Chapter 9: Natural Resources

A. INTRODUCTION

This chapter examines the potential impacts from the proposed Cornell NYC Tech project on terrestrial and aquatic natural resources[1], and floodplains near the project site, which comprises 12.5 acres within Roosevelt Island, south of the Ed Koch Queensboro Bridge (see **Figure 9-1**).

In accordance with the June 2012 *CEQR Technical Manual*, this chapter describes:

- The regulatory programs that protect floodplains, wildlife, threatened or endangered species, aquatic resources, or other natural resources within the project site;
- The current condition of the floodplain and natural resources within the project site and study area, including water quality, aquatic and terrestrial biota, and threatened or endangered species and species of special concern;
- The floodplain, water quality, and natural resources conditions in the future without the proposed project (the "No Action" condition);
- The potential impacts of the proposed project in the 2018 and 2038 analysis years on the floodplain, water quality, and natural resources (the "With Action" condition); and
- The measures that would be developed, as necessary, to mitigate and/or reduce any of the proposed project's potential significant adverse effects on natural resources, water quality, and floodplains.

As detailed in this chapter, natural resources within and near the project site would remain generally unchanged following the proposed project. Neither Phase 1 nor full build of the proposed project would result in significant adverse impacts to water quality, aquatic biota, tidal wetlands, essential fish habitat, or threatened or endangered species.

B. METHODOLOGY

OVERVIEW

The study area for terrestrial natural resources and floodplains includes the 12.5-acre project site and the area within 400 feet of the project site's boundaries (see Figure 9-1). This area reaches the Roosevelt Island Sportspark to the north, a portion of South Point Park to the south, and portions of the East River to the east and west. The identification of threatened or endangered species was evaluated for a distance of a ½-mile from the project site. The study area for water quality and aquatic resources includes the overall aquatic resources of the East River.

[1] The *CEQR Technical Manual* defines natural resources as "(1) the City's biodiversity (plants, wildlife and other organisms); (2) any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and (3) any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability."

EXISTING CONDITIONS

Existing conditions for floodplain and natural resources within the study area were summarized using:

- Existing information obtained from the following governmental and nongovernmental sources: New York City Department of Environmental Protection (NYCDEP) Harbor Water Quality Surveys and City-Wide Long Term Combined Sewer Overflow (CSO) Control Planning Project Reports; New York/New Jersey Harbor Estuary Program (NY/NJHEP) Harbor-Wide Water Quality Reports; U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and list of federally threatened and endangered species for New York County (http://ecos.fws.gov); National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) designation areas; records of wetlands, significant natural communities, and threatened and endangered species identified by the New York Natural Heritage Program (NYNHP) Environmental Resource Mapper; New York State Breeding Bird Atlas results for Block 5851C; New York State Department of Environmental Conservation (NYSDEC) Herp Atlas Project results for the 'Central Park' quadrant, and Federal Emergency Management Agency (FEMA) flood insurance rate maps.
- Information identified in peer-reviewed literature pertaining to the natural resources of Roosevelt Island and the lower East River.
- Observations made during site reconnaissance conducted within the study area on October 10 and 12, 2011.
- Tree survey conducted within the project site on March 5 and 6, 2012. The tree survey recorded species, diameter at breast height (dbh), height, canopy spread, and tree health (see **Appendix 9**).

FUTURE WITHOUT THE PROPOSED PROJECT (2018 AND 2038)

The assessment of floodplain and terrestrial natural resources in the future without the proposed project considers these resources in the 2018 and 2038 analysis years without the proposed project (the No Action condition). In the future without the proposed project, the existing Goldwater Hospital complex is assumed to remain but will be uninhabited. For the assessment of potential effects to terrestrial resources, it is assumed that vegetation management will be reduced, allowing for some succession of vegetative communities. Human activity within the project site will be reduced.

For the assessment of potential effects to aquatic resources, the assessment considered the trend of water quality improvements documented within the New York/New Jersey Harbor Estuary, implementation of planned projects that would result in water quality and aquatic habitat improvements within the East River as identified by sources such as PlaNYC, NYCDEP City-Wide Long Term CSO Control Planning Project, New York/New Jersey Harbor Estuary Program, and Hudson Raritan Estuary Ecosystem Restoration Project.

FUTURE WITH THE PROPOSED PROJECT

2018 ANALYSIS YEAR (PHASE 1)

Potential impacts on the floodplain, wetlands, aquatic, and terrestrial resources from Phase 1 of the proposed project are assessed by considering the following:

- The anticipated water quality and natural resources of the East River in the vicinity of the project site in 2018.

- The potential for discharge of stormwater during operation of Phase 1 of the proposed project to affect aquatic resources. The analysis considers beneficial effects of stormwater management measures that would result in improved quality of the runoff discharged from the project site and reduction in the peak stormwater discharge rate. The proposed project would integrate green infrastructure practices, such as bioswales, natural filtrations systems, rain gardens or rainwater collection and reuse of stormwater to the extent practical as part of the stormwater pollution prevention plan (SWPPP) prepared for the project. Additional temporary features during periods of construction may include settling ponds and approved filtration systems, some of which could become integrated into permanent site features. A SWPPP would be prepared for the entire project, with detailed design completed for Phase I construction and development and conceptual design calculations for later phases. The SWPPP would be updated prior to later development phases to describe final plans for these areas and will meet State-mandated reductions in sedimentation and flow for the redevelopment of the site.
- Indirect impacts to wildlife individuals within the study area such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities.
- Potential changes in daytime and nighttime bird strikes based on proposed building locations, heights, lighting, and lower story window reflections.
- Potential long-term beneficial effects on plants and wildlife from the proposed landscaping within the proposed public open space areas, as well as the potential for adverse impacts to natural resources due to management of these open space areas. (e.g., pesticide application).

The potential for impacts on the project site's trees due to tree removal as part of site grading and other construction activities is discussed in Chapter 20, "Construction."

2038 ANALYSIS YEAR (FULL BUILD)

Potential impacts on the floodplain, wetlands, aquatic, and terrestrial resources from the full build (Phases 1 and 2) of the proposed project are assessed by considering the following:

- The anticipated water quality and natural resources of the East River in the vicinity of the project site in 2038.
- The potential for discharge of stormwater during operation of the proposed project to affect aquatic resources, considering the anticipated improvements in the quality of runoff and reduction in the peak discharge rate due to implementation of green infrastructure practices.
- Direct impacts to wildlife individuals due to loss of habitat for those individuals using existing habitats and the interim landscaped areas developed during the Phase 1 project that would be developed as part of the full build project. Indirect impacts to wildlife individuals using the open space areas created during Phase 1 that would remain under the full build, such as avoidance of certain habitat areas due to increased human activity, noise, or construction equipment during land disturbing activities.
- Potential changes in daytime and nighttime bird strikes.
- Potential long-term beneficial effects on plants and wildlife from the proposed landscaping within the proposed public open spaces developed within the project site.
- Degree of sea level rise due to climate change projected by the New York City Panel on Climate Change (NPCC).

C. REGULATORY CONTEXT

The following sections identify the federal and state legislation and regulatory programs that pertain to activities in coastal areas, surface waters, floodplains, wetlands, and the protection of species of special concern that would apply to the proposed project.

FEDERAL

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

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) (N.Y. ECL ARTICLE 3, TITLE 3; ARTICLE 15; ARTICLE 17, TITLES 3, 5, 7, AND 8; ARTICLE 21; ARTICLE 70, TITLE 1; ARTICLE 71, TITLE 19; IMPLEMENTING REGULATIONS 6 NYCRR ARTICLES 2 AND 3)

Title 8 of Article 17, ECL, Water Pollution Control, authorized the creation of SPDES to regulate discharges to New York State's waters. Activities requiring a SPDES permit include point source discharges of wastewater into surface or groundwater of the state, including the intake and discharge of water for cooling purposes, constructing or operating a disposal system (sewage treatment plant), discharge of stormwater, and construction activities that disturb one or more acres. The proposed project would require the management of stormwater and would involved construction on a site over one acre in size. Soil disturbing activities resulting from the proposed project would be conducted in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). To obtain coverage under this permit, an SWPPP would be prepared and a Notice of Intent (NOI) would be submitted to NYSDEC. The SWPPP would comply with all of the requirements of GP-0-10-001, NYSDEC's technical standard for erosion and sediment control, presented in "New York Standards and Specifications for Erosion and Sediment Control," and NYSDEC's technical standard for the design of water quantity and water quality controls (post-construction stormwater control practices) presented in the New York State Stormwater Management Design Manual.

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

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 almost any activity that would alter wetlands or the adjacent areas (up to 300 feet inland from wetland boundary or up to 150 feet inland within New York City). NYSDEC-regulated wetlands may exist along Roosevelt Island's shoreline.

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. Under these regulations, adverse modification of occupied habitat of endangered or threatened species is prohibited without authorization from NYSDEC.

LOCAL REGULATIONS

NEW YORK CITY STREET TREE ZONING AMENDMENT AND LOCAL LAW 3 OF 2010

The City of New York passed a zoning text amendment[2] that requires trees to be planted along the curb of city streets following the construction of new buildings and certain types of alterations citywide. All applicants must apply to the NYCDPR for street tree planting permits. The current zoning requires all new buildings and all enlargements exceeding 20 percent of the floor area to have 1 tree for every 25 feet of road frontage, including existing trees. Like other zoning rules, these requirements must be satisfied in order for the builder to obtain a Certificate of Occupancy. Species shall be selected from the list of approved Street Trees for New York City. Tree replacement, protection, and transplanting would comply with the New York City Department of Parks and Recreation (DPR)'s applicable rules and regulations. The methodology used to determine the number and size of trees to be replanted (e.g., caliper replacement method) would be determined in consultation with DPR and would be in accordance with this zoning amendment and local law, and Chapter 5 Title 56 of the Rules of the City of New York. The proposed project would map the one-way ring road surrounding the project site as a city street and is therefore required to provide street trees consistent with this zoning amendment and local law.

D. EXISTING CONDITIONS

WATER QUALITY

The East River is a tidal strait connecting western Long Island Sound with upper New York Harbor. Its lower reach, in the vicinity of the project site, is classified by NYSDEC as Use Classification I. Recommended uses for Class I waters are secondary contact recreation and fishing, and water quality should be suitable for fish propagation and survival.

NYCDEP monitors water quality in New York Harbor, including the East River, through its annual Harbor Survey. The results of recent surveys (e.g., NYCDEP 2006, 2010; NYNJHEP 2011) show that water quality has improved significantly as a result of measures undertaken by the city. These measures include infrastructure improvements, the elimination of 99 percent of raw dry-weather sewage discharges, the reduction of illegal discharges, the increased capture of wet-weather-related floatables, and the reduction of toxic metals loadings from industrial sources by 95 percent (NYCDEP 2002). In 2009, the Inner Harbor survey region of the NYCDEP Harbor Survey (which includes the lower East River) had met the fecal coliform standard (an indicator of untreated sewage discharge) for at least 5 years. Average dissolved oxygen (DO)[3]

[2] http://www.nyc.gov/html/dcp/html/street_tree_planting/index.shtml

[3] DO in the water column is necessary for respiration by aquatic biota. The bacterial breakdown of high organic loads can deplete DO and result in low DO levels. Persistently low DO can degrade habitat and

concentrations also met the Use Classification I standards during this same time period and chlorophyll-a concentrations[4] were not indicative of high nutrient concentrations. Secchi transparency[5] during this 5 year period was indicative of low water clarity, likely due to high suspended solid concentrations of surface waters (NYCDEP 2010, 2011).

AQUATIC BIOTA

The Upper New York Harbor, which includes the lower East River, provides a variety of habitats that support a diverse and productive aquatic community. Aquatic organisms include phytoplankton, submerged aquatic vegetation (SAV), benthic macroalgae, zooplankton, benthic invertebrates (including shellfish), and fish, as well as occasional marine mammals and sea turtles, as described below.

PHYTOPLANKTON, SAV AND BENTHIC MACROALGAE

These organisms are the primary producers of energy in marine food webs. Diatoms, dinoflagellates, green algae, and blue-green algae are the most dominant groups of phytoplankton species in the New York Harbor and East River (Hazen and Sawyer 1983, Brosnan and O'Shea 1995). SAV refers to vascular plants that grow in shallow areas around the harbor where light sufficient for photosynthesis can penetrate. SAV provide prey with cover from predators, act as host structures for epiphytes, buffer nutrients and trap sediment, and minimize erosion of the harbor floor. The extensively developed shoreline, swift currents, and steeply sloped engineered shorelines of the East River severely limit SAV occurrence. Benthic macroalgae occur in the shallower areas of the harbor and the East River; common species include brown algae (*Fucus* sp.) and sea lettuce (*Ulva lactua*) (Perlmutter 1971).

ZOOPLANKTON

Zooplankton are another integral component of the food web in the Upper New York Harbor. These organisms feed on phytoplankton and decomposed material, and are a primary food source for fish such as bay anchovy (*Anchoa mitchilli*), as well as early life stages of commercially and recreationally important fish such as striped bass (*Morone saxatilis*) and white perch (*Morone Americana*). Copepods, rotifers, barnacle larva, mysid shrimp, and amphipods are among the most common groups of zooplankton found within this region (Perlmutter 1971, Stepien et al. 1981, Hazen and Sawyer 1983, Lonsdale and Cosper 1994).

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affect aquatic biota. Consequently, DO is one of the most universal indicators of overall water quality in aquatic systems.

[4] High levels of nutrients can lead to excessive plant growth (a sign of eutrophication) and depletion of DO. Concentrations of the plant pigment chlorophyll-a in water can be used to estimate productivity and the abundance of phytoplankton. Chlorophyll-a concentrations greater than 20 micrograms per liter (µg/L) are considered suggestive of eutrophic conditions (NYCDEP 2010).

[5] Secchi transparency is a measure of the clarity of surface waters. Transparency greater than 5 feet (1.5 meters) indicates relatively clear water. Decreased clarity can be caused by high suspended solid concentrations or blooms of plankton. Secchi transparencies less than 3 feet (0.9 meters) may be considered indicative of poor water quality conditions. Average Secchi readings in the Inner Harbor area have remained relatively consistent since measurement of this parameter began in 1986, ranging between approximately 3.5 and 5.5 feet (1.1 to 1.8 meters) (NYCDEP 2010).

BENTHIC INVERTEBRATES

Benthic invertebrates inhabit the sediments and surfaces of submerged objects such as rock pilings or debris, and are food source for fish and waterfowl in the Upper New York Harbor regional study area. Common groups include aquatic earthworms (oligochaetes), segmented worms (polychaetes), snails (gastropods), bivalves (e.g., soft shell clams, dwarf surf clam, and blue mussel), barnacles, cumaceans, amphipods, isopods, crabs, and shrimp (LMS 1980,1984; NJDEP 1984; EA Engineering Science & Technology 1990). Most benthic invertebrates reported in the area are classified as pollution tolerant species (Adams et al. 1998). Benthic and epibenthic sampling in the East River documented nine benthic macroinvertebrate taxa, including annelids, arthropods, and mollusks (NYCDEP 2007). The annelid *Haploscoloplos robustus* and mollusks *Melampus bidentatus* and *Mulinia lateralis* were found in the highest densities. Blue crab (*Callinectes sapidus*) and American lobster (*Homarus americanus*) may also be present within the Upper New York Harbor regional study area (NMFS 2001).

FISH

The finfish community in New York Harbor and East River is typical of large coastal estuaries and inshore waterways along the Mid-Atlantic Bight, supporting a variety of estuarine, marine, and anadromous fish species that use this area for spawning habitat, a migratory pathway, and as a nursery/foraging area. Hogchoker (*Tinectes maculates*), tomcod (*Microgadus tomcod*), winter flounder (*Pseadopeuronectes americanus*), white perch (*Morone americana*), bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*) and striped bass (*Morone saxatilis*) are examples of fish found within the Upper New York Harbor and lower East River (NOAA 2001). Atlantic silverside (*Menidia menidia*), mummichog (*Fundulus heteroclitus*), striped killifish (*Fundulus majalis*), and three-spined stickleback (*Gasterosteus aculeatus*) are common estuarine species that occur year round. Blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), striped bass, tomcod, Atlantic sturgeon (*Acipenser oxyrhynchus*), and rainbow smelt (*Osmerus mordax*) are anadromous fish that pass through the harbor during migration to and from spawning areas in the upper Hudson River. Examples of marine species found from spring through fall include bluefish (*Pomatomus saltatrix*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), tautog (*Tautoga onitis*), and weakfish (*Cynoscion regalis*) (NOAA 2001). Overall, the harbor's fish community is very spatially and seasonally dynamic. Transient shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus*) may occasionally be present in New York Harbor and East River (Bain 1997, NMFS 2001).

GROUNDWATER

As presented in Chapter 10, "Hazardous Materials," groundwater occurs between 12 and 15 feet below grade within the project site. Groundwater beneath the project site is expected to flow outward from the center toward the East River, but the actual flow direction is likely influenced by basements, underground utilities, bedrock geology, and nearby subway tunnels. Analytical results of groundwater samples collected within the project site indicated compliance with NYSDEC Class GA Ambient Water Quality Standard (drinking water standards) with the exception of levels of certain metals (some of these were likely related to urban fill materials whereas other are likely natural). Groundwater on Roosevelt Island is not used as a source of potable water.

WETLANDS

The East River is classified on NWI maps as estuarine subtidal unconsolidated bottom wetland (E1UBL1). Subtidal areas are continuously submerged, and unconsolidated bottoms have at least 25 percent cover of particles smaller than 7 centimeters and less than 30 percent vegetative cover. The Roosevelt Island shoreline is bulkheaded and rip-rapped, and no vegetated tidal wetlands are present. However, the near-shore water depths around the Island's perimeter may be sufficiently shallow (less than 6 feet at mean low water) to be considered NYSDEC littoral zone tidal wetlands. There are no NWI- or NYSDEC-mapped freshwater wetlands present within the project site.

FLOODPLAINS

On the basis of currently effective FEMA flood insurance rate maps (FIRM), ~~On the eastern and western sides of the study area,~~ the 100-year floodplain (i.e., the area with a 1 percent chance of flooding each year) reaches beyond the seawall and covers portions of West Road and East Road on the western and eastern edges of the study area. The project site, however, is entirely outside of the 100-year floodplain zone. The 500-year floodplain zone (i.e., the area with a 0.2 percent chance of flooding each year) extends into the project site towards its midpoint where the elevation is lowest (see **Figure 9-2**). The FEMA Advisory Base Flood Elevations (ABFE) maps [6] indicate that the eastern and western portions of the project site are within the Advisory 1% Base Flood Elevation (i.e., 100 year flood elevation, 13 feet North American Vertical Datum of 1988 (NAVD88, which converts to 14.1 feet National Geodetic Vertical Datum of 1929 [NGVD29] and 16.4 feet Belmont Island Datum[7]), and much of the project site's center is below the Advisory 0.2%. Base Flood Elevation (i.e., 500-year flood elevation). The ABFE for the 100-year flood elevation is approximately 4 feet higher than the currently applicable 100-year flood elevation at the western and eastern edges of the study area.

New York City is affected by local (e.g., flooding of inland portions of the city from short-term, high-intensity rain events in areas with poor drainage), fluvial (e.g., rivers and 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 Upper New York Bay, and tidally influenced rivers such as the Hudson River and East River, streams, and inlets [FEMA 2007]). Because the East River is tidal, its water level is controlled by the tidal conditions within the New York Bay, Long Island Sound, and the Atlantic Ocean. Within New York City, tidal flooding is the primary cause of flood damage. Coastal floodplains such as those present on Roosevelt Island are influenced by astronomic tide and meteorological forces (e.g., northeasters and hurricanes [FEMA 2007]) and not by fluvial flooding.

TERRESTRIAL ECOLOGICAL COMMUNITIES AND VEGETATION

Roosevelt Island has been highly modified by human activity and is almost entirely developed. Following Edinger et al. (2002), the majority of the Island is best described as a "terrestrial cultural" system. This category includes ecological 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" (Edinger et al. 2002).

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[6] The FEMA Advisory Base Flood Elevation (ABFE) for the portion of New York City that includes the project site was released for review on February 25, 2013.

[7] Belmont Island Datum is the datum used for Roosevelt Island.

Ecological communities within the study area include "mowed lawn with trees," "mowed roadside/pathway," "paved road," and "urban structure exterior." Most of the vegetated sections of the study area are best described as "mowed lawn with trees," which is defined by Edinger et al. (2002) as "residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and shaded by at least 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing." This category applies to the areas of lawn with mature trees on the eastern, western, and southern sides of the hospital buildings, and the medians that divide the Roosevelt Island promenade from West Road and East Road. Tree species in these areas include pin oak (*Quercus palustris*), alternate-leaf dogwood (*Cornus alternifolia*), American hornbeam (*Carpinus caroliniana*), Japanese maple (*Acer palmatum*), Japanese black pine (*Pinus thunbergii*), gingko (*Gingko biloba*), black cherry (*Prunus serotina*), Yoshino cherry (*Prunus x yedoensis*), white spruce (*Picea glauca*), American beech (*Fagus grandifolia*), eastern cottonwood (*Populus deltoides*), London planetree (*Platanus hybrida*), silver maple (*Acer saccharinum*), elm (*Ulmus sp.*), and honey locust (*Gleditsia triacanthos*). Results of a tree survey conducted on the project site on March 5 and 6, 2012 documented a total of 132 trees comprising 26 species. Pin oak is the most abundant tree, accounting for 51 of the trees on site. Most trees are mature, with an average diameter at breast height of 19 inches.

The southern end of the study area extends into the newly created South Point Park. The majority of the park is composed of a grassy area with recently planted sapling trees which include swamp white oak (*Quercus bicolor)*, tuliptree (*Liriodendron tulipifera*), and pin oak. Vegetation on the hill centered within the park largely comprises herbaceous vegetation and grasses such as switchgrass (*Panicum virgatum*), black-eyed Susan (*Rudbeckia hirta*), boneset (*Eupatorium perfoliatum),* calico aster (*Aster lateriflorus*), various goldenrod species (*Solidago sp*.) and other native herbaceous species. This restoration area cannot be described adequately by one community type but does meet some characteristics of the "successional old field" and "flower/herb garden" ecological community classifications defined by Edinger et al. (2002).

A peripheral area, which is separated from the restoration area by fencing and bounded by the East River on the east side of the Island, could be described according to Edinger et al. (2002) as "urban vacant lot" which is defined 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 area of exposed soil and often with rubble or other debris." This area is occupied by species that are characteristic of this ecological community, including common wormwood (*Artemisia vulgaris*), biennial wormwood (*Artemisia biennis*), nightshade (*Solanum sp.*), and tree of heaven (*Ailanthus altissima*).

A complete list of plants observed within the study area during the October 12, 2011 field survey is presented in **Table 9-1**.

Table 9-1
Plant Species Observed within the Study Area

Common name	Scientific name
Trees and Shrubs	
Yoshino cherry	*Prunus x yedoensis*
American basswood *	*Tilia Americana*
Juniper species	*Juniperous spp.*
Cotoneaster	*Cotoneaster* Medik
Golden raintree	*Koelreuteria bipinnata*
Pin oak *	Quercus palustris
Domestic pear	Pyrus communis
Rosemallow *	*Hibiscus*
Mulberry species	*Morus spp.*
Multiflora rose	*Rosa multiflora*
Rose species	*Rosa spp.*
Japanese maple	Acer palmatum
English yew	*Taxus baccata*
Tree of heaven	*Ailanthus altissima*
Sweetgum *	*Liquidambar styraciflua*
Princess tree	*Paulownia tomentosa*
Alternate-leaf dogwood *	*Cornus alternifolia*
American hornbeam *	*Carpinus caroliniana*
Japanese black pine	*Pinus thunbergii*
Silver maple *	*Acer saccharinum*
Eastern cottonwood *	*Populus deltoides*
London planetree	*Platanus hybrida*
American beech *	*Fagus grandifolia*
Sugar maple *	*Acer saccharum*
Forbs and Herbs	
Maple species *	*Acer spp.*
White spruce *	*Picea glauca*
Honeylocust *	*Gleditsia triacanthos*
Northern bayberry *	*Morella pensylvanica*
Tuliptree *	*Liriodendron tulipifera*
Swamp white oak *	*Quercus bicolor*
Sumac species *	*Rhus*
Gingko	*Gingko biloba*
Black cherry	*Prunus serotina*
Elm species	*Ulumus spp.*
Geranium	*Geranium spp.*
Abelia	Abelia X grandiflora
Daylilly	*Hemerocallis spp.*
Liriope	*Liriope spp.*
Hydrangea	*Hydrangea spp.*
Common plantain	*Plantago major*
Common blue violet *	*Viola sororia*
Dandelion	*Taraxacum spp.*
White clover	*Trifolium repens*
Blackeyed Susan *	*Rudbeckia hirta*
Blue flax	*Linum perenne*
Bermudagrass	*Cynodon dactylon*
Nutgrass	*Cyperus rotundus*
Nightshade	*Solanum spp.*
Japanese knotweed	*Polygonum cuspidatum*
Boneset *	*Eupatorium perfoliatum*
Foxtail	*Alopecurus*
Echinacea	*Echinacea spp.*
Common reed	*Phragmites australis*
Solidago species *	Solidago spp.

Table 9-1 (cont'd)
Plant Species Observed within the Study Area

Common name	Scientific name
Forbs and Herbs (cont'd)	
Timothy species	*Phleum spp.*
Curly dock	*Rumex crispus*
Giantdaisy	*Leucanthemella serotina*
Common wormwood *	*Artemisia vulgaris*
Switchgrass *	Panicum virgatum
Biennial wormwood	*Artemisia biennis*
Calico aster *	*Aster lateriflorus*
Cottongrass	*Eriophorum spp.*
Vines	
Boston ivy	*Parthenocissus tricuspidata*
Virginia creeper *	*Parthenocissus quinquefolia*
Oriental lady's thumb	*Polygonum cespitosum*
Morningglory	*Ipomoea eriocarpa*
Notes: * Native to North America **Source:** 10/12/11 Field investigation	

ASIAN LONGHORNED BEETLE

Roosevelt Island falls within the boundaries of a regulated quarantine zone for the Asian Longhorned Beetle (*Anoplophora glabripennis*). The Asian Longhorned Beetle is a destructive wood-boring pest of maple and other hardwoods that was first discovered in the United States in Brooklyn, NY in 1996. Since 1996, U.S. Department of Agriculture's (USDA's) Animal and Plant Health Inspection Service (APHIS); state and city cooperators in New York, Illinois, and New Jersey; and the U.S. Forest Service have undertaken eradication activities by imposing regulated boundaries, conducting survey and control activities around confirmed sites, removing infested trees, and planting trees to restore areas where trees were removed. Contractors operating in infested areas must be certified and must thoroughly clean all equipment before moving to non-infested areas.

As a measure of control, certain tree species are generally prohibited from planting within all of Brooklyn, Manhattan (including Roosevelt Island), Queens, and parts of Staten Island. The most common host species for the Asian Longhorned Beetle include: maples such as Norway, red, silver, sugar, sycamore maple, and boxelder, horsechestnut, buckeye, willows such weeping willow, pussy willow, and white willow, American elm, Siberian elm, Chinese elm, gray birch, European white birch, and river birch. Signs of infestation were not noted during the tree survey.

WILDLIFE

The habitat available to terrestrial wildlife in the study area primarily consists of manicured lawn, ornamental shrubs, single rows of young trees, and small clusters of mature shade trees. There is no woody understory beneath the mature trees, and herbaceous ground cover consists of mowed grass. As such, wildlife occurring in the study area is largely limited to urban-adapted species that tolerate degraded environments and high levels of human activity.

BIRDS

The Breeding Bird Atlas is a periodic census of the distribution of breeding birds across New York State. The most recent census was conducted from 2000-2005 and documented 43 species as confirmed or probable/possible breeders in the survey block in which the study area is located (Block 5851C; see **Table 9-2**). This survey block encompasses larger and more diverse areas of

Table 9-2
2000-2005 Breeding Bird Atlas Results for Block 5851C

Common Name	Scientific Name
Canada Goose	*Branta canadensis*
Mute Swan	*Cygnus olor*
Mallard	*Anas platyrhynchos*
Double-crested Cormorant	*Phalacrocorax auritus*
Green Heron	*Butorides virescens*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Peregrine Falcon	*Falco peregrinus*
Herring Gull	*Larus argentatus*
Rock Pigeon	*Columba livia*
Mourning Dove	*Zenaida macroura*
Eastern Screech-Owl	*Megascops asio*
Chimney Swift	*Chaetura pelagica*
Red-bellied Woodpecker	*Melanerpes carolinus*
Downy Woodpecker	*Picoides pubescens*
Northern Flicker	*Colaptes auratus*
Eastern Wood-Pewee	*Contopus virens*
Great Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Tree Swallow	*Tachycineta bicolor*
Barn Swallow	*Hirundo rustica*
Tufted Titmouse	*Baeolophus bicolor*
White-breasted Nuthatch	*Sitta carolinensis*
Carolina Wren	*Thryothorus ludovicianus*
House Wren	*Troglodytes aedon*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*
Song Sparrow	*Melospiza melodia*
Northern Cardinal	*Cardinalis cardinalis*
Red-winged Blackbird	*Agelaius phoeniceus*
Common Grackle	*Quiscalus quiscula*
Orchard Oriole	*Icterus spurius*
Baltimore Oriole	*Icterus galbula*
House Finch	*Carpodacus mexicanus*
House Sparrow	*Passer domesticus*

Note: Boldface indicates the subset of species expected to nest within the study area based on the habitat present.

habitat (including the southern end of Central Park) than what is present on Roosevelt Island; therefore, many bird species that appear in the atlas block are unlikely to breed in the study area. Eighteen of the 43 species listed in the atlas block are considered to have the potential to breed in the study area on the basis of their habitat requirements (see species highlighted in bold in Table 9-2). They are disturbance-tolerant, generalist species that have small area requirements and thrive in human-modified environments. Examples include American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), mourning dove (*Zenaida macroura*), northern cardinal (*Cardinalis cardinalis*), and red-bellied woodpecker (*Melanerpes carolinus*).

Many of the birds that likely occur in the study area during the breeding season are year-round resident species that remain at northern latitudes during winter. Landbird species expected to occur in the terrestrial habitats of the study area during winter include urban-adapted species such as blue jay, dark-eyed junco (*Junco hyemalis*), downy woodpecker (*Picoides pubescens*), European starling, house sparrow, mourning dove, northern cardinal, red-bellied woodpecker, and white-throated sparrow (*Zonotrichia albicollis*). Waterfowl and other waterbirds that are commonly found in the waters surrounding New York City (Fowle and Kerlinger 2001) and may occur on the lower East River during winter include American black duck (*Anus rubripes*), bufflehead (*Bucephala albeola*), Canada goose (*Branta canadensis*), common merganser (*Mergus merganser*), greater black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*), mallard (*Anas platyrhynchos*), and ring-billed gull (*Larus delawarensis*).

Although the terrestrial resources in the study area provide breeding and wintering habitat for only a limited number of bird species, they may be utilized as stopover sites by numerous additional species migrating through the region. Most bird species are more generalistic in their habitat preferences during migration than during the non-migratory periods, and thus, far more species are likely to occur in the study area during spring and fall than at other times of year. Migratory landbirds expected to occur in the study area during spring and fall include arboreal species that forage in mature trees, such as American redstart (*Setophaga ruticilla*), black and white warbler (*Mniotilta varia*), northern parula (*Parula americana*), red-eyed vireo (*Vireo olivaceus*), and yellow-rumped warbler (*Dendroica coronata*), among others. Species that prefer understory vegetation, early successional forests, and fields and meadows may occur in South Point Park during migration. Examples include common yellowthroat (*Geothlypis trichas*), dark-eyed junco, song sparrow (*Melospiza melodia*), and white-throated sparrow (*Zonotrichia albicollis*).

Birds observed in the study area during the field surveys included blue jay, Canada goose, cedar waxwing (*Bombycilla cedrorum*), double-crested cormorant (*Phalacrocorax auritus*), European starling, house sparrow, mourning dove, northern mockingbird (*Mimus polyglottos*), red-bellied woodpecker, ring-billed gull, rock dove (*Columba livia*), song sparrow, white-throated sparrow, yellow-bellied sapsucker (*Sphyrapicus varius*), and yellow-rumped warbler. Of these, blue jay, Canada goose, European starling, house sparrow, mourning dove, northern mockingbird, red-bellied woodpecker, ring-billed gull, and rock dove are species that likely breed in the study area, and cedar waxwing, song sparrow, white-throated sparrow, yellow-bellied sapsucker, and yellow-rumped warbler were likely migrants headed towards southern wintering grounds.

MAMMALS

Similar to the bird community, the terrestrial resources available in the study area limits the mammal community to species associated with disturbed habitats within urban landscapes. The mammal community is further limited by Roosevelt Island's isolation from the mainland.

Mammals occurring on the Island are either species that have colonized the Island naturally or were introduced by humans.

Mammals expected to occur in the study area include raccoon (*Procyon lotor*), house mouse (*Mus musculus*), gray squirrel (*Sciurus carolinensis*), Norway rat (*Rattus norvegicus*), and domestic cat (*Felis catus*). Gray squirrel and domestic cat were the only mammals observed during the field surveys. Several feral domestic cats are known to occur at the site.

REPTILES AND AMPHIBIANS

The NYSDEC Herp Atlas Project identified 10 species as occurring within the atlas block that covers the study area (*Central Park* USGS quadrangle): northern redback salamander (*Plethodon cinereus*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), common snapping turtle (*Chelydra serpentina*), eastern box turtle (*Terrapene carolina*), red-eared slider (*Trachemys scripta*), painted turtle (*Chrysemys picta*), Italian wall lizard (*Podarcis sicula*), northern brown snake (*Storeria dekayi*), and common garter snake (*Thamnophis sirtalis*). However, the atlas block spans a large geographic area (most of Manhattan and south Bronx) that includes larger and more diverse areas of habitat than what is present on Roosevelt Island, and on the basis of their habitat requirements (Mitchell et al. 2006, Gibbs et al. 2007), none of these species is expected to occur in the study area.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES AND SIGNIFICANT HABITAT AREAS

The NYNHP Environmental Resource Mapper lists the shortnose sturgeon (state and federally endangered [*Acipenser brevirostrum*]) and peregrine falcon (state endangered [*Falco peregrines*]) as occurring in New York County, but does not identify any records of federal or state-listed species within the study area. In response to a request for information on state-listed species within a ½-mile of the project site, NYNHP indicated that peregrine falcons occur in the area (Pietrusiak 2012). However, the project site does not offer suitable nesting sites for peregrine falcons—high cliff ledges and tall buildings. While bridge towers can also be a nesting site, unlike several other bridges in the New York City region, peregrine falcons are not known to nest on the Queensboro Bridge. Within the vicinity of the project site, peregrine falcons have nested on the Williamsburg Bridge (approximately 3 miles away) in recent years. Occurrence of peregrine falcons in the study area would be limited to migrants passing through the region or individuals from nest sites elsewhere in the city.

No federally listed terrestrial wildlife species are listed by the USFWS as occurring in New York County. Federally threatened or endangered aquatic species indicated by NMFS as occurring in the East River in the vicinity of Roosevelt Island include shortnose sturgeon, Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), loggerhead sea turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), Kemp's ridley sea turtle (*Lepidochelys kempii*), and green sea turtle (*Chelonia mydas*) (Damon-Randall 2012). Sea turtles neither nest in the East River, nor reside there year-round, and would be unlikely to occur in the study area except as occasional transients. The federally endangered Atlantic and shortnose sturgeon are known to pass through the East River en route to Hudson River breeding grounds or overwintering areas in the Atlantic. NMFS has designated the Atlantic Ocean waters within the greater Hudson River estuary, of which the East River is a part, as Essential Fish Habitat (at the egg, larval, juvenile, and/or adult stage) for the following species: pollock (*Pollachius virens*), red hake (*Urophycis chuss*), winter flounder, windowpane flounder (*Scophthalmus aquosus*), Atlantic sea herring (*Clupea harengus*), bluefish (*Pomatomus saltatrix*), Atlantic butterfish, Atlantic mackerel (*Scomber*

scombrus), summer flounder (*Paralichthys dentatus*), scup, black sea bass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), sand tiger shark (*Carcharias taurus*), dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carcharhinus plumbeus*), clearnose skate (*Raja eglanteria*), little skate (*Leucoraja erinacea*), and winter skate (*Leucoraja ocellata*).

E. FUTURE WITHOUT THE PROPOSED PROJECT

2018 ANALYSIS YEAR

WATER QUALITY AND AQUATIC RESOURCES

The assessment of water quality and aquatic resources for the future without the proposed project in 2018 considers ongoing programs and proposed projects in the vicinity of the project site that will occur independent of the proposed project, including:

- Water quality and sediment quality improvements expected to occur as a result of regional and local programs;
- Habitat enhancement or restoration activities associated with the New York/New Jersey Harbor Estuary Program (HEP) or Hudson-Raritan Estuary Ecosystem Restoration Project (HRE);
- Water quality improvements in the East River resulting from New York City projects; and
- The Verdant Power Roosevelt Island Tidal Energy (RITE) project on Roosevelt Island.

New York City water quality improvement projects include the implementation of the East River and Open Waters Waterbody/Watershed Facility Plan developed as part of the Citywide Long Term Control Plan (LTCP) to address CSO discharges, in compliance with the EPA's CSO Control Policy and as specified in a Consent Order signed by NYSDEC and New York City in 2005 and modified in 2011 (NYSDEC Case No. CO2-20000107-8).

Other water quality improvement projects include Vision 2020, the NYC Green Infrastructure Plan, and the City of New York's PlaNYC. The *Vision 2020: New York City Comprehensive Waterfront Plan* was developed by New York City Department of City Planning to establish goals for the New York City waterfront, with the intention of promoting various ecological objectives and enhancing sustainability and climate resilience planning through the incorporation of climate change considerations, among other goals (see Chapter 2, "Land Use, Zoning, and Public Policy"). The plan, which should be largely in effect by 2018, seeks to make improvements to water quality and aquatic resources through measures such as: additional nitrogen reduction at the Bowery Bay, Tallman Island, Hunts Point, and Wards Island wastewater treatment plants (NYCDCP 2011), additional reduction in CSOs with the increased capture of stormwater runoff with implementation of the NYC Green Infrastructure Plan (NYCDEP 2011), improved flushing of constrained water bodies, and optimization of existing sewer systems through improvements to drainage, interceptors, and tide gates (NYCDCP 2011). The City of New York's PlaNYC document is a planning agenda that targets a wide range of improvements to New York City by the year 2030 (City of New York 2011). Examples of PlaNYC goals that would result in improvements to water quality and aquatic resources include reducing nitrogen discharges from the Bowery Bay, Tallman Island and Wards Island wastewater treatment plants by more than 50 percent, construction of grey infrastructure projects to reduce the discharge of untreated water to the East River and other waterways, and reintroduction of oysters and eel grass.

The Verdant Power Roosevelt Island Tidal Energy (RITE) project is located in the East River off Roosevelt Island and will likely be underway by 2018 under the terms of the Federal Energy Regulatory Commission (FERC) license issued to the pilot project on January 23, 2012 and valid for 10 years. The RITE project would provide renewable energy to the grid from tidal currents using an array of underwater, tidal turbines. Using up to 30 commercial class turbines, the pilot project would generate 1 megawatt (MW) of power (FERC 2012). The FERC license for the RITE project requires measures to protect and enhance fish, wildlife, cultural, and aesthetic resources, including several environmental monitoring programs such as hydroacoustic and sonar monitoring; species characterization and detection; monitoring for all rare, threatened, and endangered species and migration occurrences; bird monitoring; underwater noise monitoring; and monitoring of recreation use. All project equipment will have to be removed 60 days prior to the expiration of the certification, followed by site restoration, unless a FERC license is obtained (FERC 2012).

While some water quality improvements would be achieved by 2018, the aquatic biota within the lower East River in 2018 would be expected to be as described under the existing condition.

TERRESTRIAL ECOLOGICAL COMMUNITIES, VEGETATION, AND WILDLIFE

In 2018, without the proposed project, natural resources within the study area are expected to remain the same as at present. The hospital is assumed to be inactive and vacant, but the buildings would remain in place. Land use at the northern end of the study area would not change, and South Point Park at the southern end of the study area would presumably continue to be managed in its current state. Presently manicured areas of vegetation on the hospital campus would likely become slightly overgrown, but neither plant nor wildlife species composition would change as a result. The same urban-adapted, disturbance-tolerant species would continue to inhabit the site and the site would continue to lack suitable habitat to support any species beyond those currently in the area.

2038 ANALYSIS YEAR

WATER QUALITY AND AQUATIC RESOURCES

The assessment of water quality and aquatic resources for the future without the proposed project condition in 2038 considers the ongoing programs and proposed projects described above for the 2018 analysis year.

In the future without the project in 2038 water quality improvements resulting from implementation of measures identified in the East River and Open Waters Waterbody/Watershed Facility Plan would be expected to have continued. Water quality and habitat improvements would have been achieved from the measures and actions identified in Vision 2020 and the NYC Green Infrastructure Plan as well as in PlaNYC. If issued a license, the Verdant Power RITE project would be in operation.

Aquatic biota in the East River would likely remain largely the same as described under the existing condition.

TERRESTRIAL ECOLOGICAL COMMUNITIES, VEGETATION, AND WILDLIFE

In 2038, without the proposed project, natural resources would be expected to be similar to the existing condition and the future condition without the project in 2018 with some natural maturation of vegetation. For purposes of conservatively assessing impacts, it is assumed that the Goldwater Hospital would remain vacant in the 2038 analysis year. Areas of the project site

that are presently covered by manicured lawn would be overgrown. Land use at the northern end of the study area would not change, and South Point Park at the southern end of the study area would presumably continue to be managed in its current state. Young trees currently in the study area would be mature, and mature trees presently in the study area would be older and larger. The same urban-adapted, disturbance-tolerant wildlilfe species would continue to inhabit the site and the site would continue to lack suitable habitat to support any species beyond those currently in the area.

F. PROBABLE IMPACTS OF THE PROPOSED PROJECT

2018 ANALYSIS YEAR (PHASE 1)

By 2018, the first phase of the Cornell NYC Tech project would be completed. Construction of Phase 1 would result in clearing and grading within much of the 12.5-acre project site. Phase 1 would consist of up to 790,000 gsf of development, consisting of academic space, residential units, corporate co-location space, an Executive Education Center, ancillary retail uses, a central utility plant, and up to 250 parking spaces. Phase 1 would also include publicly accessible open space and the integration of green infrastructure practices, such as bioswales, rain gardens or rainwater collection and reuse of stormwater to the extent practical as part of the SWPPP prepared for the development. As discussed in Chapter 1, "Project Description," Cornell has set a goal to achieve net-zero energy consumption for its Phase 1 academic building. To meet this goal, an array of photovoltaic (PV) panels may be constructed above the roof of the academic building, extend over a portion of the central spine (creating a canopy), and continue over the roof of the corporate co-location building.

The proposed project would not result in any changes to the promenade, which is outside the project site.

The following sections discuss the potential for natural resource impacts to occur in 2018 with the proposed project.

AQUATIC RESOURCES AND WETLANDS

Phase 1 of the proposed project would not result in water quality conditions within the East River that fail to meet Class I standards or adversely affect aquatic biota. The implementation of green infrastructure practices, such as bioswales, rain gardens or rainwater collection and reuse of stormwater to the extent practical, and other measures implemented as part of the post-construction stormwater management measures that would be incorporated in the SWPPP, would improve the quality of the stormwater discharged to the East River and NYSDEC littoral zone tidal wetlands (if any are present) from the project site, and reduce the peak stormwater discharge rate. Operation of Phase 1 of the proposed project would not adversely affect aquatic biota of the East River.

GROUNDWATER

Phase 1 of the proposed project would not result in adverse impacts on groundwater resources within the project site.

FLOODPLAINS

The 500-year floodplain zone within and adjacent to the study area is affected by coastal flooding and would not be affected by construction or regrading/filling. Therefore, Phase 1 of

the proposed project would not increase the potential for public and private losses due to flood damage, or increase the exposure of public utilities to flood hazards.

TERRESTRIAL ECOLOGICAL COMMUNITIES AND VEGETATION

Phase 1 of the proposed project would not result in significant adverse impacts to terrestrial ecological communities and vegetation (see Chapter 20, "Construction," for a discussion of potential tree loss at the site). The proposed project would be consistent with the tree planting requirements required as part of the New York City street tree zoning amendment. Landscaping within the publicly-accessible open space that would be developed by 2018 would be planted with woody and herbaceous vegetation native to New York consistent with the New York City Department of Parks and Recreation tree planting standards (NYCDPR 2009), and would not include tree species known to host the Asian Longhorned beetle. Shade-tolerance would be considered when selecting plantings for any landscaped areas in the shadow of the PV canopy.

WILDLIFE

The proposed Phase 1 facilities would not have significant adverse impacts to wildlife at either the individual or population level. Terrestrial wildlife habitat in the project area is presently extremely limited, as the site primarily consists of buildings surrounded by manicured lawn with shade trees. Phase 1 of the proposed project would create new buildings surrounded by areas of landscaped open space that would provide habitats similar to those that would occur in the future without the proposed project. The proposed open spaces, largely consisting of manicured lawn with shade trees, would create conditions for wildlife that are the same as those currently present within the project site, and would thus support the same wildlife species (described under "Existing Conditions"). Examples include gray squirrel, American robin, house sparrow, and European starling. The increased diversity of vegetation that would occur in the landscaped open space areas would have the potential to improve on the quality of the habitat available for urban tolerant wildlife species currently present within the study area, and would improve the suitability of the project site as migratory bird stopover habitat since native trees typically support a greater abundance of macroinvertebrates and produce higher quality fruits (Tallamy 2007) that most migratory songbirds feed upon. Including native fruit-bearing trees within the landscaping would also enhance the quality of the resources available to other wildlife species. The increased human activity that would occur as a result of Phase 1 of the proposed project, when compared to the future without the proposed project, would not be expected to adversely affect disturbance-tolerant wildlife using the limited habitats within the study area.

Bird Collisions

Windows and other glass surfaces of buildings have the potential to result in losses of birds due to collisions. The risk of bird collisions occurring due to a particular building is a function of building design, location, surrounding habitat, and the abundance and species of birds in the area (Hager et al. 2008, Gelb and Delecretaz 2009, Klem et al. 2009). While birds are known to collide with tall artificial structures such as buildings at night, the overwhelming majority of bird collisions with buildings occur during the daytime when lower story windows reflect images of nearby trees and other vegetation (Gelb and Delecretaz 2006, 2009, Klem et al. 2009).

Night time collisions of birds with artificial structures are often strongly related to structure height (Kerlinger 2000). For example, several studies have found bird mortality at communication towers taller than 984 feet to be significantly greater than mortality at towers that are less than 492 feet tall (Longcore et al. 2008). Most birds migrate at altitudes of 656 to 2,461 feet (Able 1970, Mabee et al. 2006) and rarely fly below 295 feet during clear weather

(Mabee and Cooper 2004). Phase 1 of the proposed project would include four buildings of varying height with a maximum height of 320 feet. As such, none of the proposed buildings would intrude upon the air space commonly used by migrating birds. While relatively short structures may still represent collision hazards to birds during inclement weather when their lighting scheme attracts and/or disorients individuals, night time collisions of birds with the proposed project's buildings would likely be an extremely rare occurrence restricted to periods of very dense fog and low cloud cover. Losses under these conditions would not be expected to result in significant adverse impacts to migratory bird populations (Arnold and Zink 2011).

Throughout New York City, bird collisions with buildings are almost entirely attributable to daytime strikes with lower story reflective glass windows, not nighttime collisions with upper floors of skyscrapers (Gelb and Delecretaz 2006, 2009; Klem et al. 2009). The potential for daytime collisions with the proposed project's buildings would be dependent upon building architecture (e.g., percentage of building surface covered by glass, window size, glass type/reflectivity) and surrounding vegetation characteristics (Hager et al. 2008, Gelb and Delecretaz 2009, Klem et al. 2009). Detailed collision monitoring data from similar buildings elsewhere in Manhattan indicate a potential for losses of between 10 to 50 birds per building per year (Gelb and Delecretaz 2006, 2009; Klem et al. 2009). Actual losses would be highly dependent on the specific design features of the buildings and surrounding landscaping (Hager et al. 2008, Gelb and Delecretaz 2009, Klem et al. 2009) and the abundance of birds in the area. The landscaped habitat that would be available in the project site would be used mostly by common, resident bird species which seldom collide with windows relative to migrants (O'Connell 2001). The landscaped habitats resulting from Phase 1 of the proposed project would not represent highly attractive stopover habitat that would concentrate very large volumes of migrants, and therefore large concentrations of migrants would not be expected to occur in proximity to the proposed buildings and be at risk of daytime collisions.

Measures to decrease the potential for losses due to daytime collisions of birds would be considered in the design of the buildings and landscaping that would be developed as part of Phase 1. Measures known to be effective in reducing daytime bird collisions with windows are varied and include those that substantially reduce the reflectivity of glass, such as the use of etched, fritted, patterned, or frosted glass (ABC 2011, Klem 2009); decorative louvers, rods, shades, and similar materials on building facades (ABC 2011); the placement of fine mesh netting over windows to intercept birds and prevent contact (Evans 1976, Stedman and Stedman 1986, Klem 1991); the inclusion of thin black lines vertically or horizontally spaced a few inches apart on a window's surface (Roessler et al. 2007, Sheppard 2011); or the use of commercially available glass that is transparent but that reflects ultraviolet light, so that birds perceive the glass as a solid barrier (Ley 2006, Sheppard 2011). The PV canopy would be a horizontal and opaque structure that would not be a factor in daytime or nighttime bird collision risk.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES AND SIGNIFICANT HABITAT AREAS

The peregrine falcon is the only federally or state-listed species that is considered to have the potential to occur in the study area. As mentioned above, the project site lacks suitable nesting locations, and the occurrence of peregrine falcons in the area would be limited to migrants briefly passing through or individuals from nest sites elsewhere in the city. As such, the proposed project would not eliminate or degrade nesting habitat for the species. Hunting opportunities in the project area for migrant peregrine falcons or individuals from nests

elsewhere in the city would remain the same in the future with Phase 1 of the proposed project. Urban peregrine falcons primarily eat rock pigeons (DeMent et al. 1986, Rejt 2001), whose abundance would not change as a result of the proposed project. Urban peregrine falcons also consume small songbirds that are on spring and autumn migration (Rejt 2001, DeCandido and Allen 2006), the numbers of which would also remain similar at the site. Overall, Phase 1 would not result in significant adverse impacts to the peregrine falcon.

No other federally or state threatened, endangered, or special concern species of terrestrial biota occur on Roosevelt Island. Therefore, operation of Phase 1 of the proposed project would not have the potential to impact any such species. The federally and state-listed species that have the potential to occur in the East River in the vicinity of the project site would only occur in the vicinity of the Roosevelt Island shoreline near the project site as occasional transients. As discussed under "Aquatic Resources and Wetlands," operation of Phase 1 would not adversely affect water quality or habitat conditions in the East River, and would therefore have no direct or indirect effects on any individuals of these species potentially occurring in the East River or essential fish habitat.

2038 ANALYSIS YEAR (FULL BUILD)

In 2038, the entire project site would be developed with academic, corporate co-location, residential, and Executive Education Center buildings. In the 2038 analysis year, up to approximately 1.34 million gsf would have been added to the Phase 1 project, comprising approximately 420,000 gsf of academic space, 500,000 gsf of residential space (652 units), 400,000 gsf of corporate co-location space, another 20,000 gsf central utility plant, and additional publicly accessible open space.

AQUATIC RESOURCES AND WETLANDS

The operation of the full build phase of the proposed project would not result in water quality conditions within the East River that fail to meet Class I standards or adversely affect aquatic biota. As discussed for the 2018 analysis year with the proposed project (Phase 1), the implementation of green infrastructure practices throughout the project site, such as bioswales, rain gardens or rainwater collection and reuse of stormwater to the extent possible, and other measures implemented as part of the post-construction stormwater management measures that would be incorporated in the SWPPP, would improve the quality of the stormwater discharged to the East River and NYSDEC littoral zone tidal wetlands (if any are present) from the project site, and reduce the peak rate of discharge. Operation of the full build phase of the proposed project would not adversely affect aquatic biota of the East River.

GROUNDWATER

Operation of the full build phase of the proposed project would not result in adverse impacts to groundwater resources within the project site.

FLOODPLAINS

Because the 500-year floodplain within and adjacent to the study area is affected by coastal flooding, it would not be affected by construction or regrading/filling that would occur as part of the full build phase.

Chapter 16, "Greenhouse Gases and Climate Change," describes the state and city efforts to address potential impacts to the coastal areas and the city's critical infrastructure against rising seas and the sea level rise projections developed by the New York City Panel on Climate Change

(NPCC). As discussed in Chapter 16, for the 2050s period (i.e., a 30-year period extending from 2040 towards 2069) which is the period applicable to the 2038 full build year, the NPCC projected sea level rise under median conditions would result in an approximately 1-foot increase in the flood elevation associated with the current 100-year storm. This would result in an increase in the flood elevation associated with the current 100-year storm from 10 feet NVGD 29 or 12.26 Belmont Island Datum[8], to about 11 feet NVGD 29, or about 13.27 feet in Belmont Island Datum.

The design of the buildings within the project site would be consistent with the *New York City Building Code* requirements for construction within the 100-year floodplain as specified in Appendix G: "Flood Resistant Construction," of the *New York City Building Code* (http://home2. nyc.gov/html/dob/ downloads/pdf/cc_appendix_g.pdf), for the applicable building category (see Table 1604.5 of the *New York City Building Code* or Table 1-1 of Appendix G to the *New York City Building Code*), and any subsequent revisions to these requirements (e.g., adoption of the ABFE). The project proposes to set the minimum elevation of the main entrance level to 17.4 ~~16.3~~ feet Belmont Island Datum, which would be about 4 feet above the current 100-year flood elevation along the eastern and western portions of the study area, and at least one foot above the Advisory 1% Base Flood Elevation. Therefore, the project would have resilience for at least a one foot increase in the 100-year flood elevation (using the Advisory 1% Base Flood Elevation) due to sea level rise, which is within the likely range of sea level rise projected by the NPCC by end of century. ~~the projected one foot increase in sea level projected to occur in the 2050s period, which would make the project resilient to projected increases in flood elevation for this period.~~ The main entrance level elevation for each building would be consistent with the *New York City Building Code*. The below-grade area for all on-site structures would be waterproofed and designed to withstand the hydrostatic pressure exerted by groundwater during a 100-year flood event, consistent with the *New York City Building Code*. Therefore, the design for the structures at full build would minimize the potential for public and private losses due to flood damage under current and projected flood conditions, and no significant adverse impacts are expected.

TERRESTRIAL ECOLOGICAL COMMUNITIES AND VEGETATION

Similar to Phase 1, the full build of the proposed project would not have significant adverse impact to terrestrial ecological communities and vegetation. The proposed project would be consistent with the tree planting requirements required as part of the New York City street tree zoning amendment and any subsequent revisions to these requirements. Landscaping within the publicly-accessible open space added with the full build would be planted with a variety of woody and herbaceous vegetation, including small areas of perennial gardens that would add to the diversity of vegetation present within the project site. All trees planted would be consistent with the New York City Department of Parks and Recreation tree planting standards.

WILDLIFE

Similar to Phase 1, the full build of the proposed project would not have significant adverse impact to wildlife at either the individual or population level. Terrestrial wildlife habitat in the project area is presently limited to manicured lawn with shade trees. The full build of the proposed project would create additional new buildings surrounded by areas of open space and, as with Phase 1, result in minimal change in the types or abundance of habitat available to

[8] Belmont Island Datum is the datum used for Roosevelt Island.

terrestrial wildlife in the area when compared to the future without the proposed project in 2038. The proposed open space, largely consisting of manicured lawn with shade trees, would create conditions for wildlife that are the same as those currently present within the project site, and would thus support the same wildlife species (described under "Existing Conditions"). Examples include gray squirrel, American robin, house sparrow, European starling, and red-bellied woodpecker. Increasing the diversity of vegetation, including planting native species and fruit-bearing plants to the extent possible, in the landscaped open space areas would have the potential to improve the quality of the habitat available for urban tolerant wildlife species currently present within the study area, and may slightly improve the suitability as migratory bird stopover habitat.

The increased human activity that would occur as a result of the full build of the proposed project, when compared to the future without the proposed project in 2038 would not be expected to adversely affect disturbance-tolerant wildlife using the limited habitats within the study area. Operation of the full build would result in more buildings with windows in the area with which birds would have the potential to collide, and thus daytime bird collision risk would be slightly greater than that described above for Phase 1 of the proposed project. The additional buildings and glass coverage that would occur in the area under the full build scenario would not be expected to increase the likelihood of nighttime bird strikes, which is considered to be extremely low. Daytime collision potential would be highly dependent on the full build building designs and the surrounding landscaping. As described for Phase 1 of the proposed project, the landscaped habitat that would be available within the project site at full build would be used most likely by common, resident bird species, such as house sparrows and European starlings, which rarely collide with windows. With the incorporation of measures to decrease the potential for losses due to daytime collisions described for the 2018 analysis year with the proposed project, losses of resident and migratory bird species would be minimized and would not result in significant adverse impacts to bird populations.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES AND SIGNIFICANT HABITAT AREAS

Similar to Phase 1, operation of the Full Build would not affect habitat quality or hunting opportunities for any peregrine falcons that may briefly occur in the area. No other federally or state threatened, endangered, or special concern species of terrestrial biota occur on Roosevelt Island. Therefore, operation of the full build would not have the potential to impact any such species. Federally and state-listed species that have the potential to occur in the East River in the vicinity of the project site include shortnose sturgeon, Atlantic sturgeon, and several species of marine turtles. Each of these species would only occur in the vicinity of Roosevelt Island shoreline near the project site as occasional transients. As discussed under "Aquatic Resources and Wetlands", operation of the Full Build would not affect water quality or habitat conditions in the East River, and would therefore have no direct or indirect effects on any individuals of these species potentially occurring in the area or to EFH.

G. CONCLUSIONS

Neither Phase 1 nor full build of the Cornell NYC Tech project would result in significant adverse impacts to water quality, aquatic biota, tidal wetlands, essential fish habitat or threatened or endangered aquatic species. The implementation of green infrastructure practices, such as bioswales, rain gardens or rainwater collection and reuse of stormwater to the extent practical, and other measures implemented as part of the post-construction stormwater management

measures that would be incorporated in the SWPPP, would improve the quality of the stormwater discharged to the East River and NYSDEC littoral zone tidal wetlands from the project site. Grass cover of the project site would increase from the existing and No Action area of 3.1 acres (25 percent) to 3.46 acres (28 percent) at full build.

No areas of the 100-year floodplain occur within the project site. Because the floodplain within and adjacent to the study area is affected by coastal flooding, it would not be affected by construction or regrading/filling of the 500-year floodplain that would occur as part of the project. Therefore, the proposed project would not increase the potential for public and private losses due to flood damage, or increase the exposure of public utilities to flood hazards. The design of the buildings within the project site would ~~have to~~ be consistent with the New York City Building Code requirements for construction within the 100-year floodplain and any subsequent revisions to these requirements (e.g., adoption of the FEMA Advisory Base Flood Elevation [ABFE]). The project proposes to set the minimum elevation of the main entrance level to ~~16.3~~ 17.4 feet Belmont Island Datum, which would be about 4 feet above the current 100-year flood elevation and at least 1 foot above the Advisory 1% Base Flood Elevation. ~~projected flood elevation for the 100-year storm in the 2050s period, which would make the~~ Therefore, the project would have resilience for at least a one foot increase in the 100-year flood elevation (using the Advisory 1% Base Flood Elevation) due to sea level rise, which is within the likely range of sea level rise projected by the NPCC by end of century. ~~project resilient to projected increases in flood elevation for this period.~~ The~~is~~ main entrance level for each building ~~elevation~~ would be consistent with the New York City Building Code. The below-grade area for all on-site structures would be waterproofed and designed to withstand the hydrostatic pressure exerted by groundwater during a 100-year flood event, consistent with the *New York City Building Code*. Therefore, the design for the structures at full build would minimize the potential for public and private losses due to flood damage under current and projected flood conditions, and no significant adverse impacts are expected.

Phase 1 and full build of the proposed project would not result in significant adverse impacts to terrestrial ecological communities and vegetation. Tree replacement would be consistent with city tree replacement requirements using tree species approved by the New York City Department of Parks and Recreation. Additionally, the proposed project would result in the development of landscaped open space within the project site which would be expected to provide suitable habitat for the urban tolerant species currently present within the study area and would have the potential to enhance the quality of habitat through the introduction of increased diversity and use of native plant species. Bird-safe building features would be considered in final building and landscaping designs to reduce the potential for daytime bird collisions with lower-story reflective glass, thus reducing potential loss of resident and migratory bird species.

Overall, the proposed project would not result in significant adverse impacts on natural resources.

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