Chapter 9: Natural Resources

A. INTRODUCTION

This chapter examines the potential for significant impacts from the Proposed Actions on natural resources. Potential impacts are considered with regard to adverse development projected under the Reasonable Worst-Case Development Scenario (RWCDS). The *CEQR Technical Manual* defines natural resources as plants, wildlife, and other organisms; aquatic or terrestrial areas capable of providing suitable habitat; and areas capable of functioning in support of ecological systems. New York City's natural resources can include: surface and groundwater; soils, drainage systems, wetlands, dunes and beaches; grasslands, woodlands, gardens, parks, and landscaped areas; and built structures used by wildlife. Stormwater runoff may also be considered in a natural resources assessment and evaluated in the context of its impact on local ecosystem functions and on the quality of adjacent waterbodies. The chapter describes:

- The regulatory programs that protect wetlands, groundwater, floodplains, aquatic resources, wildlife, threatened or endangered species and species of special concern, and other natural resources within the study area;
- The current condition of natural resources within the study area, including wetlands, groundwater, floodplains, aquatic resources, wildlife, and threatened or endangered species and species of special concern;
- The natural resources conditions in the future with and without the Proposed Actions; and
- The measures that would be developed, as necessary, to mitigate and/or reduce any of the Proposed Action's potential significant adverse effects on natural resources.

As described in Chapter 1, "Project Description," the New York City Department of City Planning (DCP), together with the New York City Department of Housing Preservation and Development (HPD), the Department of Parks and Recreation (NYC Parks), and the Department of Citywide Administrative Services (DCAS), is proposing a series of land use actions for an approximately 81-block area of the urbanized Gowanus neighborhood. The Proposed Actions also include the establishment of a Waterfront Access Plan (WAP) for blocks adjacent to the Gowanus Canal. Developments, enlargements, and/or changes of use on the waterfront would be required to comply with waterfront zoning regulations. The WAP, in conjunction with the proposed zoning districts and Special Gowanus Mixed-Use District (GSD), would establish the location of required shore public walkways, supplemental public access areas, upland connections, and visual corridors to ensure access to the Canal from surrounding neighborhoods and to address the varied lot configurations and conditions along the Canal's edge. The WAP would modify requirements and standards for public access and modify typical dimensional and grading requirements, permitted obstructions, and design standards for public access, to allow and encourage unique design solutions that are impossible under standard waterfront public access areas (WPAA) regulations, such as flood-resilient esplanades.

The Gowanus Canal is a prominent natural resource in the Project Area. While ecologically impaired in its present state, there are several initiatives planned or underway that will substantially improve the Canal in the future.

PRINCIPAL CONCLUSIONS

The Proposed Actions would not result in a significant adverse impact to natural resources. Terrestrial ecological communities within the study area are limited to regionally common Terrestrial Cultural and Open Uplands communities, which are associated with highly developed sparsely vegetated urban areas such as paved roads, buildings, and vacant lots. The Proposed Actions would result in the removal of street trees, loss of some vegetation and temporary disturbance to urban-tolerant wildlife in the study area, but would not substantially affect natural resources. Street tree removals would be performed in compliance with local laws and regulations and required replacement and/or restitution would be provided. Wildlife found within the study area are urban-adapted generalist species that can tolerate degraded environments and high levels of human activity, and would not be significantly adversely affected by the Proposed Actions. Bioswales, stormwater greenstreets, landscaping, and open space areas included in the development would provide additional habitat within the study area.

The Proposed Actions would not result in the introduction of any new groundwater contaminants, and any development that may require dewatering would be performed in accordance with all applicable federal, state, and local regulations and guidelines. Any contaminated soils encountered during development under the Proposed Actions would be managed in accordance with regulatory requirements, thereby further improving groundwater conditions in the study area. The Proposed Actions would not affect the flood elevation and would not increase risks from flooding in the study area. The Proposed Actions are expected to involve minimal in-water construction, if any, and would have the potential to result in indirect impacts to wetlands and aquatic resources associated with water quality improvements (i.e., stormwater management). Water quality and aquatic habitat would be expected to improve over time as a result of ongoing cleanup efforts associated with the Superfund Remediation efforts, capital improvements, and improvements to stormwater and combined sewer overflow (CSO) systems in the study area.

B. METHODOLOGY

STUDY AREA AND ANALYSIS TECHNIQUES

The Project Area comprises primarily New York City streets and built lots as well as the Gowanus Canal. The area is highly developed and urban in character with limited natural resources. For this reason, the study area for terrestrial natural resources, groundwater, wetlands, and floodplains includes the Project Area and immediately adjacent areas. The study area for aquatic resources includes the entire Gowanus Canal, including turning basins. The potential for threatened, endangered, or special concern species and significant natural communities to occur was evaluated for a distance of a ½-mile from the Project Area, to account for the ability of federally and state-protected wildlife to move in and out of the Project Area. This distance is used to provide an adequate buffer around any sensitive species of concern.

Existing conditions for floodplains and natural resources within the Project Area were summarized from:

- Existing information identified in the literature and obtained from governmental and nongovernmental sources, such as the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and Information, Planning and Consultation (IPaC) system for federally threatened and endangered species (http://ecos.fws.gov/ipac); New York City Department of Environmental Protection (DEP) Harbor Water Quality Survey reports and data; New York State Breeding Bird Atlas, 2000–2005; New York State Department of Environmental Conservation (DEC) Herp Atlas Project 1990–1999; DEC Environmental Resource Mapper (http://www.dec.ny.gov/gis/erm); and Federal Emergency Management Agency (FEMA) preliminary Flood Insurance Rate Maps (FIRMs).
- Observations made during the reconnaissance investigation conducted within the study area on April 24, 2019.

REGULATORY CONTEXT

FEDERAL

Clean Water Act of 1972 (33 USC §§ 1251 - 1387)

The Clean Water Act (CWA), also known as the Federal Water Pollution Control Act, is intended to restore and maintain the chemical, physical, and biological integrity of U.S. waters. It regulates point sources of water pollution (i.e., discharges of municipal sewage, industrial wastewater, stormwater, and the discharge of dredged or fill material into navigable waters and other waters of the United States) and non-point source pollution (i.e., runoff from streets, agricultural fields, construction sites, and mining). Section 404 of the CWA requires authorization from the Secretary of Army, acting through the U.S. Army Corps of Engineers (USACE), before dredged or fill material may be discharged into waters of the United States.

Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from USACE for: the construction of any structure in 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 these waters. The purpose of this Act is to protect navigation and navigable channels.

Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 USC §§ 1801 TO 1883).

The Magnuson-Stevens Act was established to protect and restore productive fisheries and rebuild depleted stocks in the U.S. The law establishes Essential Fish Habitat (EFH) for nearly 1,000 species of fish. For each species, the EFH is the waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity. This law requires federal agencies to consult with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA-NMFS) on federal actions that may adversely affect areas designated as EFH.

Migratory Bird Treaty Act of 1918 (50 CFR 10, 20, 21, EO 13186)

The Migratory Bird Treaty Act (MBTA) of 1918 was implemented following the 1916 convention between the U.S. and Great Britain (on behalf of Canada) for the protection of birds migrating between the U.S. and Canada. Subsequent amendments implemented treaties between the U.S. and Mexico, Japan, and the former Soviet Union. The MBTA makes it unlawful to pursue, hunt, take, capture, kill or sell birds listed therein. Over 800 species are currently protected under the

Act. The statute applies equally to both live and dead birds, and grants full protection to any bird parts, including feathers, eggs, and nests.

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 prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, and interstate or foreign commercial activities. The Act also provides for the protection of critical habitats on which endangered or threatened species depend for survival.

Fish and Wildlife Coordination Act of 1980 (PL 85-624; 16 USC 661-667d)

The Fish and Wildlife Coordination Act entrusts the Secretary of the Interior with providing assistance to, and cooperation with, federal, state, and public or private agencies and organizations to ensure that wildlife conservation receives equal consideration and coordination with other water-resource development programs. These programs can include the control (such as a diversion), modification (such as channel deepening), or impoundment (dam) of a body of water.

NEW YORK STATE

Tidal Wetlands Act, Article 25, Environmental Conservation Law (ECL), Implementing Regulations 6 New York City Rules and Regulations (NYCRR) PART 661.

Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis, including along the tidal waters of the Hudson River. The regulations govern activities within mapped wetlands or a designated adjacent area.

Protection of Waters, Article 15, Title 5, ECL, Implementing Regulations 6 NYCRR PART 608

The Protection of Waters permit program regulates activities that affect surface waters (streams, lakes, and ponds) of New York State. Surface water and groundwater quality standards and effluent limitations in New York State are regulated pursuant to 6 NYCRR Parts 701 and 703. Part 701, Classifications–Surface Waters and Groundwater, assigns specific categories to New York waters. These standards establish the designated uses to be achieved and specify the water quality criteria necessary to protect surface waters.

State Pollutant Discharge Elimination System (SPDES) (ECL Article 3, Title 3; Article 15; Article 17, Titles 3, 5, 7, 8; Article 21; Article 70, Title 1; Article 71, Title 19; Implementing Regulations 6 NYCRR Articles 2, 3).

New York State has established the State Pollutant Discharge Elimination System (SPDES) program for controlling wastewater and stormwater discharges to groundwater and surface waters; the SPDES program is an authorized program under the CWA.

Removal of Trees and Protected Plants (ECL, Section 9-1503)

Section 9-1503 of the ECL states that "[n]o person shall, in any area designated by such list or lists, knowingly pick, pluck, sever, remove, damage by the application of herbicides or defoliants, or carry away without the consent of the owner thereof, any protected plant."

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 taking, import, transport, possession, or selling of any endangered or threatened species of fish or wildlife, or any hide, or other part of these species as listed in 6 NYCRR §182.6.

NEW YORK CITY

New York City Local Law 3 (NYCRR Chapter 5)

Local Law 3 of 2010 amended Section 18-107 of the Administrative Code of the City of New York and codifies the ability of the New York City Department of Parks and Recreation's (NYC Parks) to regulate the replacement of trees on or within jurisdiction of NYC Parks, which includes all trees growing in the public right-of-way and on land mapped as City parkland. The law requires permits from NYC Parks for the removal of trees within the jurisdiction of NYC Parks and requires replacement of trees that are removed. The law protects against the unauthorized removal, destruction, irreparable damage, and injury to trees under the jurisdiction of NYC Parks.

C. EXISTING CONDITIONS

The study area is urbanized and densely developed, consisting mainly of paved roads, urban structures, and vacant lots, and is intersected by the Gowanus Canal which runs through the study area in a north/south direction. Wildlife found within the study area includes species that are commonly found in urban environments and can tolerate degraded environments and high levels of human activity. Existing natural resources in the study area are discussed in the sections below.

GROUNDWATER

The study area is located within the Brooklyn-Queens Aquifer System, which is composed of the Upper Glacial, Jameco, Lloyd, and Magothy aquifers, and is designated as a Sole Source Aquifer by the U.S. Environmental Protection Agency (EPA). This aquifer system consists of deposits of unconsolidated gravel, sand, silt, and clay from the Holocene, Pleistocene, and Late Cretaceous age, and attains a total thickness of about 1,050 feet in New York City.

As discussed in Chapter 10, "Hazardous Materials," groundwater is expected to be first encountered below grade at or up to a few feet above sea level and flow generally towards the Canal and ultimately out to Gowanus Bay. The flow is likely tidally influenced, especially near the Canal. Actual local groundwater flow may be affected by bulkheads, utilities, and other factors. Groundwater in Brooklyn is not used as a source of potable water; the City's drinking water is supplied by a surface supply system made up of 19 upstate reservoirs and three controlled lakes, which along with their major tributaries are protected under the New York City Watershed Program.

Water samples from monitoring wells installed along the length of the Canal were sampled by EPA in 2010 as part of their remedial investigation (RI) report as part of the federally required Superfund cleanup. Water samples from shallow groundwater wells (i.e., 15 feet in depth) were found to have concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals that exceeded screening values (i.e., state and federal standards) (EPA 2011). Water samples from intermediate groundwater wells (i.e., 35 to 45 feet in depth) were found to have concentrations of VOCs, SVOCs, pesticides, and metals that exceeded state and federal screening values. The pH of shallow and intermediate well water samples ranged from

6.5 to 8.3 and 6.3 to 8.0, respectively. The dissolved oxygen (DO) content of water samples from both shallow and intermediate wells was less than 1.1 milligrams per liter (mg/L), and was considered anoxic, or depleted of dissolved oxygen.

FLOODPLAINS

New York City is affected by local or street flooding (e.g., inland flooding due to short-term, high-intensity rain events coupled with inadequate drainage), fluvial flooding (e.g., rivers and streams overflowing their banks), and coastal flooding (e.g., astronomical high tides and/or surges) that affect the City's Atlantic coast, bays such as Upper New York Bay, tidally influenced rivers such as the Hudson and East Rivers, streams, and inlets such as the Gowanus Canal [FEMA 2007]). As a tidally influenced water of the Upper New York Bay, the coastal flood hazard areas mapped within the study area are influenced by astronomical tides and meteorological forces (e.g., nor'easters and hurricanes [FEMA 2007]), not by fluvial flooding (see **Figure 9-1**).

The Project Area is situated in a topographic depression located between land of higher elevation to the east and west, and slightly higher elevations to the north. While the Canal is under tidal influence and situated at sea level, ground elevations bordering the Canal rise gradually to the east at 4th Avenue and rise at a greater rate west of Bond Street.

FEMA released preliminary Flood Insurance Rate Maps (FIRMs) on January 30, 2015 in advance of the publication of new, final FIRMs to be adopted in the future. The preliminary FIRMs represent the Best Available Flood Hazard Data at this time. FEMA encourages communities to use the preliminary FIRMs when making decisions about floodplain management until final maps are available. As indicated in **Figure 9-1**, portions of the study area are within the 1 percent annual chance floodplain (Zone AE; the area with a 1 percent probability of flooding each year) and the 0.2 percent annual chance floodplain (the area with a 0.2 percent probability of flooding each year). The base flood elevation for Zone AE within the study area is 10 to 11 feet North American Vertical Datum of 1988 (NAVD88).

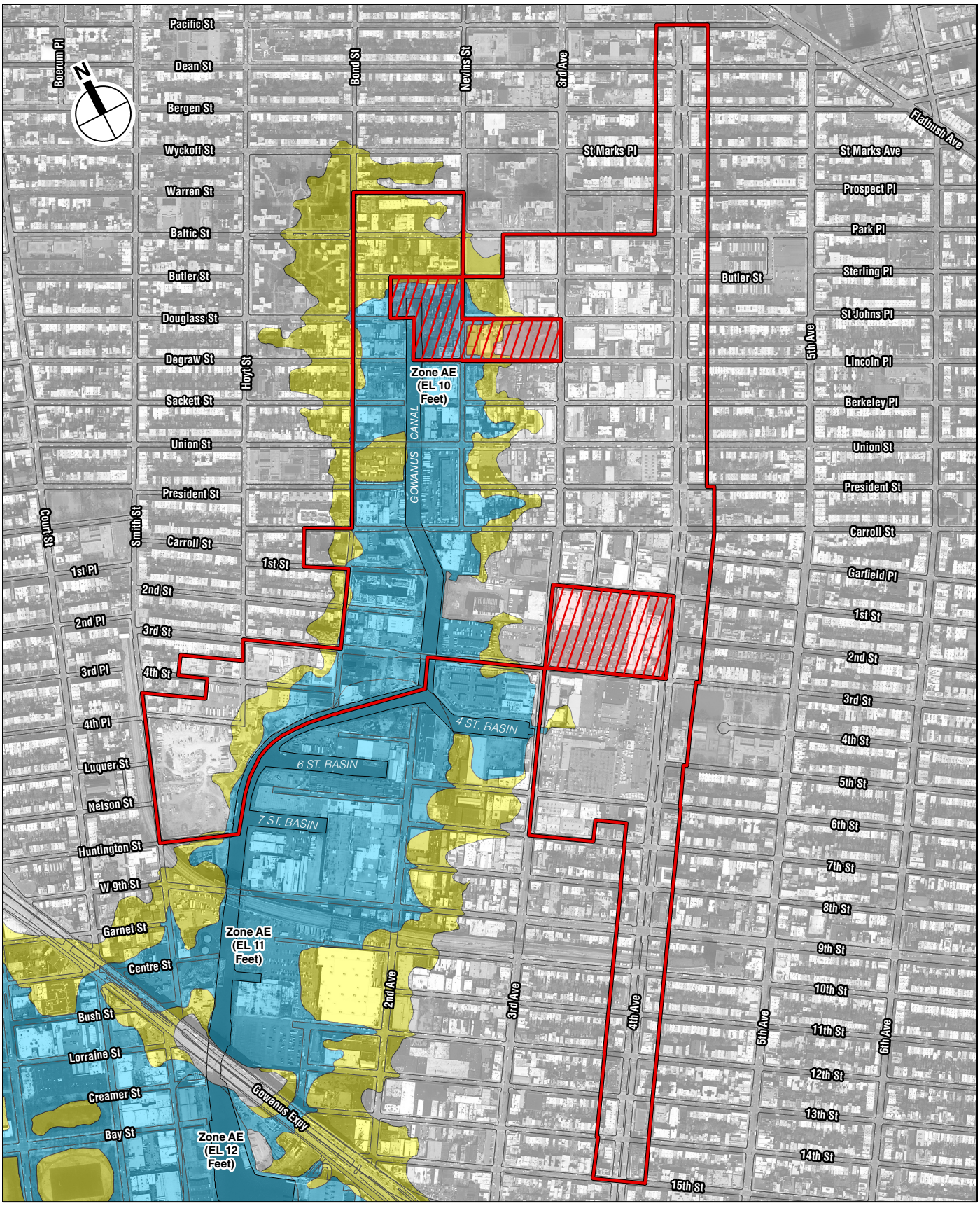
WETLANDS

The Gowanus Canal is mapped by USFWS as an estuarine subtidal wetland with an unconsolidated bottom (wetland and deepwater habitats with at least 25 percent cover of particles smaller than stones [less than 6-7 centimeters] and a vegetative cover less than 30 percent) that is permanently flooded and has been excavated (E1UBLx) (see **Figure 9-2**). These areas are also mapped by DEC as littoral zone (LZ) tidal wetland (see **Figure 9-3**). Littoral zone wetlands are any tidal wetlands under no more than six feet of water at mean low water (MLW) that are not included under another tidal wetland category. A small portion of the Canal, located near Carroll Street, is mapped by NWI as a riverine unknown perennial wetland with an unconsolidated bottom that is permanently flooded (R5UBH) (see **Figure 9-2**).

These NWI- and DEC-mapped wetlands do not meet the definition of wetlands under the CWA due to the lack of hydrophytic vegetation; however, these areas are regulated as Waters of the United States by USACE. There are no DEC-mapped freshwater wetlands within the study area.

AQUATIC RESOURCES

The Gowanus Canal is an approximately 100-foot wide and 1.8-mile-long tidally influenced, man-made channel located in Brooklyn, New York. It discharges to Gowanus Bay, which is within the Upper New York Bay portion of the New York-New Jersey Harbor Estuary (see **Figure 9-1**). The



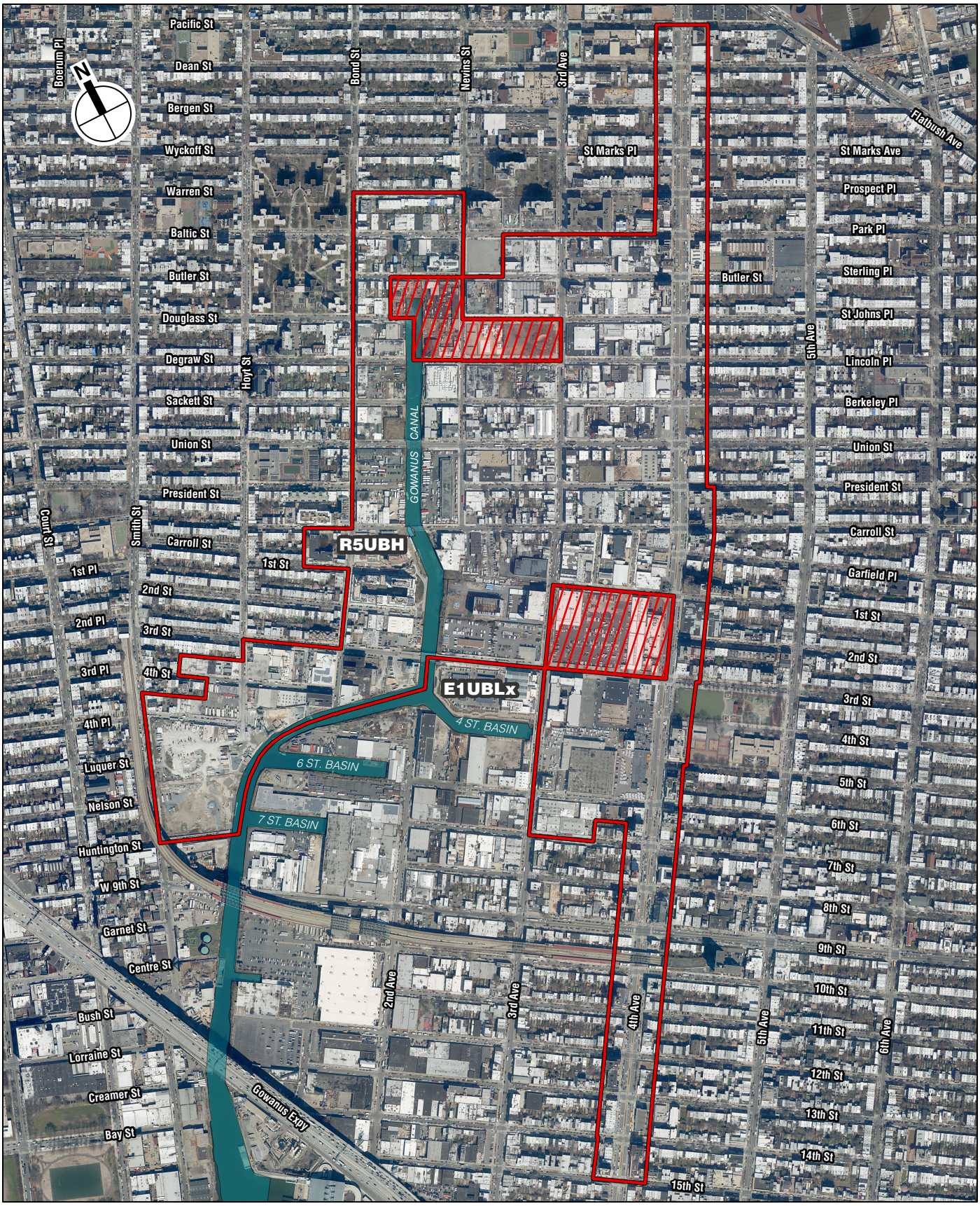
1.14.21

Data sources: NYC Department of City Planning; FEMA, January 2015 / NYS GIS Program Office, 2016 Digital Orthoimagery in New York City, October 2016

FEMA Preliminary FIRM

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 9-1



NWI Wetlands

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 9-2



1.14.21

Data sources: NYC Department of City Planning; New York State Department of Environmental Conservation. 2016 Digital Orthoimagery in New York City, October 2016

NYSDEC Tidal Wetlands

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 9-3

Canal was built in the 1860s on a site previously occupied by Gowanus Creek, local tributaries, and lowland marshes. It is connected to the Buttermilk Channel within Upper New York Bay at the confluence of the East River through the Gowanus Canal Flushing Tunnel, which pumps water from Buttermilk Channel to the Canal in order to flush poorly oxygenated water from the Canal. The shoreline of the Gowanus Canal is bulkheaded, or protected with rip-rap, for most of its length. The only freshwater inflow to the Canal is from wet-weather CSO and stormwater discharges (AECOM 2015). Due to its narrow width, limited freshwater input, and enclosed upper end, current velocities within the Canal are low and tidal exchange with Gowanus Bay is limited. The USACE has not dredged the navigational channel from Gowanus Bay to the Hamilton Avenue Bridge since the 1970s (AECOM 2015). Water depths in this region of the Bay and at the mouth of the Canal currently range from 20 to 30 feet at mean lower low water (MLLW) (NOAA Nautical Chart #12334). North of the Hamilton Avenue bridge, the Canal has a maximum water depth of about 15 feet, and bottom sediments near the head of the Canal and at the heads of the turning basins are exposed at low tide. A 2010 bathymetry survey indicated the widespread presence of debris such as tires, sunken barges, concrete rubble, timbers, gravel, and general trash throughout the Canal (EPA 2011).

WATER QUALITY

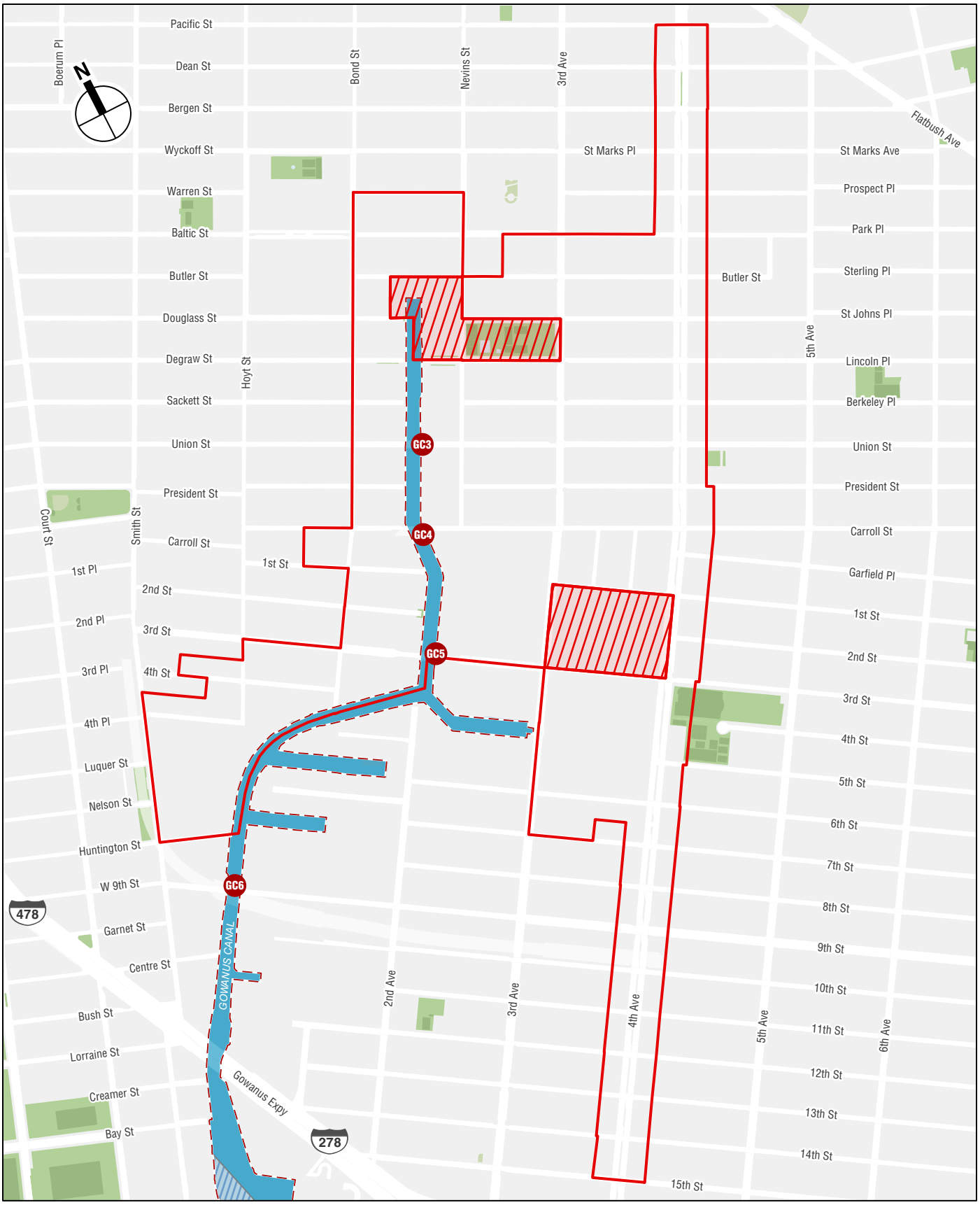
Water quality in the Gowanus Canal has historically been influenced by waste produced by manufactured gas plants (MGP), paper mills, tanneries, chemical plants, and other industries that operated along its banks beginning in the mid-1800s when the Canal was built. As required by EPA and DEC, National Grid is conducting remediation activities associated with contamination from these facilities. Water quality in the Gowanus Canal is currently influenced by the addition of water from Buttermilk Channel through the Flushing Tunnel and by CSO and stormwater discharges (AECOM 2015) similar to other waters in New York City. The majority of the Canal is classified by DEC under 6 NYCRR Part 703 as Use Classification SD, which generally applies to waters with natural or man-made conditions that limit attainment of higher standards. From approximately the Hamilton Avenue bridge to its confluence with Gowanus Bay, the Canal is classified by DEC as Use Classification I (see **Figure 9-4**). Under 6 NYCRR 701, the best use for Class SD waters is fishing, and the best uses for Class I waters are secondary contact recreation[1] and fishing. DEC has listed Gowanus Canal as impaired for "floatables," or floating debris, which originates mainly from CSO discharges and urban/stormwater runoff (DEC 2014).[2]

DEP monitors water quality in New York Harbor, including the Gowanus Canal, through its annual Harbor Survey. The results of recent surveys (DEP 2010, 2012) show that water quality throughout the Harbor has improved significantly due to measures undertaken by the City and other entities within the region. These measures include infrastructure improvements, elimination of 99 percent of raw dry-weather sewage discharges, reduction of illegal discharges, increased capture of wet-weather-related floatables, and reduction of toxic metal loadings from industrial sources (DEP 2002). Recent water quality improvements in the Canal have been spurred, in part, by the area's general transformation from industrial activity to residential and commercial uses.

Water quality has improved in the Canal over time, especially following the reactivation of the Flushing Tunnel in 1999 (AECOM 2015). In addition, improvements have resulted from Flushing Tunnel upgrades completed in 2014, including the installation of new screens and pumps that

[1] Activities where only limbs (arms and legs) are in contact with the water, such as boating.

[2] The Gowanus Canal is not included on DEC's 2016 draft 303(d) list because it does not currently require development of a total maximum daily load (TMDL). The Canal has not been delisted.



DEP Harbor Survey Stations

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 9-4

deliver an average 200 million gallons per day (MGD) of higher quality water from Buttermilk Channel to the Canal. DEP also completed upgrades to the Gowanus Wastewater Pumping Station and the sewer system in the area, which has resulted in decreased discharges of runoff and CSO to the Canal. **Table 9-1** presents recent water quality data (2012–2016) from DEP Harbor Survey stations GC3 and GC6, which are located in the Canal (see **Figure 9-4**). Both stations fall within Class SD waters, standards for which are included in **Table 9-1**. DEP's sampling efforts in the Canal during this period focused on dissolved oxygen, fecal coliform, and enterococcus and did not include temperature, salinity, pH, secchi depth, or other basic water quality parameters.

Based on DEP Harbor Survey data from 2012 to 2016, average dissolved oxygen concentrations in surface waters were about 8.1 mg/L at the head of the Canal and 7.3 mg/L at the mouth of the Canal. Average concentrations at the bottom were 7.8 mg/L at the head of the Canal and 6.7 mg/L at the mouth. However, dissolved oxygen fell below the standard of 3.0 mg/L for Class SD waters 19 times at the surface and 22 times at the bottom at Station GC3 (near the head of the Canal), and fell below the standard 9 times at the surface and 15 times at the bottom at Station GC6 (near the mouth of the Canal).

Both fecal coliform and *enterococcus* levels were higher near the head of the Canal (Station GC-3) compared with the downstream station (Station GC-6). At Station GC3, average fecal coliform levels were 14,450 colony forming units per 100 milliliters (cfu/100mL) at the surface and 15,178 cfu/100mL in bottom waters; average enterococcus levels were 6,032 cfu/100mL at the surface and 2,361 cfu/100mL in bottom waters. Downstream at Station GC6 near the mouth of the Canal, average fecal coliform ranged from 11,657 cfu/100mL at the surface to 6,051 cfu/100mL at the bottom. Average enterococcus levels near the mouth of the Canal were 2,686 cfu/100mL at the surface and1,040 cfu/100mL in bottom waters. Based on the available data from the DEP Harbor Survey for 2012-2016, enterococcus levels in the Canal generally exceeded the federal standard of 35 cfu/100 mL. Sufficient data were not available to determine compliance with the fecal coliform standard for this period. Fecal coliform and enterococcus levels in the Canal are much higher compared with those in the Inner Harbor on the whole. The 2012 average fecal coliform and enterococcus concentrations in the Inner Harbor were 81.3 cfu/100mL and 6.2 cfu/100mL, respectively.

As part of EPA's 2011 Remedial Investigation (RI), surface water was collected from 27 sample locations along the length of the Canal in both dry-weather and wet-weather conditions. Copper and nickel were found to be the parameters exhibiting the highest potential risk to aquatic biota in the water column.[3] Total and dissolved copper exceeded their screening values at about one third of all sampling locations (11 out of 27), and nickel exceeded its screening value in 4 of 27 locations (EPA 2011). Total copper was highest near the 3rd Street bridge, and nickel was highest near the mouth of the Canal (EPA 2011). Total and dissolved iron were found to be high-risk parameters, and total lead had the highest frequency of exceedance (21 of 26 locations). The maximum detected concentrations of both lead and iron were found at the 9th Street bridge (EPA 2011). Polycyclic aromatic hydrocarbons (PAHs) were detected in surface waters throughout the Canal in 25 of 26 locations during dry-weather sampling and in 24 of 27 locations during wet-weather sampling; Polychlorinated biphenyls (PCBs) were not detected in any surface water samples (EPA 2011). Maximum dry-weather PAH concentrations were detected near the mouth of the Canal, well downstream of the Project Area. Maximum wet-weather PAH concentrations were detected at the head of the turning basin below 6th Street.

[3] EPA (2011) used EPA's National Recommended Water Quality Criteria chronic values for saltwater and DEC's surface water and groundwater quality standards at 6 NYCRR Part 703 as screening values to evaluate the potential for impacts to aquatic biota.

Table 9-1
Water Quality Data and DEC Standards for Stations GC3 and GC6, 2012–2016

Parameter (DEC Standard, SD Waters)	Station GC3						Station GC6					
	Surface Waters			Bottom Waters			Surface Waters			Bottom Waters		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Dissolved oxygen, mg/L *(Not less than 3.0 mg/L at any time)*	0.04	27.9	8.1	0.06	27.5	7.8	0.06	15.7	7.3	0.09	15.2	6.7
Fecal coliform , cfu/100mL *(Monthly geometric mean shall not exceed 200 cfu/100mL)*[(1)]	4	200,000	14,450	4	200,000	15,178	4	200,000	11,657	3	181,000	6,051
Enterococcus, cfu/100mL[(2)] *(None)*	4	196,000	6,032	4	53,000	2,361	4	90,000	2,686	4	72,000	1,040

Notes: Data for basic parameters, including temperature, salinity, and total suspended solids, are not available for the Gowanus Canal stations during this time period.
(1) Fecal coliform standards are not based on the maximum fecal coliform values. Compliance with the fecal coliform standard is based on a monthly geometric mean comprising at least 5 measurements in the span of a month. Sufficient data are not available to calculate the fecal coliform standard for this time period.
(2) DEC does not identify a standard for enterococcus; however, EPA provides a standard for bathing of 35 cfu/100mL.
Sources: DEP Harbor Survey Water Quality Data 2012-2016; 6 NYCRR Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations; EPA Recreational Water Quality Criteria (Office of Water 820-F-12-058)

SEDIMENT QUALITY

Complex flow patterns between the Hudson River Estuary, Long Island Sound, Newark Bay, Upper New York Bay, Lower New York Bay, and Raritan Bay lead to widely variable sediment characteristics throughout the area. Compared with elsewhere in the New York Harbor Complex, fine sediments from river, marine, and shoreline sources tend to accumulate at higher rates in dredged areas of the Upper Bay, Newark Bay, and Raritan Bay. Sediment in the Gowanus Canal consists of a dark gray to black mixture of sand, silt, and clay underlain by brown, tan, and light gray alluvial and marsh deposits (e.g., sand, silt, clay, and peat) of the Gowanus Creek complex that was present prior to construction of the Canal (EPA 2011). The overlying soft sediment in the upper reach of the Canal ranges from 1 to 20 feet in thickness (average of 9.8 feet) and contains variable amounts of gravel, organic matter, and trash in addition to the sand/silt/clay mixture (EPA 2011). The gravel is likely associated with gravel barges that traverse the Canal between 5th and 9th Streets and adjacent to the New York City asphalt plant south of Hamilton Avenue.

As part of EPA's 2011 RI, surface sediments 0 to 6 inches in depth were sampled at 27 locations along the length of the Canal. The degree of contamination in surface sediments was evaluated using a number of standards and criteria, collectively referred to as "screening values," including those from EPA, DEC, and other sources (EPA 2010, DEC 1999, Jones et al. 1997, WDOE 1995, and Buchman 2008 as cited in EPA 2011). Metals generally had the highest frequency of exceedance of the screening values corresponding with potential impacts to benthic macroinvertebrates. Cadmium, copper, lead, mercury, and zinc concentrations exceeded their screening values in all samples (EPA 2011). In particular, lead was found in high concentrations from the Hamilton Avenue bridge upstream to the 3rd Street bridge (EPA 2011). Low to moderate

lead concentrations were found in the upper section of the Canal near Douglass Street (EPA 2011). PAHs were found throughout the Canal, with the highest concentrations occurring in the middle portion between the 9th Street bridge and the turning basin below 5th Street. PCBs were detected in about one third of the sampling locations, and the maximum detection value occurred in the same section in the middle of the Canal where PAHs were also most prevalent. PAH concentrations were also high from Carroll Street to Degraw Street, but PCB concentrations in the same section were generally "non-detect" (EPA 2011).

AQUATIC BIOTA

Historically, aquatic biota in the Canal have been severely restricted by the poor water quality caused by discharges of industrial wastewater and surface runoff from MGPs and other industrial uses, CSO discharges, stormwater discharges, poor circulation of water, and poor sediment quality. Prior to the reactivation of the Flushing Tunnel, low dissolved oxygen levels exacerbated by lack of water circulation limited the available aquatic habitat at the head of the Canal (DEP 2008). Since reactivation of the Tunnel, fish and invertebrate species characteristic of the New York-New Jersey Harbor Estuary system have been found in the Canal.

Primary Producers and Zooplankton

Phytoplankton are microscopic plants whose movements within a waterbody are largely governed by prevailing tides and currents. Light penetration, turbidity, and nutrient concentrations are important factors in determining phytoplankton productivity and biomass. Zooplankton are primary grazers of phytoplankton and detritus and, in turn, serve as prey for higher trophic level organisms. The most abundant plankton species are copepods (*Acartia* spp.), a zooplankton arthropod found throughout the New York-New Jersey Harbor. Diversity and abundance of zooplankton and other planktonic organisms has improved since the reactivation of the Flushing Tunnel, and the planktonic organisms found at the head of the Canal are largely the same organisms found in Buttermilk Channel due to the transfer of water from the Channel by the Tunnel (DEP 2008).

Benthic Invertebrates

Complexity, diversity, and abundance of the benthic community in the Canal are low in comparison to a typical benthic community in the open waters of the New York-New Jersey Harbor Estuary. The community is dominated by opportunistic species that are common in disturbed habitats and are considered to be tolerant of organic pollution. Physical habitat characteristics such as sediment particle size, temperature, salinity, and dissolved oxygen influence distribution of these species within the Canal as well (GEI 2009). Major benthic invertebrate groups in the New York-New Jersey Harbor Estuary include: oligochaetes (aquatic earthworms), polychaetes (segmented worms), gastropods (snails), bivalves, barnacles, cumaceans, amphipods, isopods, crabs, and shrimp (EEA 1988, EA 1990, Coastal 1987, PBS&J 1998). Species of hydrozoans, chaetognaths, annelids, and decapods also occur in the Canal.

Tube dwelling amphipods and polychaetes are the dominant organisms in all reaches of the Canal (GEI 2009). Nematodes, oligochaete worms, and flatworms are abundant throughout the Canal as well. These groups prefer soft substrates and are fairly tolerant of high levels of organic matter. Side swimmer (*Gammarus* sp.) and shrimp (*Palaemonetes vulgaris*) can occur near the mouth of the Canal where it empties into the Gowanus Bay (GEI 2009). Epibenthic invertebrates[4] present

[4] Epibenthic organisms are those that live on top of rather than buried in the sediment.

in the Canal include polychaetes, crustaceans, amphipods, decapods, isopods, barnacles, bryazoans, and mollusca, all of which are common throughout the New York-New Jersey Harbor complex. Pacific shore crabs (*Hemigrapsus sanguineus*), green crabs (*Carcinus maenas*), and mud crabs (*Scylla serrata*) also occur in the Canal. Sea grapes (*Molgula manhattensis*), blue mussels (*Mytilus edulis*), clam worms (*Nereis succinea*), blue crab (*Callinectes sapidus*), and spider crab (*Libinia emarginata*) occur in Gowanus Bay and have also been found in the Canal (DEP 2008).

Finfish

The finfish community in the New York-New Jersey Harbor and connected waterbodies is typical of large coastal estuaries and inshore waterways along the Mid-Atlantic Bight and includes a variety of estuarine, marine, catadromous (migrating from fresh water to spawn in salt water), and anadromous (migrating from salt water to spawn in fresh water) fish species that use its waters for spawning, nursery, migratory, and foraging purposes. Overall, the fish community of the Harbor, including Gowanus Canal, is spatially and seasonally dynamic. While some finfish species can occur in the Canal year-round, such as cunner (*Tautogolabrus adspersus*) and tautog (*Tautoga onitis*), the majority of the finfish community in the Canal is dominated by migratory species common to the region such as those listed below. While many species may occur in the Canal, especially near its confluence with Gowanus Bay, as part of their movement patterns, few are likely to remain in substantial numbers.

A 2003–2004 fish survey conducted on behalf of USACE throughout the Canal and Bay collected a number of fish species including cunner, tautog, bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*), windowpane (*Scophthalmus aquosus*), unidentified wrasse (Labridae), grubby (*Myoxocephalus aenaeus*), Atlantic herring (*Clupea harengus*), Atlantic mackerel (*Scomber scombrus*), weakfish (*Cynoscion regalis*), Atlantic croaker (*Micropogonias undulatus*), winter flounder (*Pseudopleuronectes americanus*), unidentified Gadidae, northern pipefish (*Syngnathus fuscus*), and Atlantic silverside (*Menidia menidia*) (LMS et al. 2004, as cited in GEI 2009). A sampling program conducted in 2010 for the EPA RI also collected mummichog (*Fundulus heteroclitus*), three-spined stickleback (*Gasterosteus aculeatus*), rock gunnel (*Pholis gunnellus*), American eel (*Anguilla rostrata*), striped bass (*Morone saxatilis*), northern puffer (*Sphoeroides maculatus*), spotted hake (*Urophycis regia*), Atlantic tomcod (*Microgadus tomcod*), and white perch (*Morone americana*) (EPA 2011). Eggs were the most dominant life stage collected, followed by post yolk-sac larvae, then yolk-sac larvae. However, based on the available survey results, there was no evidence that spawning by any species occurs in any part of the Canal, although some spawning likely occurs within the Gowanus Bay (DEP 2008). Eggs and larvae collected in the Canal were dominated by pelagic species, indicating that the eggs and larvae likely drifted, possibly by being drawn into the Canal from Buttermilk Channel through the Flushing Tunnel, or from the Bay via incoming tide (GEI 2009). Bay anchovy and winter flounder post yolk-sac larvae were observed in the greatest densities at the head of the Canal and in the Gowanus Bay. However, the absence of demersal winter flounder eggs in the Canal, despite the observation of post yolk-sac larvae, suggests that these larvae were transferred to the Canal via either the Flushing Tunnel or the incoming tide (DEP 2008, GEI 2009).

Essential Fish Habitat

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The NMFS designates EFH within squares identified by latitude and longitude coordinates. The Project Area is within a portion of two EFH areas. The mouth of the Gowanus Canal is included in the EFH square defined as: Atlantic Ocean waters within the Hudson River estuary affecting Staten Island, from Port Richmond, NY, on the north, west around to Great Kills South Harbor of Great Kills, NY, and south of Bayonne, NJ. The majority of the Canal upstream

of the mouth is included in the EFH square defined as: Atlantic Ocean waters within the Hudson River estuary affecting Manhattan Island, New York City, College Point, Long Island City, Brooklyn, Port Morris, Unionport, Flushing Bay, Astoria, LaGuardia Airport, Badland Island, Rikers Island, Roosevelt Island, Wards Island, and Hells Gate, along with the East River, the Harlem River, and the Bronx River. **Table 9-2** lists the species for which EFH is designated and the life stages of those fish identified as having EFH in these squares.

Table 9-2
Essential Fish Habitat Designated Species in the Vicinity of the Project

Species	Designated Life Stage			
	Eggs	**Larvae**	**Juveniles**	**Adults**
Pollock (*Pollachius virens*)			X	X
Red hake (*Urophyscis chuss*)	X	X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Long finned squid (*Loligo pealeii*)	n/a	n/a		
Short finned squid (*Illex illecebrosus*)	n/a	n/a		
Atlantic butterfish (*Peprilus triacanthus*)		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Summer flounder (*Paralichthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Black sea bass (*Centropristis striata*)	n/a		X	X
Surf clam (*Spisula solidissima*)	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
Clearnose skate (*Raja eglanteria*)			X	X
Little skate (*Leucoraja erinacea*)			X	X
Winter skate (*Leucoraja ocellata*)			X	X
Sand tiger shark (*Carcharias taurus*)		X[(1)]		
Dusky shark (*Carcharhinus obscurus*)		X[(1)]	X[(1)]	
Sandbar shark (*Carcharhinus plumbeus*)		X[(1)]		X[(1)]

Notes:
n/a—insufficient data for this life stage exists and no EFH designation has been made.
(1) These species do not have 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, dusky, and sandbar sharks refers to neonates and early juveniles.
Sources:
National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" posted at
https://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/conn_li_ny/40407350.html,
https://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/new_jersey/40307400.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.

TERRESTRIAL RESOURCES

ECOLOGICAL COMMUNITIES

Ecological communities within the study area are limited to what are best described by Edinger et al. (2014) as Terrestrial Cultural[5] and Open Uplands[6] communities which includes paved road/path,[7] urban vacant lot,[8] and urban structure exterior,[9] mowed lawn with trees,[10] and flower/herb garden[11] communities (see **Figures 9-5** and **9-6a through 9-6d**). Ecological communities within the study area are commonly found throughout the greater New York City metropolitan area. Vegetation within these communities is sparse and limited to street trees including Japanese zelkova (*Zelkova serrata*), honey locust (*Gledistia triacanthos*), pin oak (*Quercus palustris*), London plane tree (*Platanus acerifolia*) and Callery pear (*Pyrus calleryana*); or herbaceous species common to lawns including crabgrass (*Digitaria sanguinalis*), common dandelion (*Taraxacum officinale*), and red clover (*Trifolium pretense*). Similar ecological communities are found within the immediate vicinity of the Project Area. A complete list of vegetation identified within the study area during the April 24, 2019 reconnaissance investigation is found in **Table 9-3**.

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[5] Edinger et al. 2014 defines this subsystem of ecological communities as "communities that are either created and maintained by human activities, or are modified by human influence to such a degree that the physical conformation of the substrate, or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence."

[6] Edinger et al. 2014 defines this subsystem of ecological communities as "communities with less than 25 percent canopy cover of trees; the dominant species in these communities are shrubs, herbs, or cryptogammic plants (mosses, lichens, etc.)."

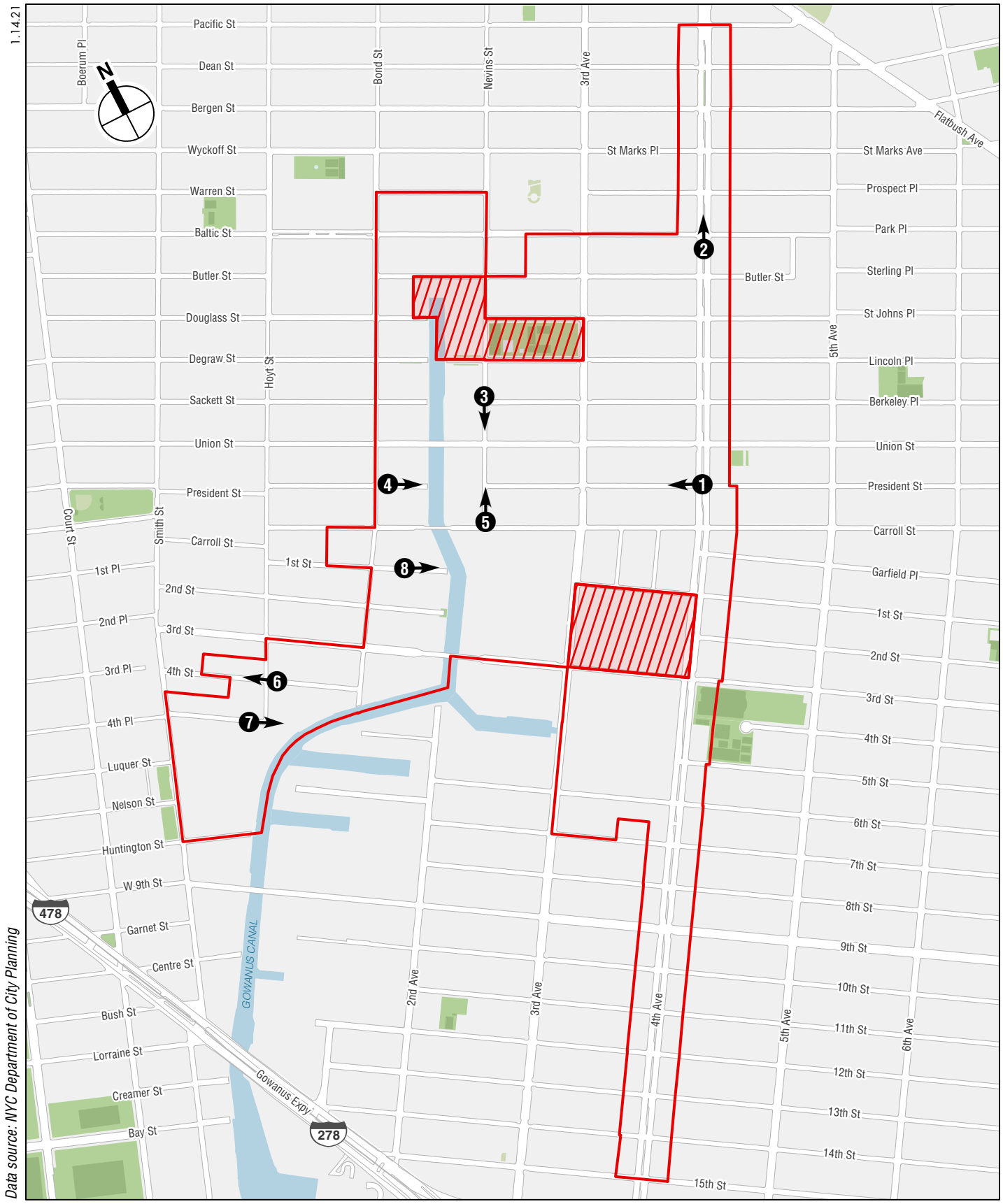
[7] Edinger et al. 2014 describes this ecological community as "a road or pathway that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface."

[8] Edinger et al. 2014 describes this ecological community as "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."

[9] Edinger et al. 2014 describes this ecological community as "the exterior surfaces of 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. Nooks and crannies may provide nesting habitat for birds and insects, and roosting sites for bats."

[10] Edinger et al. 2014 describes this ecological community as "residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and it is shaded by at least 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually less than 50 percent cover. The groundcover is maintained by mowing and broadleaf herbicide application"

[11] Edinger et al. 2014 describes this ecological community as "residential, commercial, or horticultural land cultivated for the production of ornamental herbs and shrubs. This community includes gardens cultivated for the production of culinary herbs."



Photograph Key

GOWANUS NEIGHBORHOOD REZONING AND RELATED ACTIONS

Figure 9-5



President Street facing west from 4th Avenue **1**



4th Avenue facing north from Baltic Street **2**

Site Photographs
Figure 9-6a



Nevins Street facing south from Sackett Street **3**



President Street facing east toward the Gowanus Canal from Bond Street **4**

Site Photographs
Figure 9-6b



Empty lot near the corner of Carroll Street and Nevins Street facing north **5**



4th Street facing west from Hoyt Street **6**

Site Photographs
Figure 9-6c



Empty lot near Hoyt Street and 5th Street facing east **7**



The Gowanus Canal at 1st Street facing east **8**

Site Photographs
Figure 9-6d

Table 9-3
Vegetation Identified within the Study Area

Common Name	Scientific Name	Stratum
Red maple	*Acer rubrum*	Tree
Tree of heaven	*Ailanthus altissima*	Tree
Garlic mustard	*Alliaria petiolata*	Herb
Serviceberry	*Amelanchier* sp.	Shrub
Asiatic bittersweet	*Ampelopsis brevipedunculata*	Vine
Greater burdock	*Arctium lappa*	Herb
Common mugwort	*Artemisia vulgaris*	Herb
Common milkweed	*Asclepias syriaca*	Herb
River birch	*Betula nigra*	Tree
Gray birch	*Betula populifolia*	Tree
Paper mulberry	*Broussonetia papyrifera*	Tree
Hedge bindweed	*Calystegia sepium*	Herb
Eastern redbud	*Cercis canadensis*	Tree
Bull thistle	*Cirsium vulgare*	Herb
Crabgrass	*Digitaria sanguinalis*	Herb
Japanese knotweed	*Fallopia japonica*	Tree
Bedstraw	*Gallium* sp.	Herb
Geranium	*Geranium* sp.	Herb
Ginkgo	*Ginkgo biloba*	Tree
Honey locust	*Gledistia triacanthos*	Tree
English ivy	*Hedera helix*	Vine
American holly	*Ilex americana*	Shrub
Red cedar	*Juniperus virginiana*	Shrub
Purple deadnettle	*Lamium purpureum*	Herb
Sweetgum	*Liquidambar styraciflua*	Tree
Japanese honeysuckle	*Lonicera japonica*	Vine
Yellow trefoil	*Medicago lupulina*	Herb
White mulberry	*Morus alba*	Tree
Daffodils	*Narcissus* sp.	Herb
Virginia creeper	*Parthenocissus quinquefolia*	Vine
Boston ivy	*Parthenocissus tricuspidata*	Vine
Princess tree	*Paulownia tomentosa*	Tree
Eastern white pine	*Pinus strobus*	Tree
English plantain	*Plantago lanceolata*	Herb
Common plantain	*Plantago major*	Herb
London plane tree	*Platanus acerifolia*	Tree
Black cherry	*Prunus serotina*	Tree
Kwanzan cherry	*Prunus serrulata*	Tree
Callery pear	*Pyrus calleryana*	Tree
Sawtooth oak	*Quercus acutissima*	Tree
White oak	*Quercus alba*	Tree
Pin oak	*Quercus palustris*	Tree
Multiflora rose	*Rosa multiflora*	Shrub
Curly dock	*Rumex crispus*	Herb
Seaside goldenrod	*Solidago sempervirens*	Herb
Scholar tree	*Styphnolobium japonicum*	Tree
Lilac	*Syringa vulgaris*	Shrub
Common dandelion	*Taraxacum officinale*	Herb
Bald cypress	*Taxodium distichum*	Tree
Yew	*Taxus* sp.	Shrub
Field penny-cress	*Thlaspi arvense*	Herb
American basswood	*Tilia americana*	Tree
Littleleaf linden	*Tilia cordata*	Tree
Red clover	*Trifolium pratense*	Herb
White clover	*Trifolium repens*	Herb
Tulip	*Tulipa* sp.	Herb
Siberian elm	*Ulmus pumila*	Tree
Violet	*Viola* sp.	Herb
Japanese zelkova	*Zelkova serrata*	Tree

Source: AKRF reconnaissance investigation on April 24, 2019.

WILDLIFE

The study area provides limited natural terrestrial wildlife habitat; it is a highly industrialized area with asphalt, concrete, granite pavers, unvegetated compacted soil, and sparse vegetation. As such, only the most urban-adapted, generalist species that can tolerate highly degraded environments and high levels of human activity currently have the potential to occur within the study area.

Mammals

Habitat is limited within the study area and is likely used by only the most urban-adapted species including Norway rat (*Rattus norvegicus*), feral cat (*Felis catus*), raccoon (*Procyon lotor*) and gray squirrel (*Sciurus carolinensis*). Feral cat was the only species of mammal observed during the April 24, 2019 reconnaissance investigation.

Birds

The New York State Breeding Bird Atlas documents the distribution of breeding bird species throughout the state and is based on surveys that were most recently conducted from 2000 to 2005. The study area is located within portions of survey Blocks 5750D and 5850C, which also include Greenwood Cemetery, Governors Island, and Prospect Park. A total of 64 possible species of breeding birds were documented in this survey block (see Table 9-1 in Appendix D). The two 3-square-mile survey include habitat that supports these species (e.g., Greenwood Cemetery, Governors Island, Prospect Park); the smaller study area, however, contains habitat suitable for only the most urban-adapted birds. Most species expected to occur are disturbance-tolerant generalists that can thrive in highly modified and degraded habitats and are ubiquitous in urban settings (e.g., rock pigeon [*Columba livia]*, mourning dove [*Zenaida macroura*], American robin [*Turdus migratorius*], northern mockingbird [*Mimus polyglottos*], European starling [*Sturnus vulgaris*], and house sparrow [*Passer domesticus*]). Many of these species that may be present in the study area during the breeding season may also be year-round resident birds that remain during winter. The only birds observed during the April 24, 2019 reconnaissance investigation were rock pigeon, house sparrow, American crow (*Corvus brachyrhynchos*), Canada goose (*Branta canadensis*), and double-crested cormorant (*Phalacrocorax auritus*).

Reptiles and Amphibians

The DEC Amphibian and Reptile Atlas Project (Herp Atlas) conducted a survey between 1990 and 1999 documenting the geographic distribution of New York's reptiles and amphibians. Table 9-2 in Appendix D lists the 12 species of reptiles and amphibians documented by the Herp Atlas as occurring within the *Brooklyn* USGS Quadrangle. However, due to the fully developed nature of the study area and limited natural habitat, no reptiles and amphibians are expected to occur within the study area. No reptiles or amphibians were observed during the April 24, 2019 reconnaissance investigation.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

According to the USFWS IPaC database[12] reviewed on May 30, 2019, the following four federally listed species are documented for Kings County: piping plover (*Charadrius melodus*; threatened), red knot (*Calidris canutus rufa*; threatened), roseate tern (*Sterna dougallii dougallii*; endangered),

[12] USFWS IPaC database available at http://ecos.fws.gov/ipac.

and seabeach amaranth (*Amaranthus pumilus*; threatened). Critical habitat is listed only for piping plover. No listed species under NMFS jurisdiction are documented within the Gowanus Canal.

The DEC Environmental Resource Mapper[13] was reviewed on May 30, 2019 and no recently confirmed state-listed species are documented within 0.5 miles of the study area. Therefore, no state listed species are expected to occur within the primary or secondary study areas.

PIPING PLOVER

The breeding population of piping plovers in New York City is limited to the Rockaway Peninsula in Queens County (Fowle and Kerlinger 2001, Boretti et al. 2007). In addition, the study area lacks wide, open expanses of unvegetated beach that piping plover utilize for habitat. Therefore, piping plover do not have the potential to occur within the study area. Piping plover were not observed during the April 24, 2019 reconnaissance investigation.

RED KNOT

The *rufa* subspecies of the red knot migrates up to 30,000 miles round trip between primary wintering grounds in South America and breeding grounds in the high arctic, with conditions for refueling at staging sites along the Atlantic coast being critical determinants of migration and reproductive success and overall survival (Baker et al. 2004, Morrison et al. 2007). Although migrating red knots have been observed on Jamaica Bay (Tanacredi and Badger 1995:104, Fowle and Kerlinger 2001:81), the study area does not include beaches, bays, or estuaries that red knot use for staging. Therefore, red knot are not expected to occur within the study area. Red knot were not observed during the April 24, 2019 reconnaissance investigation.

ROSEATE TERN

The roseate tern is globally widespread but has a highly localized distribution and is listed as federally endangered in the U.S. More than 90 percent of New York State's breeding population of roseate tern is made up of a single colony on Great Gull Island, off Long Island's eastern end (Hays 2007, Mitra 2008). The remainder of the state's roseate tern population is in small groups of breeding pairs in various locations on Long Island's south shore and east end (Mitra 2008, NYSERDA 2010). The study area lacks the type of unvegetated, sandy beach that breeding and migrating roseate terns use for habitat. Therefore, roseate terns are considered unlikely in the study area. Roseate terns were not observed during the April 24, 2019 reconnaissance investigation.

SEABEACH AMARANTH

Seabeach amaranth is an annual herbaceous plant. It grows along sandy beaches of the Atlantic coast where there is accreting shoreline, upper beach, foredune, or overwash flat; as well as at beach nourishment sites (USFWS 2012). These habitats do not occur within the study area. Therefore, seabeach amaranth does not have the potential to occur in the study area. Seabeach amaranth was not observed during the April 24, 2019 reconnaissance investigation.

[13] DEC Environmental Resource Mapper available at http://www.dec.ny.gov/gis/erm.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO ACTION CONDITION)

By the 2035 analysis year, improvements in water quality and other aquatic resources in the New York Harbor and within the Canal are likely to continue as a result of several ongoing local and regional initiatives, including remediation of the Canal and related upland sites pursuant to the Comprehensive, Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund) and other regulatory programs. With the exception of certain streets slated for capital improvements along the Canal, terrestrial resources in the study area are expected to remain essentially unchanged in the future without the Proposed Actions, with the exception of some tree removals and replacements. Any development requiring the removal of street trees would be performed in compliance with Local Law 3 of 2010 and the New York City Parks Tree Protection Protocol. Any required replacement and/or restitution would be provided in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York. Independent of the Proposed Actions, other parties would continue to undertake clean-up activities as part of the federally required Superfund remediation of the Canal, including the installation of containment/cutoff walls, the excavation or stabilization of contamination on upland parcels along the Canal, repair of the bulkhead, construction of new CSO facilities, and the installation of coal tar extraction wells.

SUPERFUND REMEDIATION

Components of the overall remediation plan for the Canal include dredging approximately 307,000 cubic yards of highly contaminated sediment from the upper and middle portions of the Canal and 281,000 cubic yards of contaminated sediment from the lower portion of the Canal (EPA 2013). Full-scale dredging of the Canal is scheduled to begin in 2020, with remediation expected to be completed by 2028. A multilayer cap will be placed over the dredged portions of the Canal, and bulkheads will be repaired and replaced along its length. The cap comprises an active layer of sand and gravel to prevent the exposure of contaminants and an armor layer of gravel and stone to prevent the erosion of underlying layers of the cap. Clean sand will be placed atop the armor layer to fill the voids between the stones and establish sufficient depth in order to restore the canal bottom's natural habitat. Contaminated areas adjacent to the Canal will also be remediated under the direction of DEC, in coordination with EPA, including the former Fulton Municipal Works, Citizens Gas Works, and Metropolitan MGP facilities. Construction of a cutoff wall at the former Fulton MGP site is underway to prevent the migration of coal tar to the Canal. The Superfund remediation plan for the Gowanus Canal would result in improvements to groundwater resources within the study area, through the dredging and removal of contaminated soils and the installation of a multilayer cap. Any additional enhancement enacted as a result of the findings of any future Natural Resources Damage Assessment (NRDA) would benefit aquatic organisms within the Canal.

Temporary disturbances to terrestrial and aquatic resources will occur as a result of remediation activities. However, the remediation efforts will ultimately improve groundwater, surface water, and sediment quality due to the removal of contaminated soil and sediment. Dredging throughout the Canal and the bulkhead repairs will result in temporary resuspension of sediments and contamination within the water column, resulting in temporary impacts to aquatic resources. The overall remediation efforts will ultimately result in permanent improvements to natural resources in the Canal.

GOWANUS CSO FACILITIES AND UNIFIED STORMWATER RULE

As part of the Superfund remediation, DEP plans to construct two new CSO facilities with improved outfall capacity, one at the head of the Canal (Head End Facility) and another near the middle of the Canal (Owls Head Facility). Full build out is expected to be completed by the 2035 analysis year. The CSO facilities are designed to collect and retain combined sewer overflow from their respective combined sewer systems, which currently discharge to the Canal. The Head End Facility will discharge to the Red Hook wastewater treatment plant (WWTP), and the Owls Head Facility will discharge to the Owls Head WWTP. CSO will first be stored at each facility during wet weather events, and once there is sufficient capacity in the sewer system and at the wastewater treatment plant, the stored flow will be pumped to the WWTP. The project is expected to result in a significant decrease in CSO discharge to the Canal (76 percent reduction at the Head End Site, and 85 percent reduction at the Owls Head Site). Certain components of construction will result in temporary resuspension of sediments and associated contaminants, which will be minimized using either a turbidity curtain or cofferdam. Resuspended sediments will dissipate relatively quickly with the improved water flow from the Flushing Tunnel since its repair and reactivation in 1999. Overall, the project will result in ongoing benefits to water quality through the reduction of CSO discharge directly to the Canal.

As discussed in greater detail in Chapter 11, "Water and Sewer Infrastructure," DEP has proposed a Unified Stormwater Rule that increases the amount of stormwater that will be managed on-site as part of the new development, and further restricts the release rate for sites that require a connection to a City sewer.

1ST AND 5TH STREET TURNING BASINS

Restoration of the 1st Street and 5th Street turning basins is also planned as part of the Superfund remediation in order to mitigate the loss of surface water area resulting from rehabilitated bulkhead encroachment into the Canal. Contaminated material that was placed in the 1st Street turning basin decades ago will be removed, restoring water in its footprint. A portion of the 5th Street turning basin beneath the 3rd Avenue bridge extending about 25 feet to the east will also be dredged and restored. The 1st Street turning basin project will establish approximately 7,700 square feet (0.2 acres) of vegetated tidal wetland habitat on the north and east ends of the basin, benefiting wetland resources within the Canal. Temporary effects from sediment resuspension for both projects will occur during the installation of temporary sediment control measures (e.g., pile barrier at 1st Street) prior to dredging and restoration. The multilayer sediment cap that will be installed as part of the Superfund remediation will be extended into the restored portions of both the 1st Street and 5th Street turning basins.

CAPITAL IMPROVEMENTS

DEP has commenced construction and installation of high level storm sewers in the Gowanus watershed area, which is generally located between Carroll Street and State Street near the northern end of the Canal, extending east to 4th Avenue (Capital Project SEK20067). The project is a form of partial separation that separates stormwater from streets or other public rights-of-way from the combined sewer. Once completed the project will create separate stormwater discharge to the Canal through a stormwater outfall at Carroll Street and will reduce stormwater flows to the combined sewer system, reducing the frequency and volume of CSO and helping to improve water quality in the Canal. As part of the project, 87 new catch basins will be installed to allow

stormwater drainage from the streets into 14,000 linear feet of new high level storm sewers. All existing catch basin drainage connections will be switched from the existing combined sewer to the new high level storm sewers. The first phase of the project was completed in 2018 and includes improvements to the area south of Douglass Street; the second phase of construction includes improvements to the area north of Douglass Street and is expected to be completed in 2020.

The New York City Department of Design and Construction (DDC), on behalf of DEP, is conducting infrastructure improvement and replacement in an area generally bounded by Smith Street to the west, 7th Street to the north, 2nd Avenue to the east, and includes work along 9th Street on both sides of the Canal (Capital Project SEK20068). The project includes new stormwater collection sewers, new sanitary sewers and force main, replacement storm and combined sewers, replacement water mains within the project site, and two replacement outfalls on either side of the Canal at 9th Street. It also includes resurfacing of all streets affected by construction. The project will improve the ability of the storm sewers to properly convey the volume of stormwater runoff generated during a rain event and reduce street flooding. Removal of an illegal sanitary connection to the storm sewer system will provide some reduction in pollutant loading to the Canal. Overall, the improvements will neither increase nor decrease the volume of stormwater conveyed to the Canal. The outfalls at 9th Street will use absorbent skimmers as a means of gauging their effectiveness in removing floatable oils and greases while capturing solids from street runoff.

DEP has also invested in green infrastructure that has been constructed, is in construction, or is planned in the Gowanus watershed area, including bioswales in the rights-of-way and stormwater greenstreets in the area north and east of the Canal. Green infrastructure measures are expected to reduce the amount of CSO that may reach the Canal, thereby leading to further improvements in water quality.

DEVELOPMENT

Without the Proposed Actions, much of Gowanus is expected to remain underdeveloped and underutilized. In the future, it is reasonable to assume some property owners in Gowanus may seek discretionary land use approvals to allow for development that contains a mix of uses, including residential development, and others could choose to develop their sites on an as-of-right basis under existing zoning. Absent the Proposed Actions, future development would occur in a piecemeal manner and without the benefit of a comprehensive plan to coordinate redevelopment activities, infrastructure investments, and appropriate densities and urban design controls across the neighborhood.

In the No Action condition, 30 of the 63 projected development sites are expected to experience as-of-right development in the form of new construction, conversions, or enlargements. In addition, 15 other planned developments in the Project Area are expected to be independently developed. Ecological communities within the study area are limited to Terrestrial Cultural and Open Uplands communities that are regionally common and sparsely vegetated. Any development within the study area in the future without the Proposed Actions could result in the loss of these ecological communities commonly found within New York City but would not substantially affect these resources. Any development requiring the removal of street trees would be performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol. Any required replacement and/or restitution would be provided in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York.

As discussed in Chapter 10, "Hazardous Materials," absent the Proposed Actions, development would occur on potentially contaminated sites with no mechanism in place, such as an (E) designation, to require testing and remediation. Catalyzing redevelopment with the Proposed Actions, including the placement of (E) designations in connection with the amended zoning, is critical to the overall cleanup of the Canal and surrounding upland sites. The (E) designations would require developers and property owners to test and potentially remediate properties proposed for development, which would not occur absent the Proposed Actions. Overall, in the No Action condition, the amount of soil disturbance would likely be less than in the With Action condition and the development of many of these sites would occur without restrictions or controls related to hazardous materials.

As a result of the new stormwater rule discussed above, given that the existing development sites most likely do not provide detention, it is expected that there would be a reduction in uncontrolled runoff from the projected development sites where new construction is anticipated in the No Action condition. No improvements to stormwater detention or retention, such as green roofs, blue roofs, or seepage basins, are expected on the projected development sites that are expected to remain unchanged in the No Action condition.

E. THE FUTURE WITH THE PROPOSED ACTIONS (WITH ACTION CONDITION)

GROUNDWATER

Groundwater within the study area is not used as a potable water supply. If any development associated with the RWCDS were to encounter groundwater or require dewatering, these activities would be performed in accordance with all applicable federal, state, and local regulations and guidelines, as described in Chapter 10 "Hazardous Materials." Any contaminated soils encountered during development under the Proposed Actions would be managed in accordance with regulatory requirements, thereby further improving groundwater conditions in the study area. The Proposed Actions would not result in the introduction of any new groundwater contaminants and would not have the potential to adversely affect the Brooklyn-Queens sole source aquifer. Therefore, the Proposed Actions would not result in adverse impacts to groundwater conditions within the study area. As discussed under "The Future without the Proposed Actions," the Superfund remediation plan for the Gowanus Canal would result in improvements to groundwater resources within the study area, through the dredging and removal of contaminated soils and the installation of a multilayer cap.

FLOODPLAINS

As discussed above in "Existing Conditions," portions of the study area are within the 1 percent annual chance floodplain and the 0.2 percent annual chance floodplain, and would continue to be within the floodplain in the future. Similar to other portions of New York City, Brooklyn and in particular the area surrounding the Gowanus Canal, is affected by local stormwater flooding (e.g., flooding of inland portions of the City from short-term, high-intensity rain events in areas with poor drainage), fluvial flooding (e.g., streams overflowing their banks), and coastal flooding (e.g., long and short wave surges that affect the shores of the Atlantic Ocean, bays such as Gowanus Bay, and tidally influenced canals, creeks and rivers [FEMA 2013]). Within New York City, coastal flooding is the primary cause of flood damage. The floodplains within the study area are affected by coastal flooding and would not be affected by construction or regrading/filling of the

floodplain as would occur within a riverine floodplain. Coastal floodplains are influenced by astronomic tide and meteorological forces (e.g., nor'easters and hurricanes) rather than local flooding caused by precipitation (FEMA 2013). As discussed under "The Future without the Proposed Actions," capital improvements within the study area, including the installation of storm sewers and sanitary sewers, would reduce street flooding within the study area. Development under the Proposed Actions within the floodplain would not affect the flood elevation or increased risks due to flooding in the study area. Therefore, the Proposed Actions would not result in significant adverse impacts with respect to flood hazard areas.

WETLANDS

As discussed above in "Existing Conditions," wetlands within the study area are limited to the Canal which is mapped by NWI as E1UBLx and R5UBH wetlands, and mapped by DEC as LZ wetlands. These NWI- and DEC-mapped wetlands do not meet the definition of wetlands under the Clean Water Act due to the lack of hydrophytic vegetation, however, these areas are regulated as Waters of the United States by USACE.

As discussed under the No Action condition, the Superfund remediation plan involves the repair and replacement of bulkheads along the Canal, which will result in the encroachment on and loss of open water habitat within the Canal. The 1st and 5th Street turning basin restorations will create 7,700 square feet (0.2 acres) of vegetated tidal wetland habitat, as well as additional areas of open water habitat to mitigate the loss of surface water area resulting from the bulkhead rehabilitation. The 6th Street turning basin habitat enhancement project will restore vegetated tidal wetlands to the 6th Street turning basin.

Development under the Proposed Actions would be expected to involve minimal in-water construction, which would not adversely impact wetlands. Stormwater management improvements, including potential outfall rehabilitation, would have the potential to result in minimal temporary direct impacts to wetlands from sediment disturbance during construction. Overall, these improvements would result in long-term beneficial impacts to wetland quality.

AQUATIC RESOURCES

Development under the Proposed Actions would be expected to involve minimal in-water construction if storm sewers and/or outfalls are rehabilitated, resulting in temporary disturbance to aquatic resources from sediment resuspension during construction. Any impacts to aquatic resources under the RWCDS would be from improvements to the stormwater management system (i.e., drainage, piping), which would have beneficial effects on water quality and aquatic habitat from the reduced occurrence of CSO events. These benefits would occur in concert with incremental changes in water quality from additional improvements associated with the cleanup of the Canal, occurring separately from the Proposed Actions. If outfall rehabilitation is proposed under the RWCDS, temporary impacts during sediment disturbance would be minimized through the use of best management practices for turbidity control.

As detailed in Chapter 11, "Water and Sewer Infrastructure," in the With Action condition, CSO volumes would decrease as compared to the No Action condition despite the increase in sanitary flows from new development, due to increased on-site stormwater management volume requirements and updated release rate restrictions and the number of retention practices implemented with new development in accordance with the proposed Unified Stormwater Rule. Overall, in the With Action condition, CSO volumes discharged to the Canal would remain well below existing conditions and below the No Action condition.

TERRESTRIAL RESOURCES

ECOLOGICAL COMMUNITIES

Development under the Proposed Actions would likely result in the removal of street trees. Any development requiring the removal of street trees would be performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol. Any required replacement and/or restitution would be provided in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York.

As discussed above in "Existing Conditions," ecological communities within the study area are limited to Terrestrial Cultural and Open Uplands communities that are regionally common and sparsely vegetated. Any development within the study area, in the future with the Proposed Actions, would result in the loss of these ecological communities commonly found within New York City and would not substantially affect these resources. In addition, bioswales, stormwater greenstreets, landscaping, and newly developed or enhanced open space would provide habitat for pollinators and wildlife species within the study area. Therefore, the Proposed Actions would not result in adverse impacts to vegetation and ecological communities within the study area.

WILDLIFE

As discussed above, the study area provides limited natural terrestrial wildlife habitat, and only the urban-adapted, generalist species that can tolerate degraded environments and high levels of human activity currently have the potential to occur within the study area. Any development within the study area, in the future with the Proposed Actions, would be able to temporarily relocate to similar suitable habitat nearby. In addition, bioswales, stormwater greenstreets, landscaping, and newly developed or enhanced open space would provide habitat for pollinators and wildlife species within the study area. Therefore, the Proposed Actions would not result in adverse impacts to wildlife within the study area.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

As discussed above in "Existing Conditions," the study area does not provide suitable habitat for piping plover, red knot, roseate tern, or seabeach amaranth. Therefore, threatened, endangered, and special concern species are not expected to be present in the study area. The future with the Proposed Action would not differ from the Existing condition with regards to these species. Therefore, the Proposed Actions would not result in adverse impacts to threatened, endangered, and special concern species within the study area.

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