and Kings Counties; and Federal Emergency Management Agency (FEMA) Revised Preliminary Flood Insurance Rate Maps (FIRMs);
- Consultation with the National Marine Fisheries Service (NMFS) and New York Natural Heritage Program (NYNHP) for information on rare, threatened, or endangered species in the Study Area;
- *New Stapleton Waterfront Development Plan FEIS*, 2006; and
- Observations made during field visits conducted in September 2016.

FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

The assessment of the No-Action Condition considered regional changes that are anticipated to occur as a result of as-of-right development scenarios that would likely occur independent of the Proposed Action.

FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

The potential impacts of the Proposed Actions on natural resources were evaluated by considering:

- Potential temporary impacts to water quality from discharge of stormwater during upland construction and operation phases;
- Potential direct impacts to vegetation, ecological communities, and terrestrial wildlife due to land-disturbing construction activities in the Project Area and Study Area; and
- Potential temporary impacts to fish from potential future in-water activities on the Stapleton Waterfront Phase III Sites.

E. REGULATORY CONTEXT

The following sections identify federal and state legislation and regulatory programs that pertain to coastal areas, surface waters, floodplains, wetlands, and protected species, and would apply to the Proposed Action.

FEDERAL

CLEAN WATER ACT (33 USC §§ 1251 - 1387)

The objective of the Clean Water Act, also known as the Federal Water Pollution Control Act, is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. It regulates point sources of water pollution, such as discharges of municipal sewage, industrial wastewater, and stormwater runoff; the discharge of dredged or fill material into navigable waters and other waters; and non-point source pollution (*e.g.,* runoff from streets, construction sites, etc.) that enter water bodies from sources other than the end of a pipe. Applicants for discharges to navigable waters in New York must obtain a Water Quality Certificate from the NYSDEC.

RIVERS AND HARBORS ACT OF 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the U.S. Army Corps of Engineers (USACE), for the construction of any structure in or over any navigable water 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. Any structures placed in or over navigable waters, such as pilings, piers, or bridge abutments up to the mean high water line, are regulated pursuant to this Act.

MAGNUSON-STEVENS ACT (16 USC §§ 1801 TO 1883)

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 Habitats (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.[1] Adverse impacts on EFHs, as defined in 50 CFR 600.910(A), include any impact that reduces the quality and/or quantity of EFHs. Adverse impacts may include:

- Direct impacts, such as physical disruption or the release of contaminants;
- Indirect impacts, such as the loss of prey or reduction in the fecundity (number of offspring produced) of a managed species; and
- Site-specific or habitat-wide impacts that may include individual, cumulative, or synergetic consequences of a federal action.

ENDANGERED SPECIES ACT OF 1973 (16 USC §§ 1531 TO 1544)

The Endangered Species Act of 1973 recognizes 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 provides for the protection of critical habitats on which endangered or threatened species depend for survival. The Act also prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, and interstate or foreign commercial activities. Species protected under the Act have the potential to occur in the Study Area.

STATE

TIDAL WETLANDS ACT (ENVIRONMENTAL CONSERVATION LAW, ARTICLE 25) Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis. In New York, tidal wetlands occur along the tidal waters of the Hudson River up to the salt line and along the saltwater shore, bays, inlets, canals, and estuaries of Long Island, New York City, and Westchester County. NYSDEC administers the tidal wetlands regulatory program and the mapping of the state's tidal wetlands. A permit is required for activities that would alter NYSDEC mapped wetlands or tidal wetland adjacent area. NYSDEC regulated wetlands are mapped along the shoreline in the area of the Study Area.

WATER RESOURCES LAW (ENVIRONMENTAL CONSERVATION LAW ARTICLE 1;, TITLE 5, PROTECTION OF WATERS)

NYSDEC is responsible for administering the Protection of Waters Act and regulations to govern activities on surface waters (*i.e.,* rivers, streams, lakes, and ponds). The Protection of Waters Permit Program regulates five different categories of activities: (i) disturbance of stream beds or banks of a protected stream or other watercourse; (ii) construction, reconstruction, or repair of dams and

[1] (16 USC §1802(10))

other impoundment structures; (iii) construction, reconstruction, or expansion of docking and mooring facilities; (iv) excavation or placement of fill in navigable waters and their adjacent and contiguous wetlands; and (v) 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 Clean Water Act.

F. EXISTING CONDITIONS

For the purpose of the natural resources assessment, the Study Area is defined as the Project Area and the area contained within a 500-foot buffer around the Project Area (Figure 9-1). The affected area within the Tompkinsville and Stapleton neighborhoods along Bay Street is generally bounded by Victory Boulevard to the north, the SIR tracks to the east, Sands Street to the south and Van Duzer Street to the west. The affected area in the Stapleton neighborhood along Canal Street is generally bounded by Tappan Park to the north, Wright Street to the east, Broad Street to the south, and Cedar Street to the west. The Study Area is densely developed with buildings, roads, rail lines, parking lots, and limited open space resources and vegetated communities.

GROUNDWATER

Groundwater is water contained beneath the surface in various types of soils, fill, and rock. Groundwater systems are referred to as aquifers, which provide a number of benefits including (i) as a source of potable drinking water; (ii) a source of water re-charge for freshwater streams and rivers, sustaining the hydrology of many wetlands; (iii) to serve critical geotechnical functions related to structural load bearing capacity (lowering the water table may cause subsidence); and (iv) as a barrier to salt water intrusion.

All five boroughs contain groundwater; however, the major resources in the City lie beneath Brooklyn, Queens, and Staten Island. The major aquifers in the City include the Raritan formation beneath Staten Island, southeastern Brooklyn, and the eastern half of Queens; the Lloyd and Magothy aquifers beneath southern and central Brooklyn, eastern Queens, and Staten Island; and the Jameco aquifer beneath limited areas of Brooklyn and southern Queens.

According to the USGS Richmond County Soil Survey, groundwater in the vicinity of the Study Area would generally be expected to occur greater than 200 centimeters (6.6 feet) below ground surface. Groundwater in Staten Island is not used as a source of potable water (the municipal water supply relies on upstate reservoirs).



FIGURE 9-1: USGS MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

- Bay Street Corridor Project Area
- Canal Street Corridor Project Area
- City Disposition Sites
- Stapleton Waterfront Phase III Sites
- Study Area (500-foot radius)

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: U.S. Geological Survey. Prepared by Langan

SURFACE WATER

The nearest open waterbody in proximity to the Study Area is the Upper New York Bay, specifically, the Narrows, which connects the Upper New York Bay with the Lower New York Bay (Figure 9-2). The Upper New York Bay is a tidal open waterbody with an average predicted tidal range of 4.8 feet based on data collected at the Fort Wadsworth Station [Station Id: 8519024]. The salinity of the Upper Bay varies daily with the tidal cycle and seasonally with the volume of freshwater entering from the Hudson River. The Upper New York Bay is partially stratified—higher salinity water toward the bottom and freshwater toward the top.[2] It tends to be well-mixed during low flow conditions and more stratified under high flow conditions when the freshwater overrides the saltwater layer.[3] As shown in, no other surface waters have been mapped on site.

WATER QUALITY

The water quality of the Upper New York Bay is strongly affected by human activity and the densely populated and industrialized land uses that surround it. Historically, water quality problems included low dissolved oxygen (DO) content, high nutrient concentrations, algal blooms, excessive numbers of coliform bacteria, and the presence of floatables.

Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 703 includes surface water standards for each use class of New York surface waters. The Upper New York Bay is classified by the NYSDEC as a Class I water, which have the best usage as secondary contact recreation including fishing and boating.

The results of Harbor Surveys conducted by NYCDEP show that the water quality of the New York Harbor, including the Upper New York Bay, has improved significantly since the 1970s as a result of measures undertaken by the City (*e.g.,* infrastructure improvement such as major improvements to wastewater treatment plants (WWTP) and increased capture of stormwater runoff) and others.[4]

SEDIMENT QUALITY

Sediment quality is an important component of aquatic ecosystems; it can influence the quality of overlying waters and also supports the benthic community. Contamination of sediment within the New York Upper Bay has a substantial impact on aquatic resources. Sediments in the middle of the New York Upper Bay generally have contaminant concentrations below the median compared to waters within the greater Hudson-Raritan estuary. Nevertheless, the concentrations of various containments including dichloro-diphenyl-trichloroethane (DDT), polychlorinated biphenyl (PCB),

[2] U.S. Army Corps of Engineers (USACE). 1999a. New York and New Jersey Harbor Navigation Study. Draft Environmental Impact Statement.
[3] Moran, M.A. and K.E. Limburg. 1986. The Hudson River Ecosystem. In The Hudson River Ecosystem, Limburg, K.E., M.A. Moran, and W.H. McDowell. Springer-Verlag, New York, NY. pp. 6-40.
[4] New York City Department of Environmental Protection (NYCDEP). 2010a. http://www.nyc.gov/html/dep/html/harborwater/index.shtml (accessed August 25, 2016); New York City Department of Environmental Protection (NYCDEP). 2010b. New York Harbor Water Quality Survey Report for 2009; New York City Department of Environmental Protection (NYCDEP). 2010c. 2005-2009 New York Harbor Water Quality Report data in electronic format. New York, NY.



FIGURE 9-2: SURFACE WATERS MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: NY State Dept. of Environmental Conservation
Prepared by Langan

and dioxin and furan likely exist in areas with restricted water circulation, such as interpier basins and modified tidal creeks. While most major sources of these contaminants have been eliminated, or significantly reduced, contaminants associated with stormwater runoff, combined sewer overflow discharges, and nutrients associated with eroding soils continue to impact sediment quality. [5]

AQUATIC BIOTA

The New York/New Jersey Harbor Estuary, which includes the Upper New York Bay, supports a diverse aquatic community of over 100 species of finfish and invertebrate species and a variety of phytoplankton and zooplankton. The following sections provide a general discussion of the aquatic biota found in the New York/New Jersey Harbor Estuary.

PRIMARY PRODUCERS

Phytoplankton

Phytoplankton are microscopic plants whose movements within the system are largely governed by prevailing tides and currents. Light penetration, turbidity, and nutrient concentrations are important factors in determining phytoplankton productivity and biomass. Diatoms such as *Skeletonema costatum* and *Thalassiosira spp.* generally dominate the phytoplankton community, with lesser contributions from dinoflagellates and green algae.[6] While nutrient concentrations in most areas of New York/New Jersey Harbor Estuary are very high, low light penetration has often precluded the occurrence of phytoplankton blooms.

Submerged Aquatic Vegetation and Benthic Macroalgae

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. Light penetration, turbidity and nutrient concentrations are all important factors in determining SAV and benthic algae productivity and biomass. Due to the limited light penetration observed in the Upper Harbor, as indicated by the low secchi transparency reported by the NYCDEP Harbor Surveys, as well as the extensive development of the shorelines and swift currents, the SAV habitat is limited within the New York/New Jersey Harbor Estuary.

ZOOPLANKTON

Zooplankton are an integral component of aquatic food webs; 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.

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[5] U.S. Army Corps of Engineers (USACE) and Port Authority of New York and New Jersey (PANYNJ). 2016. Hudson-Raritan Estuary Comprehensive Restoration Plan. Prepared for the New York-New Jersey Harbor and Estuary Program. June 2016.

[6] Brosnan, T.M. and M.L. O'Shea. 1995. *New York Harbor Water Quality Survey, 1994*. Marine Sciences Section, Bureau of Clean Water, NYC DEP, NTS No. PB97-100176.

BENTHIC INVERTEBRATES

Invertebrate organisms that inhabit estuary bottom sediments 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 carbon (or living material); they are also integral components of the diets of ecologically and commercially important fish and waterfowl species. Benthic invertebrates are essential in promoting the exchange of nutrients between the sediment and water column. Substrate type (rocks, pilings, sediment grain size, etc.), salinity, and DO levels are the primary factors influencing benthic invertebrate communities; secondary factors include currents, wave action, predation, succession, and disturbance.

FISH

New York City, including Staten Island, is at the convergence of several major river systems, all of which connect to the New York Bight portion of the Atlantic Ocean. This convergence has resulted in a mixture of habitats in the New York/New Jersey Harbor Estuary that support marine fish, estuarine fish, anadromous fish (fish that migrate up rivers from the sea to breed in freshwater), and catadromous fish (fish that live in freshwater but migrate to marine waters to breed). Table 9-1 lists fish species known to occur within the New York/New Jersey Harbor Estuary and have the potential to occur in the vicinity of the Study Area.

Table 9-1: Finfish Species with the Potential to Occur in the Vicinity of Study Area

Common Name	Scientific Name
Alewife	*Alosa pseudoharengus*
American eel	*Anguilla rostrata*
American sand lance	*Ammodytes hexapterus*
American shad	*Alosa sapidissima*
Atlantic cod	*Gadus morhua*
Atlantic croaker	*Micropogonias undulatus*
Atlantic herring	*Clupea harengus*
Atlantic mackerel	*Scomber scombrus*
Atlantic menhaden	*Brevoortia tyrannus*
Atlantic moonfish	*Selene setapinnis*
Atlantic needlefish	*Strongylura marina*
Atlantic silverside	*Menidia menidia*
Atlantic sturgeon	*Acipenser oxyrhynchus*
Banded killifish	*Fundulus diaphanous*
Bay anchovy	*Anchoa mitchilli*
Black sea bass	*Centropristis striata*
Blackfish	*Tautoga onitis*
Blueback herring	*Alosa aestivalis*
Bluefish	*Pomatomus saltatrix*
Butterfish	*Peprilus triacanthus*
Clearnose skate	*Raja eglanteria*
Conger eel	*Conger oceanicus*
Crevalle jack	*Caranx hippos*
Cunner	*Tautogolabrus adspersus*
Fawn cusk eel	*Lepophidium cervinum*
Feather blenny	*Hypsoblennius hentzi*
Fourbeard rockling	*Enchelypus cimbrius*

Table 9-1 (cont.): Finfish Species with the Potential to Occur in the Vicinity of Study Area

Four-spot flounder	*Paralichthys oblongus*
Gizzard shad	*Dorosoma cepedianum*
Goosefish	*Lophius americanus*
Grey snapper	*Lutjanus griseus*
Grubby	*Myoxocephalus aenaeus*
Hickory shad	*Alosa mediocris*
Hogchoker	*Trinectes maculatus*
Inshore lizardfish	*Synodus foetens*
Lined seahorse	*Hippocampus erectus*
Little skate	*Raja erinacea*
Longhorn sculpin	*Myoxocephalus octodecimspinosus*
Lookdown	*Selene vomer*
Mummichog	*Fundulus heteroclitus*
Naked goby	*Gobiosoma bosci*
Northern kingfish	*Menticirrhus saxatilis*
Northern pipefish	*Syngnathus fuscus*
Northern puffer	*Sphoeroides maculatus*
Northern searobin	*Prionotus carolinus*
Oyster toadfish	*Opsanus tau*
Planehead filefish	*Monacanthus hispidus*
Pollock	*Pollachius virens*
Rainbow smelt	*Osmerus mordax*
Red hake	*Urophycis chuss*
Rock gunnel	*Pholis gunnellus*
Rough scad	*Trachurus lathami*
Scup	*Stenotomus chrysops*
Seaboard goby	*Gobiosoma ginsburgi*
Short bigeye	*Pristigenys alta*
Silver hake	*Merluccius bilinearis*
Silver perch	*Bairdiella chrysoura*
Smallmouth flounder	*Etropus microstomus*
Spot	*Leiostomus xanthurus*
Spotfin butterflyfish	*Chaetodon ocellatus*
Spotted hake	*Urophycis regia*
Striped bass	*Morone saxatilis*
Striped cuskeel	*Ophidion marginatum*
Striped killifish	*Fundulus majalis*
Striped mullet	*Mugil cephalus*
Striped searobin	*Prionotus evolans*
Summer flounder	*Paralichthys dentatus*
Tautog	*Tautoga onitis*
Threespine stickleback	*Gasterosteus aculeatus*
Tomcod	*Microgadus tomcod*
Weakfish	*Cynoscion regalis*
White hake	*Urophycis tenuis*
White mullet	*Mugil curema*
White perch	*Morone americana*
Windowpane	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
Yellowtail flounder	*Limanda ferruginea*
Source(s): Able and Studholme 1993, Woodhead 1990, AKRF 1998, LMS 2003a and 2003b	

ESSENTIAL FISH HABITAT (EFH)

Essential fish habitats (EFHs) are waters and substrates necessary to fish species for spawning, breeding, feeding or growing to maturity. Based on data provided from the NMFS EFH Mapper program, there are a number of fish species with EFHs located within proximity to the Study Area. Table 9-2 lists the species and life stages of fish identified as having EFHs in the portion of the Upper New York Bay near the Study Area.

Table 9-2: Essential Fish Habitat (EFH) Designated Species in the Vicinity of Study Area

Common Name	Scientific Name	Life Stage			
		Eggs	Larvae	Juvenile	Adult
Window pane flounder	*Scophthalmus aquosus*	X	X	X	X
Winter flounder	*Pseudopleuronectes americanus*	X	X	X	X
Sandbar shark	*Charcharinus plumbeus*			X	X
Red hake	*Urophycis chuss*			X	X
Bluefin tuna	*Thunnus thynnus*			X	
Smooth dogfish	*Mustelus canis*	X(1)	X(1)	X	X
Longfin inshore squid	*Loligo pealeii*	X			
Summer flounder	*Paralicthys dentatus*		X	X	X

Note(s): (1) Neither of these species has a free-swimming larval stage; rather they are live bearers that give birth to fully formed juveniles. For the purposes of this table, "larvae" for sand tiger and sandbar sharks refers to neonates and early juveniles.
Source: National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" posted on the Internet at http://www.nero.noaa.gov/hcd/STATES4/new_jersey/40407400.html and http://www.nero.noaa.gov/hcd/skateefhmaps.htm National Marine Fisheries Service EFH Mapper accessed online at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html.

COASTAL RESOURCES

The New York State Department of State (NYSDOS) Division of Coastal Resources delineates the State's coastal zone boundary and identifies Significant Coastal Fish and Wildlife Habitats, Scenic Areas of Statewide Significance, Federally owned lands, and Native American owned lands. New York State's Coastal Area has been divided into four geographic regions: Long Island, New York City, Hudson Valley and Great Lakes. Given that portions of the Study Area are within New York City's designated Coastal Zone, it is subject to a consistency review with respect to the New York City Waterfront Revitalization Program (WRP) (Chapter 2, "Land Use, Zoning and Public Policy"). The Upper New York Bay waters within the Study Area are not designated as a Significant Coastal Fish and Wildlife Habitat. According to the NYSDEC Costal Erosion Hazard Area Map for Staten Island, Sheet I4, the Study Area is neither located within, nor does it border, the Coastal Erosion Hazard Area.

WETLANDS

Based on the September 2016 field survey, no freshwater wetlands were identified within the boundaries of the Study Area. The open waters of the Upper New York Bay within the Study Area are tidally influenced and are mapped by NYSDEC as Tidal Wetlands (Littoral Zone) (Figure 9-3). The boundary of this wetland would be the mean high water elevation adjacent to the Stapleton

Waterfront Phase III Sites A and B1. The mean high tide line represents the landward extent of tidal open water.

NYSDEC has jurisdiction over construction and dredge and fill activity in tidal wetlands, as well as Tidal Wetland Adjacent Areas, which may extend landward of the tidal wetlands boundary. USACE also has Jurisdiction of Waters of the United States, including navigable waters such as the Upper New York Bay. The National Wetland Inventory database maps the open waters as estuarine and marine deepwater (Figure 9-4); as such, prior authorization for dredge and fill activities in these waters is required.

FLOODPLAINS

Floodplains occur along streams, rivers and coastal zones. Officially-designated floodplains and floodways, established and delineated by FEMA, are areas where substantial flooding may result in property damage or threaten public safety. A FEMA-designated floodplain is the area that would be inundated by a 100-year flood (a flood that has the probability of occurring once every 100 years); this is referred to as Zone A. Zone B is the area that would be inundated by a flood that has the probability of occurring once every 500 years.

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 designate coastal high hazard areas and floodways and make Federal flood insurance available to buildings and structures within these areas that are constructed so as to minimize danger to human lives. FEMA regulates only the 100-year floodplain for channels that have a watershed (area that drains to them) greater than one square mile. Properties located in smaller watersheds are not part of the FEMA mapping program.

The Stapleton Waterfront Phase III Sites and the southern portion of the Bay Street Corridor Project Area are located within flood Zone AE; portions of the Stapleton Waterfront Phase III Subarea are located within the limit of moderate wave action, as delineated by FEMA (Figure 9-5). The FEMA-designated floodplain boundaries are approximations. The elevation used to determine 100-year floodplain boundaries for portions of the Study Area within Zone AE ranges between 10 and 12 feet.[7]

GEOLOGY

SURFICIAL GEOLOGY AND BEDROCK

Surficial geology consists of the loose sedimentary materials that overlie bedrock, which is found near the Earth's surface. The northeastern portion of Staten Island is located in the Atlantic Coastal Plain physiographic province. Thick layers of soft, organic, silty clays overlie glacial and interglacial deposits. These glacial and interglacial deposits, consisting of unconsolidated Cretaceous clay, overlie Precambrian crystalline basement rocks.

[7] NAVD88.



FIGURE 9-3: NYSDEC TIDAL WETLANDS MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: NY State Dept. of Environmental Conservation
Prepared by Langan

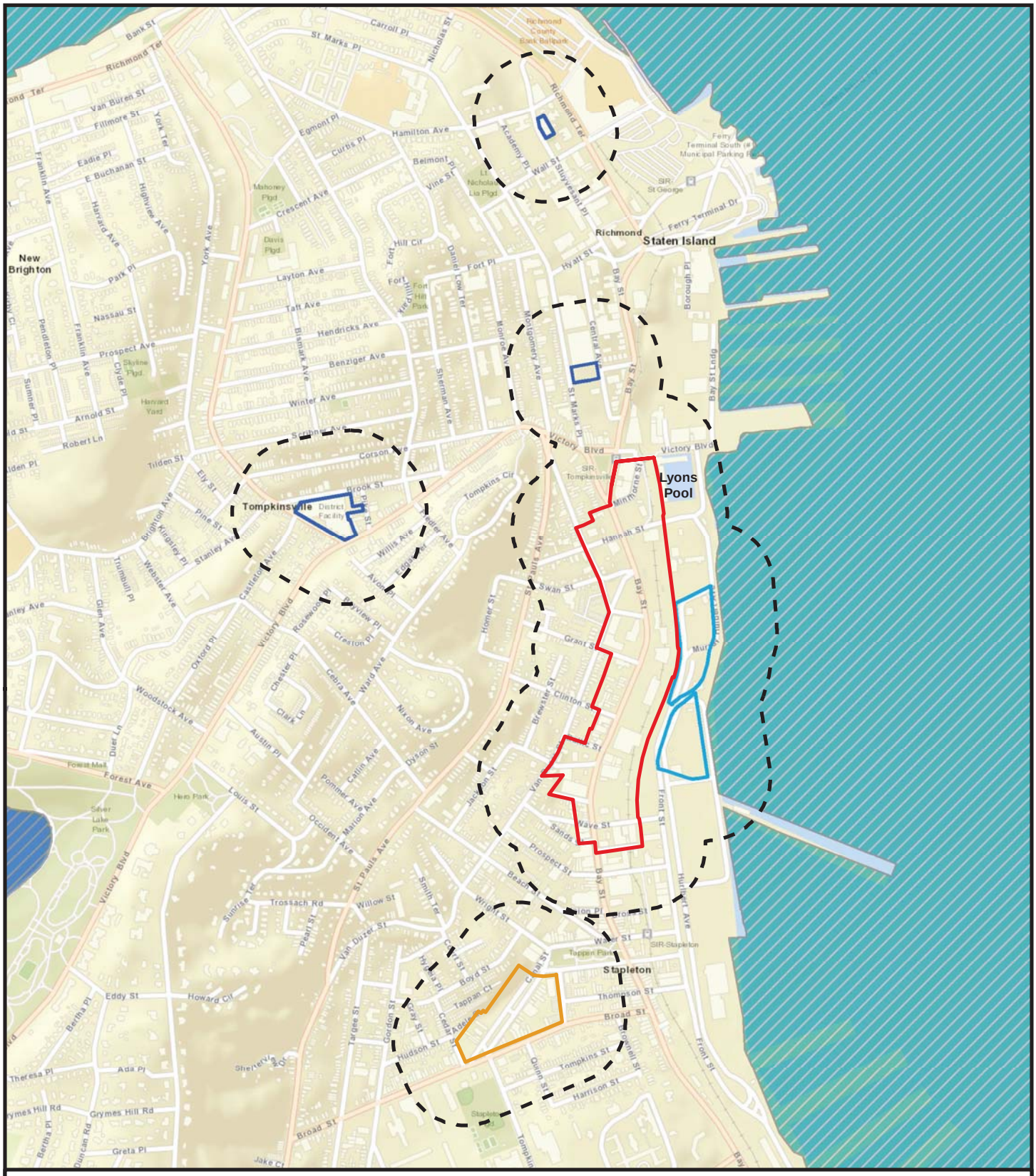

FIGURE 9-4: NATIONAL WETLANDS INVENTORY MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: U.S. Fish and Wildlife Service
Prepared by Langan

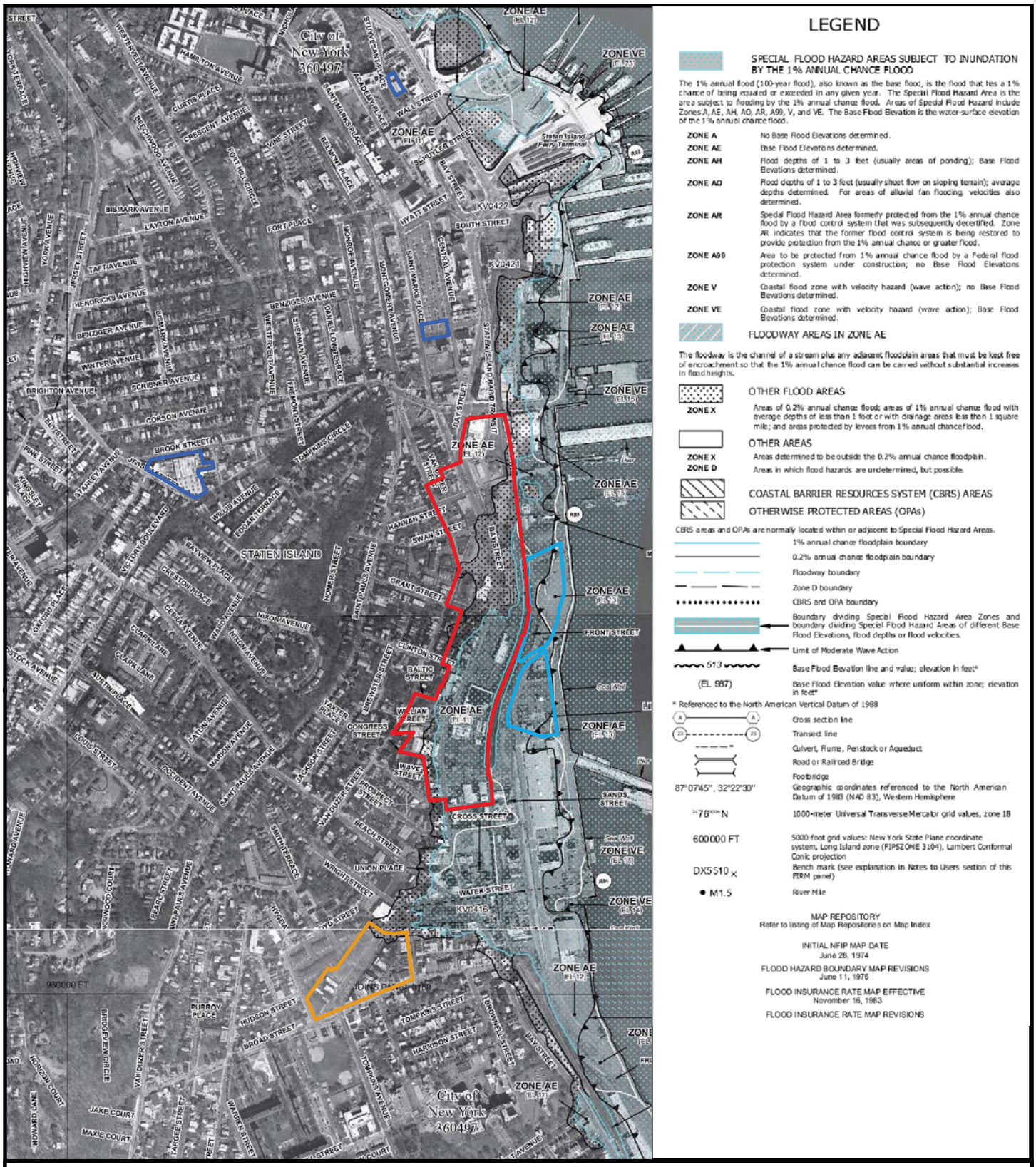

FIGURE 9-5: FEMA MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTONS

STATEN ISLAND, NY

Stapleton Waterfront Phase III Sites
City Disposition Sites
Bay Street Corridor Project Area
Canal Street Corridor Project Area

Map Reference: Basemap: FEMA Flood Insurance Rate Map (FIRM) Panels 3604970189G and 3604970327G dated December 5, 2013.
Prepared by Langan

The Study Area is underlain by outwash deposits that are expected to have been reworked by wave action. The deposits are composed of particles of iron-stained quartz, brown sandstone, shale, arkose, diabase schist, granite gneiss, serpentine, biotite, and a variety of dark, heavy minerals. The outwash deposits have a known maximum thickness of about 90 feet and have been overlain by anthropomorphic (man-made) fill. To the west of the Study Area, the deposits are mainly of terminal moraine of Pleistocene age. The terminal moraine is composed largely of a reddish-brown mixture of clay and sand, with boulders and sandstone, trap-rock (diabase and basalt), granite andgneiss. The Pleistocene deposits have a known maximum thickness of 75 feet. Terminal moraine lenses of water bearing sand and gravel may contain perched water bodies. Well records indicate that outwash material is present beneath the terminal moraine. These findings suggest either partial overriding of a newly formed outwash plain by advancing glaciers during the Wisconsin stage or the presence of an earlier outwash deposit.

Based on the available bedrock data from New York State Geological Survey, the Study Area is predominantly within the Raritan Formation, with City Disposition Sites 1 and 2 and a portion of City Disposition Site 3 located in the Serpentinite Formation (Figure 9-6). The Raritan Formation is characterized as clay or mud, extremely fine-grained, and silt, fine-grained. The Serpentinite rock type is characterized as consisting almost wholly of serpentine-group minerals.

Modifications to the natural geology have occurred in modern times and include filling, grading, and the installation of bulkheads and piers.

SOILS

The Richmond County Soil Survey maps a variety of urban land soil types within the Study Area (Table 3 and Figure 9-7). The majority of soil types include:

- Urban land, till substratum, 0 to 3 percent slopes (UtA), which is a dominant soil type in the Bay Street Corridor Subarea and Canal Street Corridor Subarea.
- Urban land, till substratum, 3 to 8 percent slopes (UtB), which is the dominant soil type found throughout the Canal Street Corridor Subarea, and City Disposition Sites 1 and 2.
- Urban land, reclaimed substratum, 0 to 3 percent slopes (UrA), which is the dominant soil type in the Stapleton Waterfront Phase III Subarea.
- Urban land-Greenbelt Complex, 0 to 3 percent slopes (UGA), found in the Canal Street Corridor.
- Urban land-Greenbelt Complex, 8 to 15 percent slopes (UGC), found in the Canal Street Corridor.

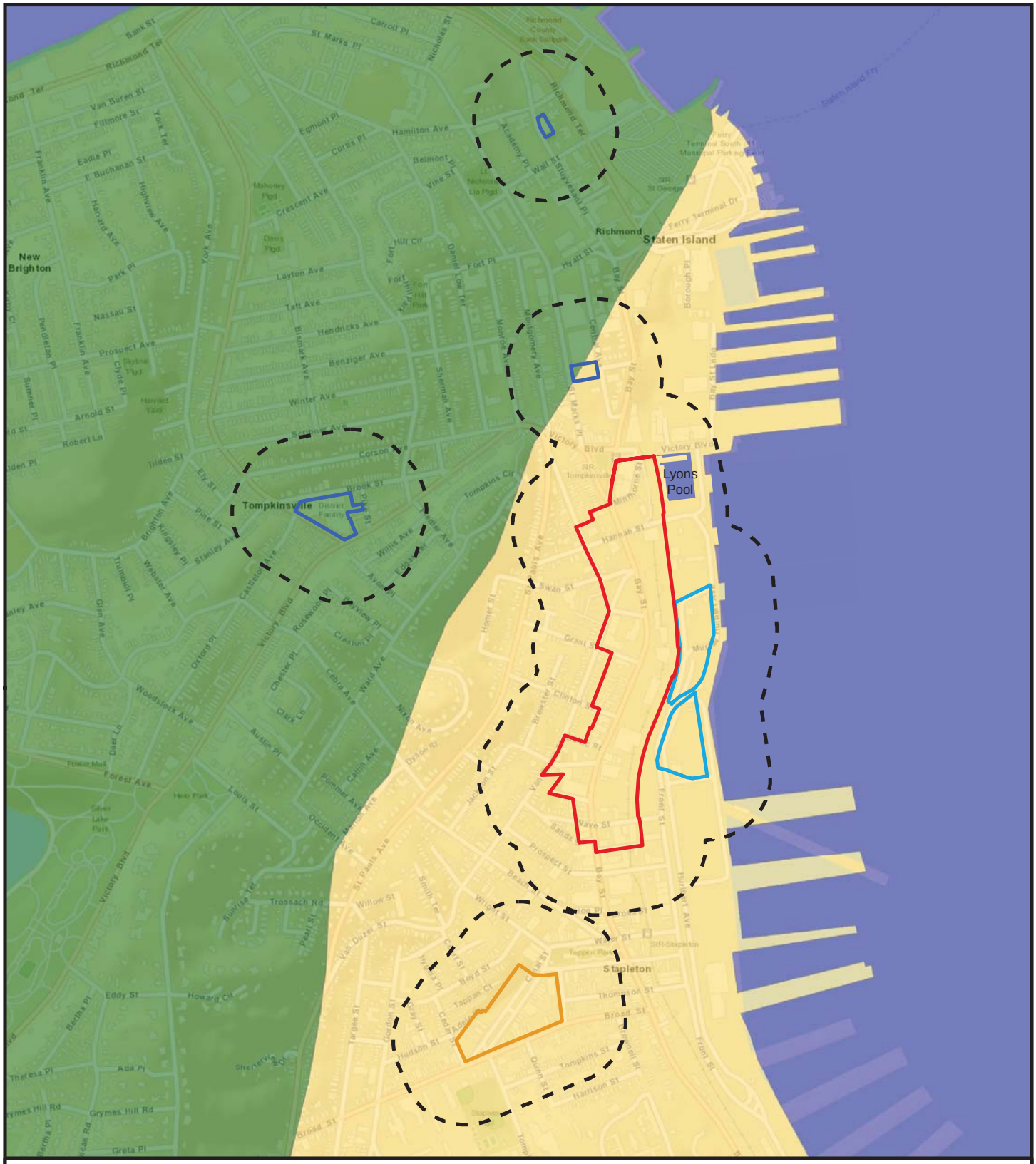

FIGURE 9-6: GEOLOGY MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: : USGS Web Mapping Service, New York State Geologic Map. Prepared by Langan

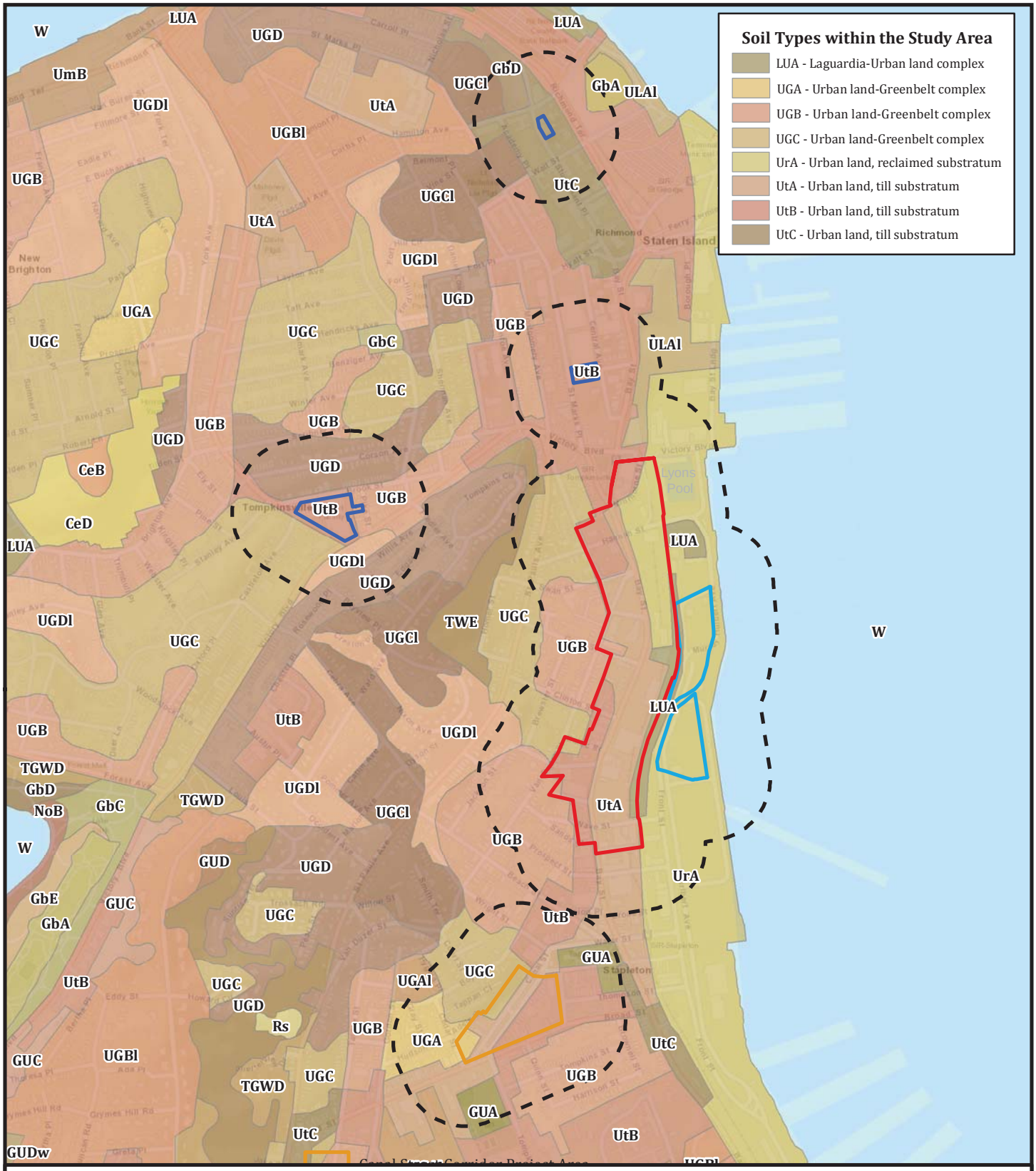

FIGURE 9-7: NRCS SOILS MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: Langan Engineering and Environmental Services. Prepared by Langan

Table 9-3: Soil Types within the Project Area

Soil Type	Soil Key	Percentage of Subarea
Bay Street Corridor Subarea		
Urban land, till substratum, 0 to 3 percent slopes	UtA	46.60%
Urban land, till substratum, 3 to 8 percent slopes	UtB	23.60%
Urban land, reclaimed substratum, 0 to 3 percent slopes	UrA	20.20%
LaGuardia-Urban land complex, 0 to 3 percent slopes	LUA	6.50%
Urban land-Greenbelt complex, 3 to 8 percent slopes	UGB	1.80%
Urban land-Greenbelt complex, 8 to 15 percent slopes	UGC	1.20%
Stapleton Waterfront Phase III Subarea		
Urban land, reclaimed substratum, 0 to 3 percent slopes	UrA	93.40%
LaGuardia-Urban land complex, 0 to 3 percent slopes	LUA	6.60%
Canal Street Corridor Subarea		
Urban land, till substratum, 3 to 8 percent slopes	UtB	41.80%
Urban land, till substratum, 0 to 3 percent slopes	UtA	36.60%
Urban land-Greenbelt complex, 8 to 15 percent slopes	UGC	13.60%
Urban land-Greenbelt complex, 0 to 3 percent slopes	UGA	7.90%
City Disposition Site 1 Primary Site (55 Stuyvesant Place, Block 9 / Lot 9)		
Urban land, till substratum, 8 to 15 percent slopes	UtC	100.00%
City Disposition Site 2 Primary Site (539 Jersey Street/100 Brook Street, Block 34, Lot 1)		
Urban land, till substratum, 3 to 8 percent slopes	UtB	95.40%
Urban land-Greenbelt complex, 3 to 8 percent slopes	UGB	4.60%
City Disposition Site 3 Primary Site (54 Central Avenue, Block 6, Lot 20)		
Urban land, till substratum, 3 to 8 percent slopes	UtB	100.00%
Source(s): *U.S. Department of Agriculture. Natural Resource Conservation Service (NRCS) Web Soil Survey GIS Database. 2016. Richmond County Soil Survey.*		

TOPOGRAPHY

The topography of land, as it relates to geology, defines the shape and features of the surface of the land, including slopes, ridges, valleys and other topographic features. The majority of the Study Area slopes generally west to east. An existing ridgeline approximately 500 feet to the west of the Bay Street Corridor Project Area and the Canal Street Corridor Project Area to the waterfront has an approximate elevation of 230 feet (Figure 9-1). Based on data obtained from the USGS, the majority of the Bay Street Corridor Subarea is located between elevation 10 and 20 feet. The Stapleton Waterfront Phase III Project Area, which is adjacent to the Upper New York Bay open water, has an approximate elevation below 10 feet. The Canal Street Corridor Project Area is between elevation 20 and 30 feet, and the three City Disposition Sites are between elevation 50 and 100 feet.

ECOLOGICAL COMMUNITIES

The extent of each vegetative community within the project sites and significant areas within the Study Area is identified on the Ecological Communities Map (Figure 9-8) along with a general description of each of the vegetative communities.[8] outlined below. A summary of the dominant species found within the Study Area is provided below in Table 9-4. Vegetative communities include:

[8] New York Natural Heritage Program Ecological Communities of New York State, Second Edition

- Park: an area of natural, semi-natural, or planted space open to the public for recreation. It may consist of grassy areas, rocks, soil, and trees, but may also contain buildings and other artifacts such as monuments, kiosks, informative signage, trails, fountains, benches, picnic tables, playground structures, or recreational fields (baseball, soccer, etc.);

- Paved road/sidewalk: a road or pathway that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface;

- Planted roadside tree: trees that are planted along roadsides, sidewalks or paths for aesthetic or ornamental purposes that may also serve as shade trees;

- Railroad: a permanent road having a line of steel rails fixed to wood ties and laid on a gravel roadbed that provides a track for cars or equipment drawn by locomotives or propelled by self-contained motors. There may be sparse vegetation rooted in the gravel substrate along regularly maintained railroads. The railroad right-of-way may be maintained by mowing or herbicide spraying. Characteristic plants include invasive weeds, such as spotted knapweed (*Centaurea stoebe* ssp. *Micranthos*), downy chees (*Bromus tectorum*), coltsfoot (*Tussilago farfara*), cypress spurge (*Euphorbia cyparissias*), sheep sorrel (*Rumex acetocella*), and crown-vetch (*Coronilla varia*);

- Successional southern hardwoods: a hardwood or mixed forest that occurs on sites that have been cleared or otherwise disturbed. Characteristic trees and shrubs include any of the following: American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), white ash (*Fraxinus americana*), red maple (*Acer rubrum*), boxelder (*Acer negundo*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), gray birch (*Betula populifolia*), hawthorns (*Crataegus* spp.), eastern red cedar (*Juniperus virginiana*), and choke-cherry (*Prunus virginiana*). Certain introduced species are commonly found in successional forests, including black locust (*Robinia pseudoacacia*), tree of heaven (*Ailanthus altissima*), and buckthorn (*Rhamnus cathartica*);

- Urban developed lot: includes accessory infrastructure located onsite as a result of development. Areas include: access drives, parking lots, parking islands, maintained lawn areas, planted shrubs or trees, or disturbed land as a result of earthwork. These areas are generally associated with an urban structure exterior (a.k.a. building) located in an urban area;

- Urban structure exterior: the exterior surfaces or metal, wood, or concrete structures, such as commercial buildings, apartment buildings, houses, bridges, or any structural surface composed of inorganic materials (glass, plastics, etc.) in an urban or densely populated suburban area. These sites may be sparsely vegetated with lichens, mosses, and terrestrial algae; occasionally vascular plants may grow in cracks; and

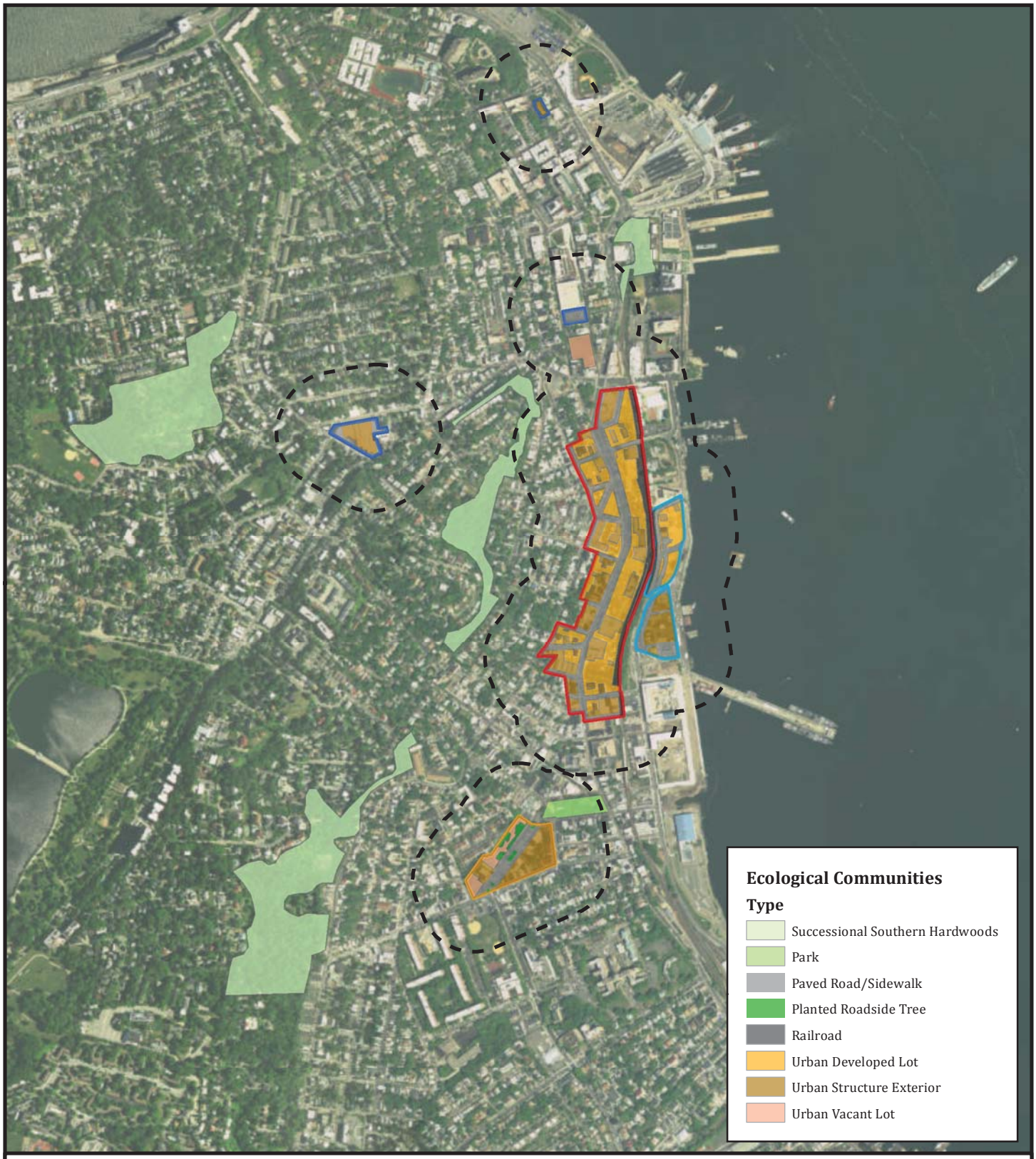

FIGURE 9-8: ECOLOGICAL COMMUNITIES MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: Langan field visits, September 2016
Prepared by Langan

- Urban vacant lot: an open site in a developed, urban area that has been cleared either for construction or following the demolition of a building. Vegetation may be sparse, with large areas of exposed soil, and often with rubble or other debris. Characteristic trees are often naturalized non-native species such as Norway maple (*Acer platanoides*), white mulberry (*Morus alba*), and tree of heaven (*Ailanthus altissima*).

Table 9-4: Identified Plant Species in the Study Area

Common Name	Scientific Name
American linden	*Tilia americana*
Black cherry	*Prunus serotina*
Black locust	*Robinia pseudoacacia*
Black walnut	*Juglans nigra*
Boxelder	*Acer negundo*
Common reed	*Phragmites australis*
Common thistle	*Cirsium vulgare*
Common wormwood	*Artesmia vulgaris*
Crown vetch	*Securigera varia*
Eastern cottonwood	*Populus deltoides*
Goldenrod	*Solidago* spp.
Hedge bindweed	*Calystegia sepium*
Japanese honeysuckle	*Lonicera japonica*
Japanese knotweed	*Fallopia japonica*
London planetree	*Platanus acerifolia*
Magnolia	*Magnolia* spp.
Multi-flora rose	*Rosa multiflora*
Northern red oak	*Quercus rubra*
Norway maple	*Acer platanoides*
Poison ivy	*Toxicodendron radicans*
Ragweed	*Ambrosia artemisiifolia*
Red maple	*Acer rubrum*
River birch	*Betula nigra*
Sassafras	*Sassafras albidium*
Silver maple	*Acer saccharinum*
Spotted knapweed	*Centaurea maculosa*
Sugar maple	*Acer saccharum*
Timothy grass	*Phleum pratense*
Tree of heaven	*Ailanthus altissima*
Upland grasses	*Poaceae* spp.
Virginia creeper	*Parthenocissus quinquefolia*
White mulberry	*Morus alba*

Note(s): Plant species identified in this table were based upon a Langan field visit in September 2016 and represents the dominant species throughout the Study Area.
Source: U.S. Department of Agriculture. Natural Resource Conservation Service. 2016.The Plants Database National Plant Data Team, Greensboro, NC 27401-4901 USA.

WILDLIFE

Because the Study Area is mostly developed, the habitat available to terrestrial wildlife is extremely limited and consists primarily of manicured lawn, landscaped areas, rows or clusters of deciduous trees and overgrown areas adjacent to the railroad tracks and trees in Tappen Park, Tompkinsville

Park, and along the west side of Canal Street. Two areas west of the Study Area are mapped as successional southern hardwoods.

As described above, the Study Area, which mainly consists of existing buildings, roads and parking lots, is primarily unvegetated and covered by impervious surface. As such, wildlife habitats within the Study Area are those that would support disturbance-tolerant, generalist species common to degraded habitats within urban areas.

BIRDS

The *2000–2005 New York Breeding Bird Atlas* documented 59 species as possible, probable, or confirmed breeders in census Block 5749D (Table 9-5). Census blocks span three square miles; Block 5749D includes woodland, forest, freshwater and tidal wetlands, and other habitat types that are either not present in the Study Area or are significantly degraded (the tidal wetlands adjacent to the Stapleton Waterfront Phase III Sites). As such, many bird species documented by the Atlas within this census block might not occur in the Study Area specifically, but nonetheless might be present within the Study Area.

Table 9-5: Bird Species within the Study Area

American black duck	*Anas rubripes*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Carduelis tristis*
American goldfinch	*Spinus tristis*
American robin	*Turdus migratorius*
Baltimore oriole	*Icterus galbula*
Barn swallow	*Hirundo rustica*
Black-capped chickadee	*Poecile atricapillus*
Blue jay	*Cyanocitta cristata*
Brown thrasher	*Toxostoma rufum*
Canada goose	*Branta Canadensis*
Carolina wren	*Thryothorus ludovicianus*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerine*
Common grackle	*Quiscalus quiscula*
Common yellowthroat	*Geothlypis trichas*
Downy woodpecker	*Picoides pubescens*
Eastern kingbird	*Tyrannus tyrannus*
Eastern screech-owl	*Megascops asio*
Eastern towhee	*Pipilo erythrophthalmus*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Gadwall	*Anas strepera*
Green heron	*Butorides virescens*
Hairy woodpecker	*Picoides villosus*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferous*
Gray catbird	*Dumetella carolinensis*

Table 9-5 (cont.): Bird Species within the Study Area

Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern cardinal	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern mockingbird	*Mimus polyglottos*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock pigeon	*Columba livia*
Ruby-throated hummingbird	*Archilochus colubris*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularius*
Tree swallow	*Tachycineta bicolor*
Tufted titmouse	*Baeolophus bicolor*
Warbling vireo	*Vireo gilvus*
Willow flycatcher	*Empidonax traillii*
Yellow warbler	*Dendroica petechial*
Source(s): *2000–2005 New York Breeding Bird Atlas for Block 5749D*	

Many of the bird species that are likely to breed in the Study Area are non-migratory and expected to also occur in the Study Area during winter. Examples include house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), blue jay (*Cyanocitta cristata*), and mourning dove (*Zenaida macroura*). Other birds with the potential to occur within the terrestrial sections of the Study Area during winter include black-capped chickadee (*Poecile atricapillus*), red-bellied woodpecker (*Melanerpes carolinus*), tufted titmouse (*Baeolophus bicolor*), and American goldfinch (*Spinus tristis*), among others. Waterfowl, such as American black duck (*Anas rubripes*), and mallard (*Anas platyrhynchos*), may occur in the Arthur Kill and portions of the Upper New York Bay in late fall and throughout the winter.

Although the terrestrial habitats within the Study Area provide breeding and wintering habitats for only a limited number of bird species, they may be briefly used as stopover sites for additional species that migrate through the area during the spring and fall. Most species are more generalist in their habitat preferences during migration than during the non-migratory periods, and thus, more species are likely to occur in the Study Area during spring and fall than at other times of year. Some migratory landbirds that are common to the region and that may briefly stopover in the Study Area on occasion include the common yellowthroat (*Geothlypis trichas*) and redeyed vireo (*Vireo olivaceus*).

Birds observed during the September 2016 field survey include the mourning dove, European starling, and house sparrow.

MAMMALS

The eastern gray squirrel (*Sciurus carolinensis*) and Norway rat (*Rattus norvegicus*) are the only mammals expected to occur within the Study Area. Elsewhere in the Study Area, where there are

larger colonies of trees, raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*) and white-footed mice (*Peromyscus leucopus*) may also occur. The only mammal observed in the Study Area during the September 2016 field survey was the eastern gray squirrel.

REPTILES AND AMPHIBIANS

The Study Area lacks surface waters and other features needed to support many of the reptiles and amphibians of the region. The asphalt parking lots, small areas of manicured lawn with shade trees, and various buildings within the Study Area are not expected to satisfy the habitat requirements of any reptiles or amphibians, and no such species are expected to occur.

RARE, THREATENED AND ENDANGERED SPECIES

The IPaC system identifies the piping plover (*Charadrius melodus*; Threatened) and roseate tern (*Sterna dougalli*; Endangered) within the Study Area. The breeding population of piping plovers in New York City is limited to the Rockaway Peninsula in Queens County.[9] The Study Area lacks wide, open expanses of unvegetated beach that the piping plover uses and requires for its habitat. Therefore, piping plovers are not considered to have the potential to occur within the Study Area. Roseate terns do not nest anywhere in New York City or its neighboring counties, and any occurrence of roseate terns in the vicinity of Staten Island would be limited to rare and brief passages of birds offshore that are associated with nesting colonies elsewhere, such as eastern Long Island.[10]

None of the species documented by the 2000–2005 Breeding Bird Atlas in the census blocks in which the Study Area is located are federally- or state-listed species. No federally- or state-listed species were observed during the September 2016 field survey.

The NYSDEC Natural Heritage Program (NHP) response letter dated August 18, 2016, (Appendix J, "Agency Correspondence") identified an upland/terrestrial community, the Serpentine Barrens, which is a rare community type and globally rare. The Serpentine Barrens community is found in the Grymes Hill area of Staten Island, west of the Study Area (Figure 9-9). The NYSDEC NHP describes the community as in good condition with natural erosion processes intact, but very small and in a highly urbanized landscape.

The NYSDEC NHP response letter also listed one rare plant species, the green milkweed (*Asclepias viridiflora*; threatened), and one rare animal species, the northern cricket frog (*Acris crepitans*; endangered). Individuals of the plant species were not identified during September 2016 field survey.

[9] Fowle, M., and P. Kerlinger. 2001. New York City Audubon Society Guide to Finding Birds in the Metropolitan Area. Cornell University Press, Ithaca, NY; Boretti AA, Brear MJ, Watson HC (2007). Experimental and Numerical Study of a Hydrogen Fuelled I.C. Engine Fitted with the Hydrogen Assisted Jet Ignition System. 16th Aust. Fluid Mechanics Conference Crown Plaza, Gold Coast, Australia. pp.1142-1147.
[10] Boretti, et al, 2007; Mitra, P and Saar, S. 2008. A Technique for Characterizing the Development of Rhythms in Bird Song. PLOS One 3. doi: 10.1371.

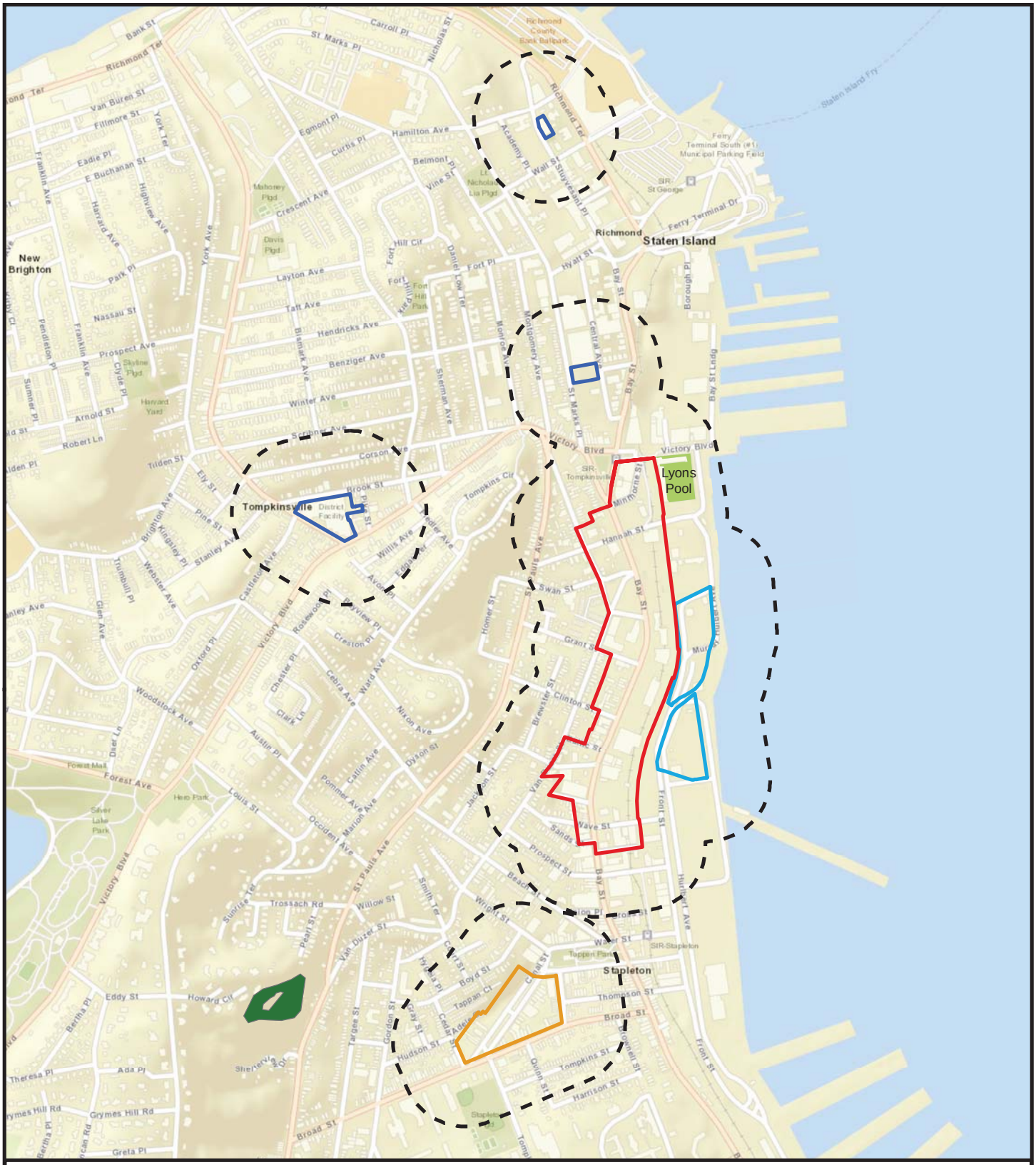

FIGURE 9-9: SIGNIFICANT NATURAL COMMUNITIES MAP
BAY STREET CORRIDOR REZONING AND RELATED ACTIONS

STATEN ISLAND, NY

Map Reference: Basemap: ESRI; Shapefile: NYSDEC Significant Natural Communities. Prepared by Langan

G. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

The No-Action Condition assumes that the land cover type and human activity would not differ significantly from existing conditions. In the No-Action Condition, the Study Area would remain densely developed with existing buildings, roads, parking lots, and limited vegetated communities. Natural resources within the Study Area would remain largely unchanged from existing conditions, as would vegetation and ecological communities. Because land cover type and the patterns and levels of human activity within the Study Area are not expected to change in the future without the Proposed Action, wildlife utilization in the Study Area would generally remain unchanged. The limited vegetated areas, street trees, and patches of landscaped areas within the Study Area would continue to support the same communities of urban-adapted, generalist wildlife such as eastern gray squirrel, Norway rat, rock dove, and house sparrow.

H. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

Under the With-Action Condition, the Proposed Action's potential effects on natural resources were evaluated by considering:

- Potential temporary impacts to water quality from discharge of stormwater during upland construction and operation phases;
- Potential direct impacts to vegetation, ecological communities, and terrestrial wildlife due to land-disturbing construction activities in the Study Area; and
- Potential temporary impacts to fish from future possible in-water activities in the Stapleton Waterfront Phase III Sites.

GROUNDWATER

The Proposed Actions would not affect groundwater resources. Because groundwater is not used as a potable water supply on Staten Island, any future development would not have the potential to affect drinking water supplies. Although some buildings could include basements that are situated below the water table, basements can be waterproofed or utilize underdrain technology in order to relieve hydrostatic pressure; therefore, permanent dewatering would not be necessary. Any temporary construction dewatering would be subject to NYCDEP and/or NYSDEC disposal regulations regarding water quality and volume; therefore, no significant adverse impacts to groundwater are anticipated.

COASTAL RESOURCES

A portion of the Study Area is in the New York City Coastal Zone; therefore, the Proposed Actions are subject to a New York City WRP consistency assessment. The Proposed Actions are also within 500-feet of a Priority Marine Activity Zone (PMAZ). As discussed in Chapter 2, "Land Use, Zoning, and Public Policy," the Proposed Actions are consistent with the policies of the WRP, which also assesses PMAZ consistency (Appendix D, "Waterfront Revitalization Program"). The Proposed Actions are not located within a designated Special Natural Waterfront Area or Significant Maritime and Industrial Area.

As documented in the *2006 New Stapleton Waterfront Development Plan FEIS*, shadows cast by the development of future buildings anticipated within the Proposed Actions would reach the waters of the Upper New York Bay. Exposure to shadows could cause a decrease in light intensity and could affect primary productivity within affected waters.[11] Primary productivity within the Study Area is generated mainly from phytoplankton. However, light requirements for phytoplankton are low, and the reduction in light within the shadow footprint would have a negligible impact on phytoplankton populations. In addition, the phytoplankton communities would be carried by tidal currents and would be exposed to the shadows for a relatively short period, moving through the area in shadow to areas outside the shadow exposure.

Shadows would enter the bay in the late afternoon when the sun is low on the horizon. At this time of day, the incident angle of sunlight on the surface is acute and a large percentage of available energy is reflected. In addition, due to the distance from the buildings to the water (likely between 100 and 150 feet), abundant diffuse light is available in the water and deep shadows are not anticipated. Shadows from the proposed buildings are not anticipated to result in significant impairment of the coastal habitat area, as discussed in a detailed assessment of the potential shadow impacts on sunlight sensitive resources, including the waters of the Study Area surrounding the Stapleton Waterfront Phase III Sites, in Chapter 7, "Shadows."

The Proposed Actions do not involve construction in the waters of the Upper New York Bay. Implementation of the Proposed Actions is not expected to result in substantial changes to the water quality of the Upper New York Bay, and it would not introduce substantial new elements within the bay waters. Future development associated with the Proposed Actions is expected to increase the amount of sanitary sewage generated; however, any increases would be relatively minor and would be directed to the sewer network and pumped to the Port Richmond WPCP for treatment. Stormwater would be conveyed, in compliance with applicable NYSDEC requirements, into the bay via existing combined sewer overflow (CSO) outlets in an area downstream of the regulating chamber to avoid additional CSO. Therefore, the Proposed Actions would not result in any significant adverse impacts to the water quality or existing uses of the Upper New York Bay.

WETLANDS

There are no freshwater or upland tidal wetlands within the Study Area; however, areas of tidal open water are located within the Study Area. It is not anticipated that the Proposed Actions would require regulatory action (*i.e.,* permits) or agency involvement from the USACE or NYSDEC.

FLOODPLAINS

The Stapleton Waterfront Phase III Sites and the southern portion of the Bay Street Corridor Project Area are located within floodplain Zone AE. As previously stated, the FEMA-designated floodplain boundaries are approximations. The elevation used to determine 100-year floodplain boundaries is between 10 and 12 feet.[12] It is anticipated that the future development would have finished floor elevations above the applicable flood hazard area elevation in order to meet insurance

[11] Chapter 7, "Shadows," *New Stapleton Waterfront Development FEIS,* 2006.
[12] NAVD88

requirements. Therefore, the Proposed Actions would not impede flood waters, or raise the elevation level of flood waters.

GEOLOGY

Future development associated with the Proposed Actions would involve some excavation for building foundations and basements. No significant natural resources are contained within the geology underlying the Study Area, and excavation is not expected to result in any significant adverse impacts to geological resources. Contaminated soil that might be encountered would be handled in compliance with applicable laws and regulations.[13]

ECOLOGICAL COMMUNITIES

The Study Area is in a predominantly urbanized area of Staten Island that contains limited natural ecological communities. Nonetheless, wooded corridors and occasional vacant vegetated lots are found in some areas, including the SIR right-of-way, Tappen Park on Bay Street, Tompkinsville Park on Victory Boulevard, and along the west side of Canal Street. Tree, plants, and other landscaping features required by applicable zoning provisions would benefit some species of wildlife such as beneficial insects and songbirds, providing them with suitable habitat and forage. Tree plantings would also result in benefit to terrestrial resources. Therefore, the Proposed Actions would not result in any significant adverse impacts to vegetation and ecological communities.

WILDLIFE

At present, only highly urban-adapted, synanthropic wildlife species (*i.e.,* those that benefit from an association with humans) occur within the Study Area. The increased human activity that would result from future development associated with the Proposed Actions would not adversely affect these disturbance-tolerant species, and for some, numbers could possibly increase. During the majority of the year, wildlife that would be expected to occur in these areas would remain limited to non-native, invasive birds such as the house sparrow. During spring and fall, common migratory songbirds would have the potential to occasionally and briefly occur in the trees present within the Study Area, and would benefit from the landscaping improvements and additional trees that would be planted with the future development of the Proposed Action. Therefore, the Proposed Actions would not result in any significant adverse impacts to wildlife.

RARE, THREATENED AND ENDANGERED SPECIES

As discussed above the Study Area lacks suitable habitat for piping plover and roseate terns and does not contain any NYSDEC significant natural communities. Therefore, the Proposed Actions would not result in any significant adverse impacts to these resources.

[13] Specifically, the following:
6 NYCRR Part 371 - Identification and Listing of Hazardous Waste
6 NYCRR Part 375 - Environmental Remediation
6 NYCRR Part 364 - Waste Transporter Permits
6 NYCRR Part 360 - Solid Waste Management Facilities
6 NYCRR Part 613 - Petroleum Bulk Storage Regulations