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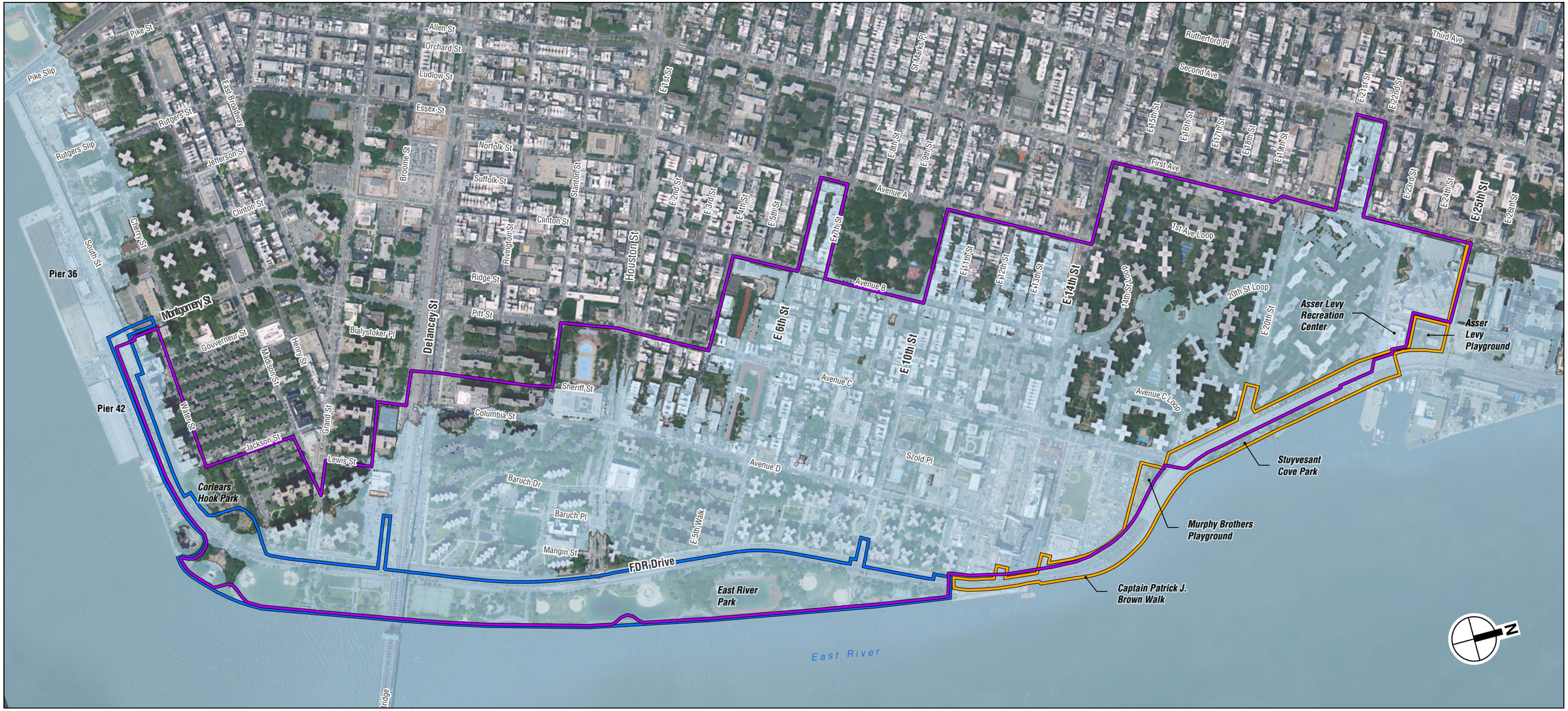
A. INTRODUCTION

On October 29, 2012, Hurricane Sandy made landfall and the resulting waves and storm surge battered the City's coastline, leading to 43 deaths, the destruction of homes and other buildings, and severe damage to critical infrastructure. During Hurricane Sandy, the east side of Manhattan was greatly impacted, highlighting the need for the City of New York (the City) to increase its efforts to protect vulnerable populations and critical infrastructure during extreme coastal storm events (the 100-year flood events with sea level rise projections to the 2050s[1]), referred to herein as the design storm event. Hurricane Sandy, a presidentially declared disaster, caused extensive coastal flooding, resulting in significant damage to residential and commercial property, open space, and critical transportation, power, and water and sewer infrastructure, which in turn affected medical and other essential services. As part of its plan to address vulnerability to such major flooding, the City is proposing the East Side Coastal Resiliency (ESCR) Project, which involves the construction of a coastal flood protection system along a portion of the east side of Manhattan and related improvements to City infrastructure (the proposed project).

The area that would be protected under the proposed project (the protected area) includes lands within the Federal Emergency Management Agency (FEMA) 100-year special flood hazard area (SFHA), as well as those projected to be within the 100-year flood hazard area in the 2050s, taking into account the 90th percentile projection for sea level rise (see **Figure S-1**). This includes portions of the Lower East Side and East Village neighborhoods, Stuyvesant Town, Peter Cooper Village, as well as the John V. Lindsay East River Park (East River Park) and Stuyvesant Cove Park. Within the project area, the City is proposing to install a flood protection system generally located within City parkland and streets, which would consist of a combination of floodwalls, elevated infrastructure or park areas, closure structures (e.g., floodgates), and other infrastructure improvements to reduce the risk of flooding. In addition to providing a reliable, FEMA accredited coastal flood protection system for this area, another goal of the proposed project is to improve open spaces and enhance access to the waterfront, including East River Park and Stuyvesant Cove Park.

To implement the proposed project, the City and its federal partners have committed approximately $1.45 billion in funding. The City has entered into a grant agreement with the U.S. Department of Housing and Urban Development (HUD) to disburse $338 million of Community Development Block Grant-Disaster Recovery (CDBG-DR) funds for the design and construction of the proposed project. The City is the grantee of CDBG-DR funds related to Hurricane Sandy for the development of a coastal flood protection system, which would be provided to the City

[1] Sea level rise estimate represents the 90th percentile value for 2050 as presented by the New York City Panel on Climate Change. See Chapter 2.0, "Project Alternatives," for additional details on design principals and sea level rise.



Source: 2016 New York State Digital Orthoimagery Program, NYS 2016

Project Area One

Project Area Two

Protected Area

100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Proposed Project Area Aerial Map

Figure S-1

through the New York City Office of Management and Budget (OMB), acting under HUD's authority.

This Draft Environmental Impact Statement (DEIS) addresses the requirements of the National Environmental Policy Act (NEPA), the New York State Environmental Quality Review Act (SEQRA), and New York City Environmental Quality Review (CEQR). NEPA is a federal law requiring the analysis of potential environmental effects of actions that are funded or subject to approval by federal agencies, such as HUD which is providing a portion of the funding for this project. SEQRA and CEQR are similar requirements for environmental review of State and City actions.

This DEIS describes the purpose and need for the proposed project and presents the alternative designs that were considered. In addition, the DEIS describes the methodologies and the criteria used to assess the potential for significant adverse effects associated with both the operation and construction of each alternative and presents mitigation measures, where needed. The methodologies and criteria used in the impact analyses are primarily based on the guidance set forth in the City's 2014 *CEQR Technical Manual*, and also draw upon applicable State and federal guidelines.

B. PURPOSE AND NEED

As previously stated, Hurricane Sandy underscored the City's need to advance its resiliency efforts to protect property, vulnerable populations, and critical infrastructure from major coastal storms. This need is intensified when considering projections of more frequent flooding events and aligns with resiliency planning goals described in *OneNYC* and *A Stronger, More Resilient New York*. To address these goals, the purpose of the proposed project is to reduce coastal flooding vulnerability and risk while enhancing waterfront open spaces and access to the waterfront.

The principal objectives of the proposed project are as follows:

- Provide a reliable coastal flood protection system against the design storm event for the protected area;
- Improve access to, and enhance open space resources along, the waterfront, including East River Park and Stuyvesant Cove Park;
- Respond quickly to the urgent need for increased flood protection and resiliency, particularly for the communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and
- Achieve implementation milestones and comply with conditions attached to funding allocations as established by HUD, including scheduling milestones.

C. ENVIRONMENTAL REVIEW PROCESS

The environmental review process provides decision-makers with the necessary information to systematically consider the proposed project's potential adverse environmental effects. This includes evaluating the potential adverse environmental effects from reasonable alternatives, and identifying and mitigating, where practicable, the effects identified as part of this process. The development and evaluation of project alternatives is central to the NEPA and SEQRA and CEQR processes. OMB and New York City Department of Parks and Recreation (NYC Parks), as NEPA and SEQRA/CEQR Lead Agencies, respectively, have determined that the proposed project has the potential to result in significant adverse environmental effects. Therefore, at OMB's request, the U.S. Department of Housing and Urban Development (HUD) issued a Notice of Intent to

Prepare an EIS in accordance with 24 CFR Part 1502.[2] In addition, OMB and NYC Parks prepared a Draft Scope of Work to describe the proposed content of the Draft Environmental Impact Statement (DEIS), to explain the methodologies to be used in the impact analyses, and to allow for public and stakeholder participation in accordance with 24 Code of Federal Regulations (CFR) Part 58, 40 CFR Parts 1500-1508 and 6 NYCRR Part 617.

A Draft Scope of Work for the DEIS was published on October 30, 2015, and a public scoping meeting was held on December 3, 2015, with a public input and review period that remained open until December 21, 2015. A Final Scope of Work, which reflected public comments made on the Draft Scope, was issued on April 5, 2019**.** This DEIS is based upon the Final Scope of Work. As stated above, the DEIS and subsequent Final EIS (FEIS) will serve to fulfill the statutory obligations of NEPA, SEQRA, and CEQR.

A Notice of Availability (pursuant to NEPA) and a Notice of Completion (pursuant to CEQR) for this DEIS were issued on April 5, 2019. Publication of the DEIS and the Notices initiates the public review period. The public review period for the DEIS will remain open for a minimum of 45 days. During this period, the public has the opportunity to comment on the DEIS in writing or at a public hearing. After the DEIS public comment period has closed, an FEIS will be prepared, which will include a summary of the comments received on the DEIS, responses to all substantive comments, and any necessary revisions to the DEIS to address those comments. No sooner than 45 days after publishing the FEIS, OMB, as NEPA Lead Agency, will prepare a Record of Decision that will describe the Preferred Alternative for the proposed project, its environmental impacts, and any required mitigation. Similarly, NYC Parks, as the SEQRA/CEQR Lead Agency, will prepare a Statement of Findings, demonstrating that it has reviewed the impacts, mitigation measures, and alternatives in the FEIS as part of its decision-making process. OMB can proceed with the federal action of requesting release of Community Development Block Grant-Disaster Recovery (CDBG-DR) grant funds from HUD once the environmental review process is concluded.

D. ANALYSIS FRAMEWORK

OVERVIEW

The proposed project area is comprised of two sub areas for the purposes of both design and environmental impact analysis (see **Figure S-1**):

- Project Area One extends from Montgomery Street on the south to the north end of East River Park at about East 13th Street. Project Area One and consists primarily of East River Park as well as the Franklin Delano Roosevelt East River Drive (FDR) Drive right-of-way, a portion of Pier 42 and Corlears Hook Park. The majority of Project Area One is within East River Park and includes four existing pedestrian bridges across the FDR Drive to East River Park

[2] HUD, which grants OMB the authority under 24 CFR Part 58, to serve as the responsible entity under NEPA and in accordance with 24 CFR 58.2(a)(7) as the lead agency responsible for environmental review, decision-making, and action under 42 U.S.C. § 5304(g), determined that the proposed project has the potential to result in significant adverse environmental impacts. Pursuant to the HUD NEPA implementing procedures, OMB, as responsible entity, must certify that it has complied the related laws and authorities identified by 24 C.F.R. § 58.5 and must consider the criteria, standards, policies and regulations of these laws and authorities.

(the Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges) and the East Houston Street overpass.

- Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Con Edison facilities including East River Generating Station, Captain Patrick J. Brown Walk Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreation Center and Playground, the Veterans Affairs (VA) Medical Center, and in-street segments along East 20th Street, East 25th Street, and along and under the FDR Drive.

This DEIS considers both the short-term (construction) and long-term (operational and, where relevant, maintenance) effects of each alternative under consideration for implementation of the proposed project. These alternatives have been evaluated for potential adverse effects to the project site and applicable study areas during storm and non-storm operational conditions for all relevant potential environmental effect categories.

E. ALTERNATIVES EVALUATED

INTRODUCTION

Alternatives for the proposed project were developed and refined during the public scoping process, which commenced with the issuance of the Draft Scope of Work, included input from the public, agencies, and other stakeholders, and concluded with the development of the Final Scope of Work, issued on April 5, 2019.

The City evaluated and reviewed the proposed alternatives' conceptual design against the purpose and need and principal objectives for the project, including providing a reliable flood protection system for the protected area, improving access to and enhancing open space resources along the waterfront, and meeting HUD funding deadlines for federal spending, along with the goal to minimize potential environmental effects and disruptions to the community.

As described in detail below, the Flood Protection System with a Raised East River Park Alternative best meets the principal objects for the project and therefore was selected as the Preferred Alternative. With the implementation of the Preferred Alternative, the proposed project would reconstruct East River Park to protect this valuable resource from flooding during coastal storm events as well as inundation from sea level rise and enhance its value as a recreational resource in addition to providing flood protection to the inland communities. The Preferred Alternative would raise the majority of East River Park and would limit the length of exposed wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. In addition, pedestrian bridges would be reconstructed and 2 embayments would be relocated to improve access and enhance the park user experience. Furthermore, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground would be reconstructed and improved. The Preferred Alternative includes the construction of a shared-use flyover bridge linking East River Park and Captain Patrick J. Brown Walk. This bridge will address a long-standing access deficiency along the East River Greenway at the Con Edison 13th Street Generating Station and would substantially improve the City's greenway network. The selection of this alternative also allows for a shorter construction duration and park closure, earlier deployment of the flood protection system (which is expected to be completed in mid-2023), and reduced construction disruption along the FDR Drive. A summary description of the five alternatives selected for analysis within this DEIS is provided below.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative represents the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The build year for the proposed project is 2025 and accordingly, the No Action Alternative assumes that projects planned or currently under construction in the project area are completed by 2025. A list of these planned projects is included in **Appendix A1**.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative is a flood protection system comprised of a combination of floodwalls, 18 closure structures (i.e., swing and roller floodgates), and supporting infrastructure improvements that together would reduce risk of damage from coastal storms in the protected area. The inland limits of the protected area are generally along First Avenue, Avenue B, Avenue C, Avenue D, and Columbia Street and includes private and public properties and streets within the Lower East Side, East Village, Stuyvesant Town, Peter Cooper Village and Kips Bay communities that are currently in the East River coastal flood hazard area. The design flood elevation for the project is 16.5 feet NAVD88, which is generally 8 to 9 feet above the existing land surface along the project alignment but diminishes in height along the inland alignments (e.g., along Montgomery Street). This design elevation was developed based on the 100-year Federal Emergency Management Agency (FEMA) flood level and adding to that wave effects and the 90th percentile projection for sea level rise through to the 2050s (30 inches).

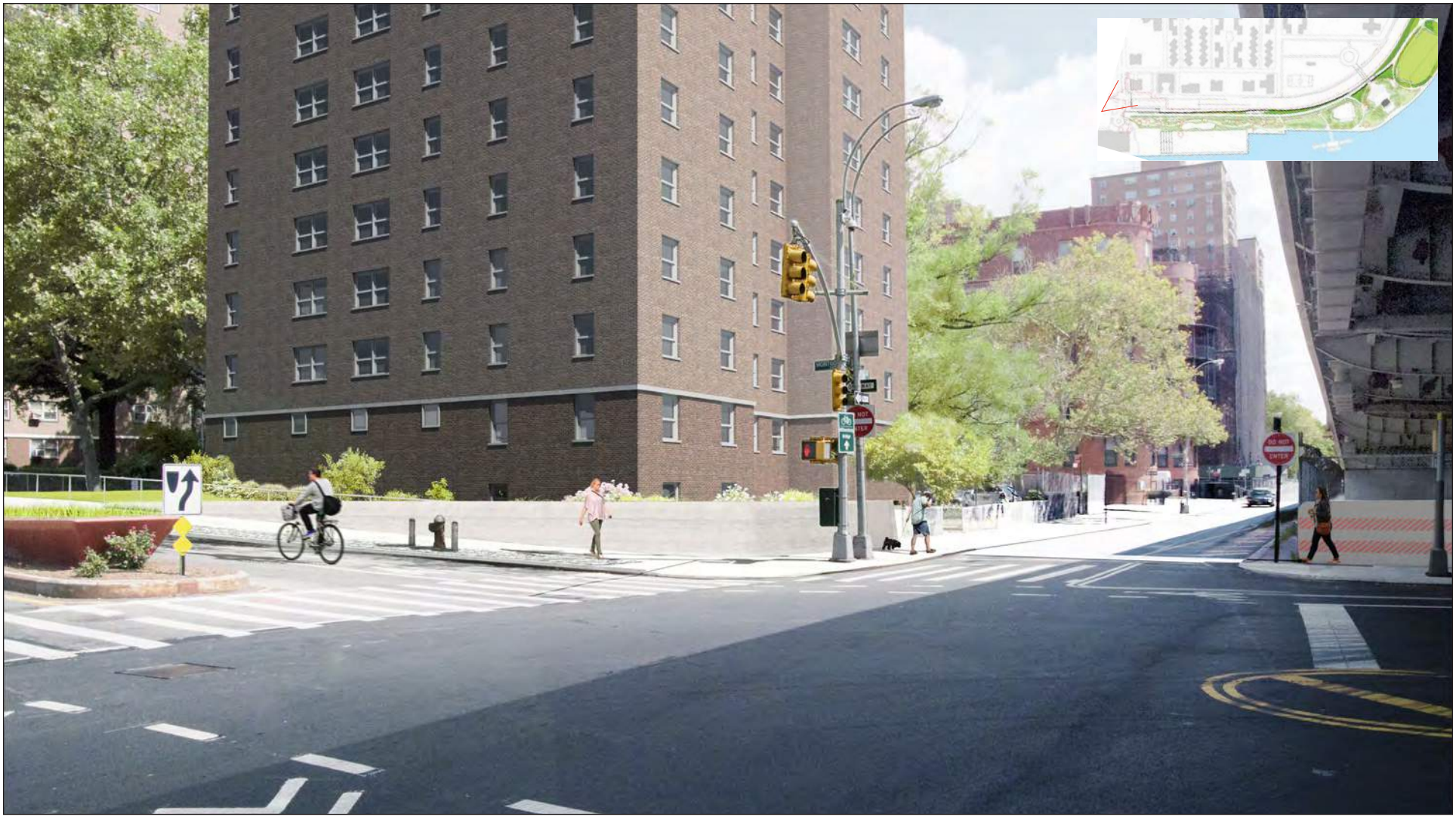
As described in greater detail below, a key element of the Preferred Alternative is elevating and reconstructing East River Park to make it more resilient to coastal storms and inundation from sea level rise. The proposed project also includes integrating flood protection with open space improvements at other parks along the flood protection alignment including Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground, an improved shared use path (bikeway/walkway), and a new shared-use flyover bridge to address the narrow and substandard waterfront public access near the Con Edison facility (on the east side of the FDR Drive between East 13th and East 15th Streets) known as the "pinch point."

Also proposed are redesigned and enhanced connections to the waterfront and East River Park, with the reconstruction of the Corlears Hook Bridge, the replacement of the Delancey and East 10th Street bridges, and the above-mentioned flyover bridge. These proposed bridge improvements would create more inviting and accessible crossings over the FDR Drive to the reconstructed East River Park and the East River waterfront, including the waterfront shared-use path. With the proposed project, the reconstructed bridges would be designed to provide more community-oriented access that supports and encourages public access to the waterfront with gentler grades that are consistent with the principle of universal access. Within the park, the bridge landings would provide an elevated gateway with expanded views of the reconstructed park and the river.

Flood Protection Alignment and Design

The description below summarizes flood protection alignment and design for the Preferred Alternative. **Figures S-2 through S-20** show the conceptual renderings of the Preferred Alternative.

3.22.19



For Illustrative Purposes Only

Preferred Alternative:
Montgomery Street Tie-Back (Reach A)
Conceptual Design

Figure S-2

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach A on East River Bikeway near Pier 42
Conceptual Design

Figure S-3

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach C at Corlears Hook Bridge Approach
Conceptual Design
Figure S-4

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
East River Park Bikeway/Walkway Conceptual Design
View North to Grand Street

Figure S-5

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Proposed Delancey Street Pedestrian Bridge
Conceptual Design

Figure S-6

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Delancey Street Bridge Landing
Conceptual Design
Figure S-7

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach E at Delancey Street
Conceptual Design

Figure S-8

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

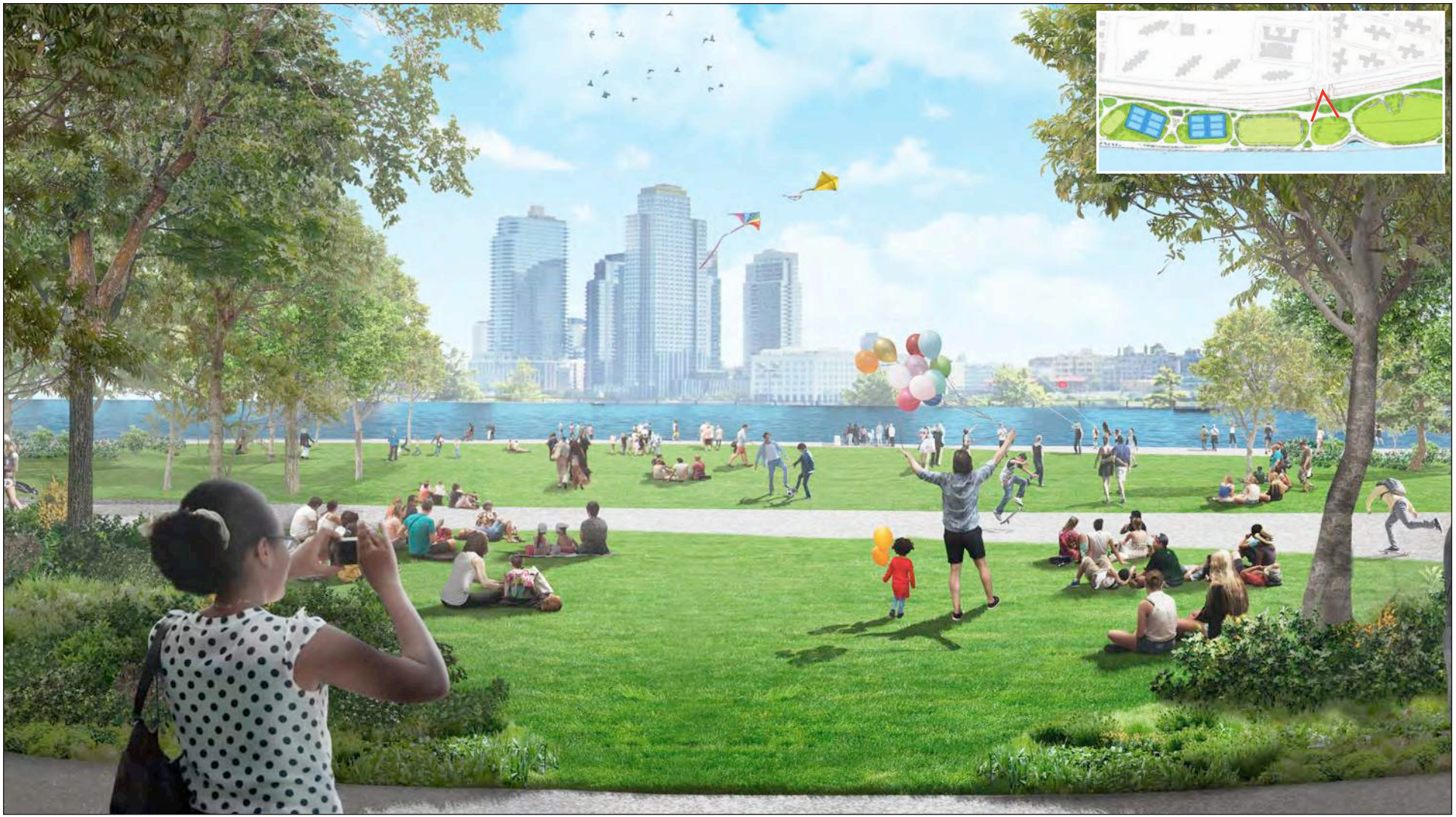
3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Delancey Street Bridge Park Landing
Conceptual Design
Figure S-9

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19



For Illustrative Purposes Only

Preferred Alternative:
East Houston Street Entry
Conceptual Design
Figure S-10

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach G at East Houston Street
Conceptual Design
Figure S-11

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach H near East 8th Street
Conceptual Design
Figure S-12

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Proposed East 10th Street Pedestrian Bridge
Conceptual Design

Figure S-13

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
East 10th Street Approach
Conceptual Design
Figure S-14

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach I and J near East 12th Street
Conceptual Design
Figure S-15

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach M at Murphy Brothers Playground
Conceptual Design
Figure S-16

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Reach N at Stuyvesant Cove South Entry
Conceptual Design
Figure S-17

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Stuyvesant Cove Park at the 20th Street Gate
Conceptual Design

Figure S-18

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
View north from East 23rd Street of Asser Levy Playground
Conceptual Design

Figure S-19

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.22.19

For Illustrative Purposes Only

Preferred Alternative:
Asser Levy Playground
Conceptual Design
Figure S-20

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Project Area One – South of East River Park

The proposed flood protection alignment begins at its southerly tieback along Montgomery about 130 feet west of South Street; at South Street the system turns north along for a distance of about 50 linear feet and then east, crossing under the FDR Drive to the east side of the highway with a pair of swing floodgates. Once on the east side of the highway, the flood protection system turns north and runs adjacent to the FDR Drive, continuing north into East River Park, which generally comprises of the area between the existing amphitheater and East 13th Street.

Project Area One – East River Park

Once in East River Park, the proposed flood protection alignment starts to turn east towards the East River, near the existing amphitheater. From here, the alignment continues north and the system parallels the East River Park bulkhead.

Within East River Park, the proposed project includes the following key design elements:

- Installing a below-grade flood protection structure (i.e., floodwall) running parallel to the existing East River Park bulkhead coupled with the elevation of a majority of East River Park (with the exception of the Fireboat House), generally beginning at the existing amphitheater and continuing northward to the northern end of the park near East 13th Street, thereby protecting park facilities and recreational spaces from design storm events and sea level rise inundation;
- Installing the floodwall below-grade to soften the visual effect of the flood protection system;
- Raising the majority of park grade with an increase in elevation from west (the FDR Drive) to east (the East River bulkhead) to attain the flood protection design elevation, accompanied by the reconstruction of the park open space including all fields and passive spaces, and incorporating resilient landscaping and substantial tree replanting that envisions a more diverse, resilient, and ecologically robust habitat;
- Reconstructing the Tennis House, Track and Field House and comfort stations;
- Reconstructing the East River Esplanade to increase the deck elevation to match the raised park and protect the esplanade from design storms and sea level rise;
- Improving north/south access along the waterfront with a new shared-use flyover bridge connecting the north end of East River Park with Captain Patrick J. Brown Walk;
- Improving access to the waterfront by reconstructing the Corlears Hook Bridge over the FDR Drive and replacing the existing Delancey Street and East 10th Street Bridges to be universally accessible;
- Creating an expanded and reconfigured park-side East Houston Street landing and entryway to the waterfront;
- Relocating the two existing embayments in the park with the objective of repurposing the filled areas as open space that allows for improved recreational programming and creating two new compensatory embayments that will allow for a closer river access opportunity for the public than the existing embayments with the designed steps off the esplanade;
- Reconstructing the amphitheater as an outdoor theater space; and
- Reconstructing all water and sewer infrastructure in the park, some of which is reaching the end of the serviceable life, including the outfalls and associated pipes that cross the park to the East River bulkhead.

It is an objective of the design to improve the ecology of East River Park, which is susceptible to the effects of sea level rise, storm surge, and heavy rainfall events. Storm surge from severe events like Hurricane Sandy can overwhelm the park. Moreover, the threat from gradually increasing sea level rise adds to the risk of more frequent flooding from everyday storms or high tides. This flooding not only interrupts the ability for parks visitors to enjoy and utilize the amenities within East River Park, but also affects its ecology. In 2014, NYC Parks removed 258 trees from East River Park due to salt water damage from Hurricane Sandy.

The existing landscaping and planting plan is reflective of the popular styles of the late 1930s, when the park was first designed and completed. The existing planting design is formal, with a focus on tree geometry and placement that maximizes open spaces for active recreation. Species diversity and ecology were not priorities of the original landscape design: over half of the current tree canopy is comprised of just two species. In the original design, plant selection relied heavily on canopy trees, such as London plane, a non-native species, and oaks. London plane trees in particular were significantly affected by salt inundation post Hurricane Sandy and have comprised most of the tree removals in East River Park since then.

In contrast, the proposed landscaping plan incorporates park resiliency through a design that can withstand a changing climate and consideration of species diversity, habitat, salt spray, wind, maintenance, and care. The proposed landscape plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resiliency and adaptive capacity in a plant ecosystem. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that have flexibility and plant communities that together improve ecological richness. By elevating the majority of the park and its landscape, and diversifying plant species, the landscape in the park will be more resistant to salt spray exposure and improve resiliency and post-storm functionality over the long term.

Project Area Two

North of East River Park, the proposed flood protection system includes a closure structure across the FDR Drive near East 13th Street. Two swing floodgates that when deployed would close this segment of the flood protection system across the highway, but in non-storm conditions would be recessed to the sides of the highway. From there, the floodwall continues northward and aligns along the west (southbound) side of the FDR Drive, connecting into the existing flood protection system at the Con Edison East River Generating Station (between East 14th and East 15th Streets). A closure structure adjacent to East 14th Street near the FDR Drive would also be installed to allow Con Edison operational access. North of the East River Generating Station, a closure structure is proposed across the FDR Drive East 15th Street ramp, and the floodwall continues northward along the FDR Drive to Murphy Brothers Playground.

At Murphy Brothers Playground, the proposed floodwall is aligned along the east side of the park, which would also be reconstructed with new ballfields, active recreational spaces, grading, and landscaping.

Beginning at the northeast corner of Murphy Brothers Playground, the proposed flood protection system turns east along Avenue C, heading towards the East River, crossing the FDR Drive ramps (two swing gate closure structures are proposed here) and under the elevated FDR Drive into Stuyvesant Cove Park. Within Stuyvesant Cove Park, the proposed flood protection system turns northward, where it is comprised of a combination of floodwalls with closure structures (roller gates) at the southerly entrance (from Avenue C) and at the East 20th Street entrance to allow public access into the park and to the waterfront esplanade during non-storm conditions; design

of this segment is also being coordinated with the new design for Solar One Environmental Education Center and existing Citywide Ferry Service ferry landing.

North of Stuyvesant Cove Park, the system again turns west and back under the elevated FDR Drive at East 23rd Street. In this segment, a combination of floodwalls and closure structures i.e., roller and swing gates) are needed to maintain vehicular and pedestrian circulation through this intersection during non-storm conditions, including: vehicle access to the FDR Drive ramps and service roads; pedestrian and cyclist access to and along the East River shared-use path; and, vehicle and pedestrian access to Waterside Plaza (including the U.N. School and the British International School of New York), the Skyport Marina and parking garage, and a BP service station. These closure structures are to be recessed except under storm conditions when they would be deployed to provide flood protection.

North of East 23rd Street and west of the FDR Drive, the proposed flood protection system continues northward along the sidewalk of the southbound FDR Drive service road. The proposed system then turns westward into and across the Asser Levy Park Playground (between the Asser Levy Recreation Center and the outdoor recreational space). Similar to Murphy Brothers Playground, the outdoor recreational space at Asser Levy Playground would be redesigned and reconstructed and a roller floodgate is proposed to connect to the VA Medical Center floodwall. The floodgate would maintain the connection between the playground and the Asser Levy Recreation Center and during a storm condition it would be deployed. The VA Medical Center flood protection system extends north and then west along East 25th Street to complete the northern tieback at First Avenue.

Drainage System Modifications

Drainage system modifications are also proposed as part of the Preferred Alternative, including measures to control flow into the drainage protected area[3] from the larger sewershed (i.e., drainage isolation) and measures to manage flooding within the drainage protected area (i.e., drainage management). These modifications would reduce the risk of flooding in the protected area during extreme storm events coincident with rainfall events. As part of the Preferred Alternative, the water and sewer infrastructure in East River Park would be reconstructed and reconfigured where necessary to ensure that it could withstand the additional loading from the added fill materials once the park is raised. A summary of each of these measures is provided below.

Drainage Isolation

Measures to isolate the drainage protected area from the unprotected portions of the larger sewershed would be implemented to eliminate potential pathways for storm surge waters to inundate the existing sewer system and flood inland areas. The measures include: (1) installing interceptor gates on the existing 108-inch diameter interceptor at the northern and southern extremes of the drainage protected area sewershed, generally in the vicinity of East 20th Street and Avenue C to the north and between Corlears Hook Park and the FDR Drive to the south; (2) floodproofing the regulators, manholes, and other combined sewer infrastructure on the unprotected side of the flood protection system; (3) replacing existing tide gates on the combined sewer outfall pipes that serve the drainage protected area and rerouting storm drainage; and (4) installing one isolation gate valve in the existing Regulator M-39, located within Asser Levy

[3] The drainage protected area encompasses the project protected area as well as the lateral sewers, regulators, outfalls, and other sewer infrastructure that serve or are tributary to those that serve the project protected area.

Playground, to isolate a branch interceptor that crosses the flood protection system alignment at the northern boundary of the drainage protected area. These measures would prevent storm surge water from entering the sewer system through existing combined sewers, the outfall pipes, or through at-grade access points (i.e., manholes and hatches) for existing sewer infrastructure on the portion of the drainage protected area that is unprotected from overland coastal surge events.

Drainage Management

In addition to the isolation measures outlined above, the Preferred Alternative includes drainage management elements to ameliorate the reduced sewer capacity due to outfall closure during a design storm event. The proposed drainage management would reduce the risk of sewer backups and associated flooding within the drainage protected area during a design storm. These drainage elements include installing additional combined sewers, termed "parallel conveyance," within the drainage protected area to augment the capacity of the existing sewer system. Specifically, nine parallel conveyance connections are proposed.

Parallel conveyance pipes are proposed at 9 locations to convey excess combined sewer flows to the interceptor. Each parallel conveyance pipe would consist of a new upstream connection to a regulator or lateral sewer, a downstream connection to the interceptor, and a connecting length of pipe. The parallel conveyance pipes would range in diameter from 18 to 48 inches and require no above ground features. The parallel conveyance would be sited within City rights-of-way with two exceptions where some parallel conveyance infrastructure is proposed on private property. The parallel conveyance pipes and connections would include manholes for access, similar to the existing sewer pipes, generally every 200 to 250 feet, at pipe bends, and at all connections to allow access for maintenance and repairs, as needed, and would be sited within streets and paved surfaces (e.g., parking), where possible.

In addition, similar to the parallel conveyance, the Preferred Alternative also proposes to increase the size of the branch interceptor in order to increase the conveyance capacity to the Manhattan Pump Station for three sub-drainage areas within the protected area.

These proposed drainage management system improvements would not alter daily operation of existing sewer infrastructure under non-storm conditions. Under rainfall events or periods of high sewer flow, combined sewer flow would be conveyed to the interceptor via the existing branch interceptors and potentially also via the parallel conveyance.

East River Park Infrastructure Reconstruction

The Preferred Alternative also includes reconstructing the water and sewer infrastructure within the portion of East River Park that would be elevated, including the outfalls, regulators, and sewers and water supply infrastructure, to withstand the added loads of the proposed flood protection system and elevated parkland. The outfalls and regulators within the portion of East River Park to be elevated are also proposed for replacement. In most cases, the existing infrastructure would be abandoned in place and the new infrastructure would be reconstructed adjacent to the existing locations, although the outfalls would be relocated slightly along the East River Park bulkhead. Of the existing 11 outfalls, two would be combined as part of the outfall reconstruction effort.

System Operation and Maintenance

An operations and maintenance manual will be developed for the proposed system to identify the procedures for deploying, inspecting, testing, and maintaining each element of the proposed flood protection system to ensure that the floodwalls and closure structures remain in proper working order and are ready to perform in advance of a design storm event.

Operation and maintenance of the proposed parallel conveyance and interceptor gates would require periodic inspection and maintenance of the piping and mechanical equipment. These inspections would be in accordance with standard operation and maintenance procedures for the City's sewer infrastructure and a pre-approved operations and maintenance protocol developed for the proposed project.

Upon completion of construction of the proposed project, the City would submit engineering plans, design modifications during construction, supporting materials (i.e., design criteria, geotechnical data, hydraulic modeling, etc.), a final operations and maintenance plan, and relevant construction data to FEMA to demonstrate compliance with requirements listed in Chapter 44 of the Federal Code of Regulations, Section 65.10 for FEMA accreditation (recognition of the proposed project on Flood Insurance Rate Maps [FIRMs]).

Construction

The flood protection system and raised East River Park proposed under this alternative would be constructed in 3.5 years and completed in 2023. The foundations for the shared-use flyover bridge would also be completed in 2023. Subsequently, a prefabricated bridge span would be installed and completed in 2025. East River Park is anticipated to be closed for the entire 3.5-year construction duration. The City is committed to the outdoor recreational needs for these communities and is currently identifying opportunities to open portions of East River Park as work is completed, however, to be conservative, the analysis assumes a full close of the park for 3.5 years. Access to the Corlears Hook and Stuyvesant Cove ferry landings would be maintained during construction. Construction activities would require the use of barges and trucks for material deliveries. Approximately 600,000 cubic yards of fill is estimated to be required for the construction under the Preferred Alternative, and an average of 3 barge trips per day are anticipated throughout the 3.5-year construction period.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would provide flood protection in Project Areas One and Two using a combination of floodwalls, levees, and closure structures (i.e., deployable gates) from Montgomery Street to East 25th Street. In Project Area One, the line of flood protection would generally be located on the west side of East River Park. Protection would be provided by a concrete floodwall starting at Montgomery Street within the sidewalk adjacent to the Gouverneur Gardens Cooperative Village. The floodwall would then cross under the FDR Drive with closure structures across the FDR Drive's South Street off- and on-ramps. A combination of floodwalls and levees would then run along the west side of East River Park for the length of the entire park. The park-side landings for the Delancey Street and East 10th Street bridges would be rebuilt within East River Park to accommodate the flood protection system. As with the Preferred Alternative, a shared-use flyover bridge linking East River Park and Captain Patrick J. Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

In Project Area Two, the flood protection alignment would be similar to that proposed in the Preferred Alternative. However, portions of Murphy Brothers and Asser Levy Playgrounds that are affected during construction under this alternative would be replaced in kind instead of reconstructed and improved.

This alternative also includes modifications of the existing sewer system similar to the Preferred Alternative, including installing gates underground near the northern and southern extents of the project area within the existing large capacity sewer pipe (interceptor) and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment to control flow into the project area from the larger combined sewer drainage area. Installation of additional sewer pipes and, in one location, enlarging existing sewer pipes, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a design storm event.

The flood protection alignment proposed in Alternative 2 would require that the majority of flood protection construction be performed during night-time single-lane closures of the FDR Drive and in proximity to sensitive Con Edison transmission lines. Given the related construction complexities and logistical considerations, the flood protection system and associated components under this alternative are assumed to be constructed in 5 years and completed in 2025.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 provides flood protection using a combination of floodwalls, levees, and closures structures in Project Areas One and Two. As with Alternative 2, the line of protection in Project Area One would be generally located on the western side of East River Park. However, under Alternative 3, there would be more extensive use of levees and other earthwork in association with the flood protection along the FDR Drive compared to Alternative 2 to provide for more integrated access, soften the visual effect of the floodwall on park users, and introduce new types of park experience. The landscape would generally gradually slope down from high points along the FDR Drive towards the existing at-grade esplanade at the water's edge. Due to the extent of the construction of the flood protection system, compared to Alternative 2, this alternative would include a more extensive reconfiguration and reconstruction of the bulk of East River Park and its programming, including landscapes, recreational fields, playgrounds, and amenities. In addition, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to provide universal access, and a new raised and landscaped park-side plaza landing would be created at the entrance to the park from the East Houston Street overpass.

In Project Area Two, the flood protection alignment would be similar to that proposed in the Preferred Alternative and, as with the Preferred Alternative, would include the reconstruction and improvements to Murphy Brothers and Asser Levy Playgrounds.

As proposed in the Preferred Alternative, this alternative would include drainage components to reduce the risk of interior flooding and the shared-use flyover bridge to address the Con Edison pinch point.

Alternative 3 would involve construction of the flood protection system alignment along the FDR Drive and in proximity to sensitive Con Edison transmission lines. Given the associated complexities and logistical considerations involved when working in and around these facilities, a 5-year construction duration is assumed, with the proposed project estimated to be completed in 2025.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative

would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need for gates crossing the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to the New York City Housing Authority (NYCHA)'s Jacob Riis Houses, Con Edison property, and Murphy Brothers Playground.

As with the Preferred Alternative, this alternative would also include drainage components to reduce the risk of interior flooding and construction of the shared-use flyover bridge to address the Con Edison pinch point.

Alternative 5 is anticipated to be constructed in 5 years and completed in 2025 and this duration is driven by construction of the raised northbound lanes of the FDR Drive and the adjacent shared-use flyover bridge in this same footprint.

F. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

The following sections contain a description of the principal conclusions for each DEIS technical analysis. These technical analyses include~~:~~ land use, zoning and public policy, socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, natural resources, hazardous materials, water and sewer infrastructure, transportation, neighborhood character, and environmental justice. The analysis of construction related effects included the following technical areas: socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, natural resources, hazardous materials, water and sewer infrastructure, energy, transportation, air quality, greenhouse gas, noise and vibration, and public health. **Table S-1** provides a summary of the potential effects for each of technical areas under each of the project alternatives.

Table S-1
Summary of Environmental Effects by Alternative[1]

	Preferred Alternative: Flood Protection System with a Raised East River Park (Alternative 4)	Flood Protection System on the West Side of East River Park - Baseline (Alternative 2)	Flood Protection System on the West Side of East River Park - Enhanced Park & Access (Alternative 3)	Flood Protection System East of FDR Drive (Alternative 5)
Principal Objectives of the Proposed Project	1) Provide a reliable coastal flood protection system against the design storm event for the protected area; 2) Improve access to and enhance open space resources along the waterfront, including East River Park and Stuyvesant Cove Park; 3) Respond quickly to the urgent need for increased flood protection and resiliency, particularly for communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and 4) Achieve implementation milestones and comply with the conditions attached to funding allocations as established by HUD, including scheduling milestones			
Project Components that Meet the Principal Objectives of the Proposed Project	1) Protects community and East River Park 2) Elevation of a majority of East River Park with new and improved park experience (step downs/water access, etc.) and enhanced neighborhood connectivity and integration; reconstruction of esplanade, Corlears Hook, East 10th Street and Delancey Bridges; improvements of the park-side landings of the East 6th Street Bridge and East Houston Street entrance; construction of a shared-use flyover bridge; open space improvements at Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground; improve ecology of East River Park 3) Flood protection in place by mid-2023 and reduce construction risks, with flyover bridge completed in 2025. 4) Implementation milestones will be achieved	1) Protects community 2) Construction of a shared-use flyover bridge 3) Flood protection in place by 2025 4) Implementation milestones will be achieved	1) Protects community 2) Reconstruction of East 10th Street and Delancey Bridges; improvements of the park-side landings of the East 6th Street Bridge and East Houston Street entrance; construction of a shared-use flyover bridge; open space improvements at Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground; reconfiguration of bulk of East River Park and its programming 3) Flood protection in place by 2025 4) Implementation milestones will be achieved	1) Protects community and East River Park 2) Elevation of a majority of East River Park with new and improved park experience (step downs/water access, etc.) and enhanced neighborhood connectivity and integration; reconstruction of esplanade, Corlears Hook, East 10th Street and Delancey Bridges; improvements of the park-side landings of the East 6th Street Bridge and East Houston Street entrance; construction of a shared-use flyover bridge; open space improvements at Stuyvesant Cove Park and Asser Levy Playground; improve ecology of East River Park 3) Flood protection in place by 2025 4) Implementation milestones will be achieved
Note: [1]The No Action Alternative (Alternative 1) assumes that no new comprehensive coastal protection system is installed in the proposed project area and therefore has been excluded from this table.				
ENVIRONMENTAL EFFECTS DURING THE OPERATIONAL PERIOD				
Land Use, Zoning and Public Policy	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Socioeconomic Conditions	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Open Space	**No significant adverse effects** **Impact avoidance measures: NYC Parks Tree Restoration Plan**	**No significant adverse effects** **Impact avoidance measures: NYC Parks Tree Restoration Plan**	**No significant adverse effects** **Impact avoidance measures: NYC Parks Tree Restoration Plan**	**No significant adverse effects** **Impact avoidance measures: NYC Parks Tree Restoration Plan**
Historic and Cultural Resources	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Urban Design and Visual Resources	**Significant adverse effects** - Views of the East River would be blocked on Grand Street **Mitigation measures -** Unmitigatable and unavoidable visual context effects from blocked waterfront views	**Significant adverse effects** - Views of the East River and existing waterfront would be blocked on Grand Street. Views of the existing waterfront would be blocked in the Cherry Street, East 6th Street, and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, portions of the FDR Drive and FDR Drive Service Road **Mitigation measures -** Unmitigatable and unavoidable visual context effects from blocked waterfront views	**Significant adverse effects** - Views of the East River and existing waterfront would be blocked on Grand Street. Views of the existing waterfront would be blocked in the Cherry Street, East 6th Street, and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, portions of the FDR Drive and FDR Drive Service Road **Mitigation measures -** Unmitigatable and unavoidable visual context effects from blocked waterfront views	**Significant adverse effects** - Views of the East River would be blocked on Grand Street **Mitigation measures -** Unmitigatable and unavoidable visual context effects from blocked waterfront views
Natural Resources	**No significant adverse effects** **Impact avoidance measures:** NYC Parks Tree Restoration Plan; wetland restoration design that meets all NYSDEC and USACE permit conditions	**No significant adverse effects** **Impact avoidance measures:** NYC Parks Tree Restoration Plan	**No significant adverse effects** **Impact avoidance measures:** NYC Parks Tree Restoration Plan	**No significant adverse effects** **Impact avoidance measures:** NYC Parks Tree Restoration Plan; wetland restoration design that meets all NYSDEC and USACE permit conditions
Hazardous Materials	**No significant adverse effects** **Impact avoidance measures:** Implementation of Site Management Plans (SMPs), that address long-term management of residual hazardous materials	**No significant adverse effects** **Impact avoidance measures:** Implementation of Site Management Plans (SMPs), that address long-term management of residual hazardous materials	**No significant adverse effects** **Impact avoidance measures:** Implementation of Site Management Plans (SMPs), that address long-term management of residual hazardous materials	**No significant adverse effects** **Impact avoidance measures:** Implementation of Site Management Plans (SMPs), that address long-term management of residual hazardous materials
Water and Sewer Infrastructure	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Transportation	**No significant adverse effects** **Impact avoidance measures:** Traffic Management Plans during the deployment, testing, and maintenance of the closure structures	**No significant adverse effects** **Impact avoidance measures:** Traffic Management Plans during the deployment, testing, and maintenance of the closure structures	**No significant adverse effects** **Impact avoidance measures:** Traffic Management Plans during the deployment, testing, and maintenance of the closure structures	**No significant adverse effects** **Impact avoidance measures:** Traffic Management Plans during the deployment, testing, and maintenance of the closure structures
Neighborhood Character	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Environmental Justice	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
ENVIRONMENTAL EFFECTS DURING THE CONSTRUCTION PERIOD				
Construction Socioeconomics	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Construction Open Space	**Significant adverse effects -** Temporary displacement of recreational facilities and open space amenities, including East River Park, over the 3.5-year construction period; significant adverse noise effects at the Asser Levy Recreation Center **Mitigation measures -** Potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the city, including accommodating permit users at existing facilities; identify recreational resources that can be available to the community; providing alternative recreational opportunities; implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. Refer to "Construction - Noise and Vibration" below for potential noise mitigation measures	**Significant adverse effects -** Temporary displacement of recreational facilities and open space amenities, including East River Park, over the 5-year construction period; significant adverse noise effects at the Asser Levy Recreation Center **Mitigation measures -** Potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the city, including accommodating permit users at existing facilities; identify recreational resources that can be available to the community; providing alternative recreational opportunities; implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. Refer to "Construction - Noise and Vibration" below for potential noise mitigation measures	**Significant adverse effects -** Temporary displacement of recreational facilities and open space amenities, including East River Park, over the 5-year construction period; significant adverse noise effects at the Asser Levy Recreation Center **Mitigation measures -** Potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the city, including accommodating permit users at existing facilities; identify recreational resources that can be available to the community; providing alternative recreational opportunities; implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. Refer to "Construction - Noise and Vibration" below for potential noise mitigation measures	**Significant adverse effects -** Temporary displacement of recreational facilities and open space amenities, including East River Park, over the 3.5-year construction period; significant adverse noise effects at the Asser Levy Recreation Center **Mitigation measures -** Potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the city, including accommodating permit users at existing facilities; identify recreational resources that can be available to the community; providing alternative recreational opportunities; implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. Refer to "Construction - Noise and Vibration" below for potential noise mitigation measures

Table S-1
Summary of Environmental Effects by Alternative[1]

	Preferred Alternative: Flood Protection System with a Raised East River Park (Alternative 4)	Flood Protection System on the West Side of East River Park - Baseline (Alternative 2)	Flood Protection System on the West Side of East River Park - Enhanced Park & Access (Alternative 3)	Flood Protection System East of FDR Drive (Alternative 5)
Construction - Historic and Cultural Resources	**No significant adverse effects** **Impact avoidance measures:** Archaeological testing and Construction Protection Plans (CPPs) to be stipulated in a Programmatic Agreement (PA)	**No significant adverse effects** **Impact avoidance measures:** Archaeological testing and CPPs to be stipulated in a PA	**No significant adverse effects** **Impact avoidance measures:** Archaeological testing and CPPs to be stipulated in a PA	**No significant adverse effects** **Impact avoidance measures:** Archaeological testing and CPPs to be stipulated in a PA
Construction - Urban Design and Visual Resources	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Construction - Natural Resources	**No significant adverse effects** **Impact avoidance measures:** Trees would be replaced or replanted in accordance with a NYC Parks-approved Tree Restoration Plan; a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasure Plan (SPCCP) would be implemented; cushion block, turbidity curtains employed; all conservation measures required by NMFS would be used.	**No significant adverse effects** **Impact avoidance measures:** Trees would be replaced or replanted in accordance with a NYC Parks-approved Tree Restoration Plan; a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasure Plan (SPCCP) would be implemented; cushion block, turbidity curtains employed; all conservation measures required by NMFS would be used.	**No significant adverse effects** **Impact avoidance measures:** Trees would be replaced or replanted in accordance with a NYC Parks-approved Tree Restoration Plan; a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasure Plan (SPCCP) would be implemented; cushion block, turbidity curtains employed; all conservation measures required by NMFS would be used.	**No significant adverse effects** **Impact avoidance measures:** Trees would be replaced or replanted in accordance with a NYC Parks-approved Tree Restoration Plan; a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasure Plan (SPCCP) would be implemented; cushion block, turbidity curtains employed; all conservation measures required by NMFS would be used.
Construction - Hazardous Materials	**No significant adverse effects** **Impact avoidance measures:** Implementation of all applicable regulatory requirements and a Remedial Action Plan (RAP), a Construction Health and Safety Plan (CHASP), and a Mitigation Work Plan (MWP)	**No significant adverse effects** **Impact avoidance measures:** Implementation of all applicable regulatory requirements and a Remedial Action Plan (RAP), a Construction Health and Safety Plan (CHASP), and a Mitigation Work Plan (MWP)	**No significant adverse effects** **Impact avoidance measures:** Implementation of all applicable regulatory requirements and a Remedial Action Plan (RAP), a Construction Health and Safety Plan (CHASP), and a Mitigation Work Plan (MWP)	**No significant adverse effects** **Impact avoidance measures:** Implementation of all applicable regulatory requirements and a Remedial Action Plan (RAP), a Construction Health and Safety Plan (CHASP), and a Mitigation Work Plan (MWP)
Construction - Water and Sewer Infrastructure	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**
Construction - Energy	**No significant adverse effects** **Impact avoidance measures:** measures would be taken to minimize vibration, to carefully control excavation around existing infrastructure, and to manage the placement of fill and soil stockpiles.	**No significant adverse effects** **Impact avoidance measures:** measures would be taken to minimize vibration, to carefully control excavation around existing infrastructure, and to manage the placement of fill and soil stockpiles.	**No significant adverse effects** **Impact avoidance measures:** measures would be taken to minimize vibration, to carefully control excavation around existing infrastructure, and to manage the placement of fill and soil stockpiles.	**No significant adverse effects** **Impact avoidance measures:** measures would be taken to minimize vibration, to carefully control excavation around existing infrastructure, and to manage the placement of fill and soil stockpiles.
Construction - Transportation	**Significant adverse effects:** Significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour; temporary significant adverse effects for users of the East River bikeway/walkway **Mitigation measures:** Traffic effects could be fully mitigated with standard traffic mitigation measures (e.g., signal timing changes); pedestrian/bicyclist rerouting plan	**Significant adverse effects:** Significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour; temporary significant adverse effects for users of the East River bikeway/walkway **Mitigation measures:** Traffic effects could be fully mitigated with standard traffic mitigation measures (e.g., signal timing changes); pedestrian/bicyclist rerouting plan	**Significant adverse effects:** Significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour; temporary significant adverse effects for users of the East River bikeway/walkway **Mitigation measures:** Traffic effects could be fully mitigated with standard traffic mitigation measures (e.g., signal timing changes); pedestrian/bicyclist rerouting plan	**Significant adverse effects:** Significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour; temporary significant adverse effects for users of the East River bikeway/walkway; significant adverse traffic effects that could occur due to the closure of the FDR Drive (a temporary full 24-hour closure of the FDR Drive in the northbound direction and one-lane closure in the southbound direction for two consecutive months or partial closure in both directions) **Mitigation measures:** Traffic intersection effects could be fully mitigated with standard traffic mitigation measures (e.g., signal timing changes); pedestrian/bicyclist rerouting plan; the potential extensive FDR Drive closure would require the use of Traffic Enforcement Agents (TEAs)
Construction - Air Quality	**No significant adverse effects** **Impact avoidance measures:** Measures would be taken to reduce pollutant emissions, including dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies	**No significant adverse effects** **Impact avoidance measures:** Measures would be taken to reduce pollutant emissions, including dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies	**No significant adverse effects** **Impact avoidance measures:** Measures would be taken to reduce pollutant emissions, including dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies	**No significant adverse effects** **Impact avoidance measures:** Measures would be taken to reduce pollutant emissions, including dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies
Construction - Greenhouse Gas	**No significant adverse effects** **Impact avoidance measures:** Potential measures for further reductions of emissions under consideration may include the use of biodiesel, expanded use of recycled steel and aluminum, and construction waste reduction.	**No significant adverse effects** **Impact avoidance measures:** Potential measures for further reductions of emissions under consideration may include the use of biodiesel, expanded use of recycled steel and aluminum, and construction waste reduction.	**No significant adverse effects** **Impact avoidance measures:** Potential measures for further reductions of emissions under consideration may include the use of biodiesel, expanded use of recycled steel and aluminum, and construction waste reduction.	**No significant adverse effects** **Impact avoidance measures:** Potential measures for further reductions of emissions under consideration may include the use of biodiesel, expanded use of recycled steel and aluminum, and construction waste reduction.
Construction - Noise and Vibration	**Significant adverse noise effects:** Predicted at sensitive receptor locations near the flood protection alignment and the reconstructed pedestrian bridges. Maximum construction noise levels at receptors nearest floodwall construction within East River Park for the Preferred Alternative would be slightly lower than Alternatives 2 and 3, because pile driving would occur further from the receptors. **Mitigation measures:** Potential to partially mitigate the effects to the greatest extent practicable are being explored by the City; measures being considered include the use of the quieter hydraulic press-in pile installation method, noise barriers around the pile driving head, enclosures on concrete operations, increases usage of barges of materials deliveries, and selection of quieter equipment models **No significant adverse vibration effects**	**Significant adverse noise effects:** Predicted at sensitive receptor locations near the flood protection alignment **Mitigation measures:** Potential to partially mitigate the effects to the greatest extent practicable are being explored by the City; measures being considered include the use of the quieter hydraulic press-in pile installation method, noise barriers around the pile driving head, enclosures on concrete operations, increases usage of barges of materials deliveries, and selection of quieter equipment models **No significant adverse vibration effects**	**Significant adverse noise effects:** Predicted at sensitive receptor locations near the flood protection alignment and reconstructed bridges **Mitigation measures:** Potential to partially mitigate the effects to the greatest extent practicable are being explored by the City; measures being considered include the use of the quieter hydraulic press-in pile installation method, noise barriers around the pile driving head, enclosures on concrete operations, increases usage of barges of materials deliveries, and selection of quieter equipment models **No significant adverse vibration effects**	**Significant adverse noise effects:** Predicted at sensitive receptor locations near the flood protection alignment and the reconstructed pedestrian bridges. Maximum construction noise levels at receptors nearest floodwall construction within East River Park for the Preferred Alternative would be slightly lower than Alternatives 2 and 3, because pile driving would occur further from the receptors. **Mitigation measures:** Potential to partially mitigate the effects to the greatest extent practicable are being explored by the City; measures being considered include the use of the quieter hydraulic press-in pile installation method, noise barriers around the pile driving head, enclosures on concrete operations, increases usage of barges of materials deliveries, and selection of quieter equipment models **No significant adverse vibration effects**
Public Health	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**	**No significant adverse effects**

OPERATIONAL CONDITIONS

LAND USE, ZONING, AND PUBLIC POLICY

No Action Alternative (Alternative 1)

The No Action Alternative would not result in significant adverse effects to any existing or planned land use, zoning, or public policies within the study area. Projects proposed within the study area would continue as planned. However, the No Action Alternative would not meet the project goal of providing comprehensive coastal flood protection for the protected area. During a coastal storm event similar to the design storm, the protected area could experience effects similar to Hurricane Sandy. Targeted resiliency measures may reduce the effects of storms in certain locations but would not provide protection for the larger protected area or East River Park.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative proposes to move the line of flood protection in East River Park into the park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park except the southern end and western pathway. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. In addition, two existing embayments would be relocated within the project area to provide adequate space to site heavily utilized active recreation facilities and to allow for an Americans with Disabilities Act (ADA) accessible path to improve accessibility to, and enjoyment of, the waterfront for all Park users. The two proposed embayments would be comparable or larger in size, would be similarly located within East River Park, and would be designed to provide enhanced aesthetic and experiential value in addition to improved ecological function. A shared-use flyover bridge linking East River Park and Captain Patrick J. Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

This alternative would not result in significant adverse effects to any existing or planned land use, zoning, or public policies within the study area. Land use actions resulting from the Preferred Alternative include acquisition of real property, amendments to the City Map for changes related to existing and proposed pedestrian bridges following construction, and a zoning text amendment; however, these actions would not result in any adverse effects on land uses and would be consistent with zoning and public policies including the City's Waterfront Revitalization Program (WRP). Since the Preferred Alternative provides resiliency and protection for East River Park against design storm events and periodic inundation from projected sea level rise coupled with the enhanced public access, this alternative would ensure that East River Park provides improved public access, operations, and functionality, during pre- and post-storm periods compared to the No Action Alternative.

Other Alternatives

Alternatives 2, 3, and 5 would similarly be consistent with existing and planned land use and zoning, although Alternatives 2 would require fewer land use actions than the Preferred Alternative (i.e., City Map change would not be required for Alternative 2). The alternatives would vary in the degree to which they advanced public policies pertaining to improving open spaces

and access to open spaces as well incorporate resiliency features, but all alternatives would be consistent with public policies.

SOCIOECONOMIC CONDITIONS

No Action Alternative (Alternative 1)

Under the No Action Alternative, in the absence of the flood protection system, the existing neighborhoods would remain at risk to coastal flooding during design storm events. Thus, for the No Action Alternative, there is the potential for adverse socioeconomic effects within the study area due to potential flood damage created by design storm events. Socioeconomic effects would include the direct physical damages associated with a design storm event, displacement, human impacts, and loss of services. In addition, the open space amenities included in the With Action Alternatives would not be implemented within the study area.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative would result in park and neighborhood connection improvements, and does not present new uses or activities to the project area that could markedly influence the study area's residential or commercial market. Therefore, the Preferred Alternative would not result in the direct displacement of any residents or businesses.

Under the Preferred Alternative, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during storm events. Under the Preferred Alternative, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

Other Alternatives

Alternatives 2, 3, and 5 would not result in the direct displacement of any residents or businesses. In addition, none of the With Action Alternatives would result in significant indirect residential or business displacement pressures within the study area for the same reasons as the Preferred Alternative.

OPEN SPACE

No Action Alternative (Alternative 1)

The No Action Alternative would not alter the size or use of existing open spaces; the open space projects identified in **Appendix A1** would continue to be implemented as planned. However, the No Action Alternative would not provide comprehensive coastal flood protection for the protected area. During a design event, the protected area, including open spaces, could be adversely impacted, potentially experiencing effects similar to that of Hurricane Sandy or other extreme coastal storm events. Targeted resiliency measures may reduce the effects of storms in certain locations but would not provide comprehensive flood protection for the protected area.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative would not result in significant adverse effects to existing or planned open spaces within the study area. Overall, the Preferred Alternative would not alter the amount of open space, nor would this alternative introduce new worker and residential populations to the study area. By elevating East River Park and reconstructing Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground, the Preferred Alternative provides the opportunity for a holistic reconstruction, reimagining, and expansion of the types of user experiences in the park, while also enhancing neighborhood connectivity and resiliency. Increased

improvements to landscaping along the waterfront and to the waterfront esplanade itself would also be included in this alternative. These benefits would ensure improved resiliency, operations, usability, and functionality of East River Park during pre- and post-storm periods. In addition, the Preferred Alternative would alleviate shared-use path congestion at the Con Edison facility with the construction of a flyover bridge (which would be complete by 2025). The Preferred Alternative also provides inland flood protection and allows these benefits to be available sooner than other alternatives as flood protection construction is expected to be complete in 2023. A total of 981 trees would require removal throughout the project area but would be replaced or replanted in accordance with a NYC Parks-approved tree replanting plan such that there would be a net overall increase in the number of trees within the park, and would also protect the long-term viability of trees and ecological resources by protecting them from damaging salt water inundation and providing for planting that is more appropriate for the park.

Other Alternatives

Alternatives 2, 3, and 5 would not result in significant adverse effects to any existing or planned open spaces within the study area. None of the With Action Alternatives would substantially alter the size or use of existing open spaces, nor would they introduce new worker and residential populations to the study area. Each alternative would slightly alter the ratio of active to passive recreation space. Trees within the study area—specifically within East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground—would be removed in support of the construction of the proposed flood protection system. Trees would be replaced or replanted in accordance with a NYC Parks-approved tree replanting plan as part of the restoration of each park.

HISTORIC AND CULTURAL RESOURCES

Archaeological Resources

Two Phase 1A Archaeological Documentary Studies were prepared for the Area of Potential Effects (APE) in March 2016, and a Supplemental Phase IA Archaeological Documentary Study was prepared in March 2019. The March 2016 reports identified the following broad categories of historic-period archaeological resources that could be located in the APE—river bottom remains, landfill retaining structures and landfill deposits, historic streetbed resources, and former city block resources. Because of the potential presence of these resources, as mitigation, additional archaeological investigation will be performed in accordance with Section 106 regulations, based on a scope of work reviewed and approved by New York City Landmarks Preservation Commission (LPC) and the State Historic Preservation Office (SHPO); this archaeological investigation would include pre-construction testing and/or monitoring during project construction performed in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology, the Advisory Council on Historic Preservation (ACHP)'s Section 106 Archaeological Guidance, and the New York Archaeological Council's Standards for Cultural Resource Investigations and Curation of Archaeological Collections. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidelines in the CEQR Technical Manual. In written communications

dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that work be halted until the tribe is notified and the artifact can be evaluated by an archaeologist. The additional archaeological investigation will be stipulated in a Programmatic Agreement (PA) that is being prepared and will be included in the FEIS. It is expected that the PA will be executed among HUD, OMB, NYC Parks, SHPO, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, and ACHP.

Architectural Resources

There are 17 architectural resources within the Primary Area of Potential Effects (APE). In addition, there are 42 known architectural resources located within the Secondary APE beyond the boundaries of the project area.

No Action Alternative (Alternative 1)

One planned NYC Parks project within Project Area One could affect architectural resources that have been determined eligible for listing on the State and National Registers of Historic Places (S/NR)—construction of an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (#4). This architectural resource would be offered some protection from accidental damage through Building Code Section BC 3309: Protection of Adjoining Property.

In addition, three projects within the 400-foot portion of the Primary APE could affect architectural resources in the No Action Alternative—reconstruction of the Baruch Playground within the Bernard Baruch Houses (#9, S/NR-eligible), resiliency measures at the Baruch Houses (#9, S/NR-eligible), and rehabilitation work at the Asser Levy Public Baths (#12, NYCL, S/NR).

In the absence of a comprehensive flood protection system, architectural resources located within the APEs would remain at risk to flooding, with the exception of the Bernard Baruch and Jacob Riis Houses, which would be protected by resiliency measures being implemented by NYCHA.

Preferred Alternative (Alternative 4): Flood Protection System with A Raised East River Park

The Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible) through the installation of closure structures. As will be stipulated in the PA, construction affecting the FDR Drive would be coordinated with the New York City Department of Transportation (NYCDOT) to ensure that it is protected during construction of the Preferred Alternative.

Construction of the Preferred Alternative would occur within 90 feet of the Asser Levy Public Baths (#12, S/NR, NYCL) and a small portion of the Jacob Riis Houses (#15, S/NR-eligible). In addition, construction of the drainage management components would occur within 90 feet Construction under the Preferred Alternative would occur within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement Construction Protection Plans (CPPs) for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

It is not expected that the Preferred Alternative would result in any contextual effects on architectural resources. As will be stipulated in the PA, an effort would be made to design the floodwalls adjacent to the Asser Levy Public Baths (#12, S/NR, NYCL) so that they are compatible with the historic building, and the design would be coordinated with LPC.

In a future storm condition, the following two S/NR-eligible architectural resources could experience adverse direct effects from storm surge and flooding: the Williamsburg Bridge (#2) and East River Bulkhead (#3) from Whitehall Street to Jackson Street.

The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be located on the landward side of the flood protection system that would be constructed under the Preferred Alternative. It would, therefore, be protected from damage that could result from storm surge and flooding in a future storm condition. The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area Two, however, would not be protected. Therefore, in a future storm condition, that portion of the FDR Drive could experience adverse direct effects from storm surge and flooding.

The architectural resources located within the 400-foot portion of the Primary APE and within the Secondary APE are landward of the flood protection system that would be constructed under the Preferred Alternative. Therefore, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

Other Alternatives

Effects to architectural resources in both the non-storm and storm conditions would be similar to Alternatives 2, 3, and 5 as described above for the Preferred Alternative.

Unlike the Preferred Alternative and Alternatives 2 and 3, Alternative 5 would reconstruct the section of the FDR Drive (#1, S/NR-eligible) between approximately East 13th and East 18th Streets. However, it is not expected that this work would have adverse effects on the FDR Drive, as only an approximately 6-block section of the 9.44-mile-long FDR Drive would be reconstructed. Further, because the FDR Drive currently has elevated sections, raising the northbound lanes within a portion of Project Area Two would not affect the overall appearance of the highway, and it would still convey its historic significance. Also, the FDR Drive has been altered over time. Further, Alternative 5, unlike the Preferred Alternative and Alternatives 2 and 3, would protect the section of the FDR Drive between East 13th and Avenue C from storm surge and flooding.

MITIGATION

Archaeological Resources

As will be stipulated in the PA, additional archaeological investigation prior to or during construction will be performed in accordance with Section 106 regulations. Such scope of work will be prepared in consultation with LPC and SHPO, and this further phase of archaeological work would include testing and/or monitoring conducted in consultation with LPC and SHPO and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The testing and/or monitoring would not be done during the EIS process but would occur before and/or during project construction. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures

across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed as per the *CEQR Technical Manual*.

Architectural Resources

The City, in consultation with LPC and SHPO, would develop and implement CPPs for the following architectural resources, or portions of multi-building resources, located within 90 feet of project construction: for the FDR Drive (#1, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible) to avoid inadvertent construction-period damage to these architectural resources. The development and implementation of the CPPs will be stipulated in the PA. In addition, as will be stipulated in the PA, an effort would be made to design the floodwalls that would be located adjacent to the Asser Levy Public Baths (#12, NYCL, S/NR), so that they are compatible with the architectural resource, and the design of the floodwalls would be coordinated with LPC.

URBAN DESIGN AND VISUAL RESOURCES

No Action Alternative (Alternative 1)

Under the No Action Alternative, the future condition without the proposed project assumes that no new comprehensive coastal protection system is installed in the project area. However, there are a number of projects planned, projected, or under construction in the project area and 400-foot study area that are expected to be complete by 2025. Projects to be built by 2025 within the project area, including the proposed project, aim to enhance recreational resources and access to East River Park, Pier 42, and Stuyvesant Cove Park. Projects within the 400-foot study area include resiliency projects at NYCHA complexes. The resiliency projects are not likely to change the visual character of the area. Other expected development activity in the No Action condition includes the continuing redevelopment of the Lower East Side with mixed-used development, which is expected to change the visual character of the area by continuing an existing trend of new residential and mixed-use development adding to the area's mix of low and high-rise structures. Over time, East River Park's tree canopy and landscaping would likely be diminished due to storm surge and rising sea level.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Urban Design

It is not expected that the floodwalls and closure structures installed under the Preferred Alternative would have adverse urban design effects to the southern end of Project Area One, Project Area Two, or the surrounding portions of the 400-foot study area. While the shared use flyover bridge would be a new urban design feature, it would have beneficial urban design effects by elevating pedestrians and bicyclists above the Con Edison pier and the FDR Drive. In this area, pedestrians and bicyclists would no longer be immediately adjacent to vehicular traffic on the FDR Drive, but would be above it. Further, the flyover bridge would enhance pedestrian and bicyclist safety by bypassing the narrowed walkway.

In general, the floodwalls, closure structures, and interceptor gate buildings would be new features to the public realm, but they would be installed in locations where there are existing fences and walls and where the FDR Drive runs on a viaduct.

Under this alternative, East River Park would be raised and completely reconstructed. While it would have a new design, the park would maintain the visual character of a landscaped, recreational waterfront park with paths, lawns, and athletic fields, and it would add improved entrances to the park from Corlears Hook Park and at Delancey Street, East Houston Street, and East 10th Street.

This alternative would result in a temporary adverse effect from the removal of existing trees in East River Park, and with this alternative 784 of the existing trees in the park would be removed. To lessen that adverse effect, the design of the alternative includes the planting of new trees and the potential transplantation of some existing trees into the raised and reconstructed park. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions.

Although Stuyvesant Cove Park would be reconstructed, which would involve the removal of 45 existing trees, the new design would reference the design of the existing park and would include new trees and multiple planting elements, and there would not be an adverse effect.

While the flyover bridge would be a new urban design feature, it would have beneficial urban design effects by elevating pedestrians and bicyclists above the Con Edison pier and the FDR Drive. In this area, pedestrians and bicyclists would no longer be immediately adjacent to vehicular traffic on the FDR Drive, but would be above it. Further, the flyover bridge would enhance pedestrian and bicyclist safety by bypassing the narrowed walkway.

Views, Aesthetic and Visual Resources, and Viewer Groups

The Preferred Alternative would maintain the visual connectivity between the waterfront and the adjacent upland neighborhoods. In Project Area One, the design of East River Park to slope down to the level of the FDR Drive would maintain views of East River Park from the adjacent neighborhoods. However, by raising East River Park, this alternative would potentially block some views of the East River. On Grand Street, views of the East River would be blocked, resulting in a significant adverse impact, but these eastward views would be of East River Park with Brooklyn in the distance. The raised park would alter views of East River Park and Brooklyn in the East 6th Street and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses compared to existing views, but these views would be of a landscaped waterfront park and there would be no potential significant adverse effects to these views. At East 6th and East 10th Streets, views to the waterfront would continue to be of East River Park. From the portions of the FDR Drive and FDR Drive service road that run through Project Area One, views would be of East River Park, similar to existing views, although occasional views of the East River would no longer be available. There are no view corridors to the waterfront between East 13th and East 18th Streets and, therefore, the flyover bridge would not block any views from the study area.

Other Alternative (Alternative 2): Flood Protection System on the West Side of East River Park – Baseline

Urban Design

As under the Preferred Alternative, it is not expected that the flood protection components of Alternative 2 would have adverse urban design effects to the southern end of Project Area One

and the surrounding portion of the 400-foot study area, or in Project Area Two and the surrounding portion of the study area.

Alternative 2 would maintain large portions of East River Park as would the No Action Alternative and would install a combination of floodwalls and levees generally along the west edge of the park, creating a hard, visually impermeable edge. However, these resiliency measures would not affect the experience of most users within the park, and it is not expected that this alternative would have overall adverse effects on the visual character of East River Park. Unlike under the Preferred Alternative, the existing Corlears Hook, Delancey Street, and East 10th Street bridges would not be reconstructed under Alternative 2 and access to the park at those points would not be improved.

Views, Aesthetic and Visual Resources, and Viewer Groups

Overall, Alternative 2 would result in a lengthy and monolithic floodwall between the waterfront and the adjacent, upland neighborhoods, reducing the visual connectivity between those neighborhoods and the waterfront and diminishing visual quality. In comparison, the Preferred Alternative would maintain the visual connections between the upland neighborhoods and East River Park. In addition, the levees, floodwalls, and closure structures constructed under this alternative would likely block existing waterfront and East River views in the Cherry Street, Grand Street, East 6th Street, and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, potentially resulting in significant adverse effects. This alternative would also potentially result in significant adverse effects to waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. As with the Preferred Alternative, the flood protection measures constructed in Project Area Two are not expected to result in significant adverse visual effects.

Other Alternative (Alternative 3): Flood Protection System on the West Side of East River Park – Enhanced Park and Access

Urban Design

Under Alternative 3, the flood protection systems installed at the southern end of Project Area One and in Project Area Two would be similar to those that would be installed under the Preferred Alternative and Alternative 2, and it is not expected that the floodwalls, levees, and closure structures would have adverse urban design effects to the southern end of Project Area One, Project Area Two, or the surrounding portions of the 400-foot study area.

With the exception of the removal of 590 trees, it is not expected that Alternative 3 would have overall significant adverse effects on the visual character of East River Park, as the alternative would maintain the park's visual character as a landscaped, waterfront park with paths and recreational facilities, and it would add improved entrances to the park at Delancey, East Houston, and East 10th Streets.

Removal or alteration of certain existing park features would not result in adverse effects to its visual character. Throughout the park, where athletic fields would be moved and reoriented, they would be replaced, with the exception of Ball Fields Nos. 7 and 8, which will be reoriented and transformed into one multi-use field. At Grand Street, the play area with the multiple seal statues would be replaced with a new water and nature exploration play area. At the northern end of the park, as under the Preferred Alternative, the existing barbecue and picnic area would be removed for the new park-side landing of the reconstructed East 10th Street Bridge and a grassed amphitheater, but a replacement barbecue and picnic area would be located in the immediate vicinity. More trees would be removed throughout East River Park under Alternative 3 than under

Alternative 2, and this alternative, like the Preferred Alternative, would result in a temporary adverse effect, but the landscape plan for this alternative includes the planting of new trees that would result in a net increase of trees to the park to lessen this effect. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions. Views through the park would be altered by this alternative, but the park would retain its overall character of a recreational, waterfront park with paths, lawns, and athletic fields.

Views, Aesthetic and Visual Resources, and Viewer Groups

Views to the waterfront would be largely the same with this alternative as with Alternative 2, with reduced visual connectivity between the waterfront and the adjacent, upland neighborhoods, and there would potentially be significant adverse effects from blocked views of the East River on Cherry and Grand Streets; blocked waterfront views in the East 6th Street and East 10th Street view corridors; blocked waterfront views from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses; and blocked waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. On Grand Street, views to the river would be blocked; views would instead be of the redesigned park, which would lessen the impact on this view corridor. As with the Preferred Alternative and Alternative 2, the floodwalls, levees, raised landscape, and closure structures constructed in Project Area Two are not expected to result in significant adverse visual effects.

Other Alternative (Alternative 5) – Flood Protection System East of FDR Drive

Urban Design

The flood protection measures provided in Project Area One under this alternative would be the same as provided under the Preferred Alternative. Therefore, this alternative would result in the same adverse urban design effects to East River Park as the Preferred Alternative and Alternative 3 from the removal of existing trees. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions.

In general, it is not expected that Alternative 5 would have adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area. The section of the northbound FDR that would be elevated is a short 6-block-long section primarily adjacent to the Con Edison East River Generating Facility, a portion of the study area where pedestrians are confined to the existing walkway along the Con Edison pier and to Captain Patrick J. Brown Walk. The raised FDR Drive would not adversely affect the pedestrian experience of those users, because they would be elevated above it on the new flyover bridge between East River Park and East 16th Street. Between East 16th and East 18th Streets where users of Captain Patrick J. Brown walk would be adjacent to the elevated northbound FDR Drive, the raised platform and floodwall would create a buffer between vehicular traffic on the FDR Drive and users of Captain Patrick J. Brown Walk, resulting in beneficial effects to the pedestrian experience. North of the proposed raised platform, the floodwalls and closure structures would be installed in locations where there are existing fences and walls, and where the FDR Drive is elevated on a viaduct.

Views, Aesthetic and Visual Resources, and Viewer Groups

In Project Area One, views to the waterfront would be the same with this alternative as with the Preferred Alternative. In Project Area Two, the proposed floodwall along the east side of the raised portion of the FDR Drive would obscure views of the waterfront as seen from the FDR Drive.

MITIGATION

As described above, the Preferred Alternative and Alternatives 2, 3, and 5 could potentially result in significant adverse visual effects by blocking views to the waterfront and East River from multiple locations within the study area. These potential significant adverse effects would not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls, levees and/or raised landscape under the With Action Alternatives to allow continued views to the waterfront and East River would impair the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, floodwalls are expected to be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls.

NATURAL RESOURCES

No Action Alternative (Alternative 1)

Future storms would be expected to cause further damage to natural resources within the parks, beyond the effects caused by Hurricane Sandy. Hundreds of trees in East River Park have been removed due to salt water inundation, and additional trees are still in decline and will likely require removal in the near future. Targeted resiliency measures described in Appendix A1 may reduce the effects in certain locations but would not provide comprehensive protection against the design storm (the 100-year flood events with sea level rise projections to the 2050s).

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative would result in temporary adverse effects to trees, with a total of 981 trees to be removed for the proposed flood protection system, of which 784 are located within East River Park. The project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The landscape restoration plan would ultimately result in a net increase of 399 total trees within the project area. While these trees would not be as mature as some existing trees, over time, the new tree canopy would fill in and represent an improved habitat over the existing conditions, which is largely dominated by London plane trees, known for their poor response to salt-water inundation.

The Preferred Alternative also includes in-water elements such as support foundations for the shared-use flyover bridge to connect the north end of East River Park to Captain Patrick J. Brown Walk to the north as well as relocating the two existing embayments and reconstructing water and

sewer infrastructure within the park. Installation of the structural supports for the flyover bridge and relocation of the embayments would result in adverse effects to 24,085 square feet of New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands and U.S. Army Corps of Engineers (USACE) Waters of the United States within the East River.

Adverse effects to the littoral zone wetland have the potential to affect Essential Fish Habitat (EFH) and habitat for epifaunal benthic organisms that may provide a foraging habitat for certain fish that are protected under the Fish and Wildlife Coordination Act (FWCA). However, for fish species that would not be considered rare or transient within the study area, the EFH and habitat with the potential to be affected by the Preferred Alternative constitutes a very small portion of the available EFH and habitat within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute not only a replacement in kind within the study area, but an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. Lastly, additional habitat would be created within the NY Harbor Estuary through the creation of off-site tidal wetland habitat or purchase of wetland mitigation credits. A consultation with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) as required by the FWCA, Magnuson Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Clean Water has been reinitiated. Any conservation measures identified as a result of that consultation will be identified in the Final EIS. No significant adverse effects to natural resources are anticipated.

Other Alternatives

The natural resources that would be affected under Alternatives 2, 3, and 5 would be similar to the Preferred Alternative, though to varying extents. During storm conditions, the flood protection systems of Alternatives 2 and 3 would largely limit storm surge effects to East River Park and Stuyvesant Cove Park to the unprotected side of the flood protection system. This inundation would affect soil and other vegetated areas such as tree pits, landscape beds, all existing horticulture, and other park resources. Alternative 5 includes the same flood protection alignment as the Preferred Alternative, including protection of East River Park, except for the area between East 13th Street and Avenue C where the northbound lanes of the FDR would be raised.

Alternatives 2 and 3 would require the removal of trees but would leave any remaining or newly planted trees in East River Park susceptible to the effects of future storms. Alternative 5 would require the same number of tree removals as the Preferred Alternative and would include the long-term protection of these terrestrial resources accomplished through the raising of East River Park proposed under the Preferred Alternative. For Alternatives 2, 3 and 5, the tree removals would also constitute a temporary adverse effect to terrestrial resources and a NYC Parks approved landscape restoration plan would be implemented to improve the landscape. Alternatives 3 and 5 would result in a net increase of trees within the project area (342 and 399, respectively) while Alternative 2 would result in no net loss of trees. Over time, the new tree canopy would fill in and represent an improved habitat over the existing condition; however, the number of trees that would remain susceptible to future storm events would be significantly higher under Alternatives 2 and 3 than under the Preferred Alternative (944, 433, and 228, respectively).

Similar to the Preferred Alternative, Alternatives 2 and 3 would also adversely affect wetland resources though the footprint of disturbance would be limited to the placement of footings and

shafts for the flyover bridge within the East River. Compared to the Preferred Alternative, Alternative 5 would result in a slightly larger footprint of adverse effects to these resources due to the placement of shafts for the raised FDR Drive within NYSDEC littoral zone tidal wetlands and USACE Waters of the United States in addition to the in-water elements described for the Preferred Alternative. These alternatives are not anticipated to result in significant adverse effects to natural resources.

MITIGATION

Adverse effects to aquatic resources would be mitigated for with the creation of approximately 26,000 square feet new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements, and would not be considered significant. The mitigatory elements of the Preferred Alternative are consistent with the City's WRP policies of protecting water quality, sensitive habitats, and the aquatic ecosystem.

HAZARDOUS MATERIALS

No Action Alternative (Alternative 1)

Under the No Action Alternative, no new comprehensive coastal protection system would be implemented. However, the No Action Alternative assumes that projects planned or currently under construction near the project area are completed by the 2025 analysis year. These planned projects might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure, but these projects would need to comply with applicable regulatory requirements.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative would involve demolition and excavation activities and would have the potential to disturb hazardous materials in existing structures and the subsurface. However, with the implementation of appropriate protection measures the potential for significant adverse effects related to hazardous materials would be avoided. Following construction, with the capping layer in landscaped areas and the implementation of Site Management Plans (SMPs) that address long-term management of residual hazardous materials, there would be no pathways for exposure to park users from remaining subsurface contaminants beneath the project construction areas. Therefore, the Preferred Alternative would not have the potential for significant adverse effects related to hazardous materials during the operational stage of the proposed project. In addition, as the alignment of the Preferred Alternative includes areas that have not been fully characterized (e.g., the line of protection in East River Park, two interceptor gate house locations), additional soil and groundwater testing is also to be implemented in both Project Areas One and Two, in accordance with a work plan and Construction Health and Safety Plan (CHASP) submitted to the New York City Department of Environmental Protection (DEP) for review and approval for the purposes of identifying any soil groundwater contamination at these locations.

Other Alternatives

Alternatives 2, 3, and 5 would be similar in that they all include the potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for operational-phase effects would be avoided in the same manner as described above for the Preferred Alternative.

WATER AND SEWER INFRASTRUCTURE

No Action Alternative (Alternative 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The No Action Alternative would not change existing water and sewer infrastructure in the study area. Projects independent of the proposed project that are planned or ongoing would continue as planned. During a design storm, the protected area would be subject to overland flooding (which refers to flooding that exceeds the elevation of the coastal topography) from storm surge and rainfall and there would potentially be sewer infrastructure surcharge.[4] Targeted resiliency measures proposed in the protected area may reduce the effects of coastal flooding in specific locations but would not provide comprehensive flood protection.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative proposes to move the line of flood protection in East River Park into the park, thereby protecting both the community and the majority of the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The existing sewer system would be modified to isolate the drainage protected area[5] from the larger sewershed during design storm events to prevent coastal floodwaters from inundating the drainage protected area. The existing sewer system would also be modified to increase its capacity to convey wet-weather flows during design storm events with coincident rainfall events, thereby managing flooding within the drainage protected area. The Preferred Alternative would also reconstruct and reconfigure the park's underground sewer and water infrastructure, including outfalls and their tide gates within the park, to withstand the loads of the proposed flood protection system and elevated parkland. The Preferred Alternative would be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of the Preferred Alternative.

Other Alternatives

Alternatives 2, 3, and 5 would include the same modifications to the sewer system to isolate the drainage protected area and increase hydraulic capacity as the Preferred Alternative. Alternatives 2 and 3 would not include reconstruction of the drainage infrastructure within East River Park and would require more floodproofing of existing sewer infrastructure within the park compared to the Preferred Alternative. These alternatives would be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation.

[4] Surcharge refers to the condition in which combined sewer flow exceeds the capacity of sewer pipes and/or drainage infrastructure, potentially resulting in backups in sewer pipes and, ultimately, above-grade flooding.

[5] The drainage protected area encompasses the project protected area as well as the lateral sewers, regulators, outfalls, and other sewer infrastructure that serve or are tributary to those that serve the project protected area

TRANSPORTATION

No Action Alternative (Alternative 1)

The No Action Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year. These planned projects include Pier 42, Brookdale Campus, One Manhattan Square/Extell, Alexandria Phase 3, and the Two Bridges Large Scale Residential Development. Traffic, transit, pedestrian, and parking demand in the study area is expected to increase only as a result of background growth and these proposed developments.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative is a reconstruction of the existing recreational elements in the park; therefore, the proposed project would not generate any new travel demand upon its completion or significantly affect traffic, transit, or pedestrian operations within the project area. Modifications to the streets attributable to the proposed project (e.g., conversion of East 10th Street from two-way to one-way eastbound) would also not significantly affect vehicle or pedestrian circulation patterns. Therefore, the Preferred Alternative would not result in significant adverse traffic, transit, and pedestrian effects during non-storm conditions. The *CEQR Technical Manual* states that if a quantified traffic analysis is not required, it is likely that a parking assessment is also not warranted. Therefore, a quantified parking analysis is not warranted, and the proposed project would similarly not be expected to result in any significant adverse parking effects during non-storm conditions.

During a storm event and the periodic testing and maintenance of closure structures, certain streets, FDR Drive ramps, and segments of the FDR Drive adjacent to the closure structures would need to be temporarily closed to traffic/pedestrian use. The periodic testing and maintenance of closure structures would be temporary in nature and where feasible, would occur during off-peak hours with the necessary traffic management systems in place and therefore would not result in significant adverse effects on transportation systems. During testing and maintenance of the closure structures or under a design storm condition, access and circulation near the project area, including the Waterside Plaza complex, would be temporarily affected. Any testing and maintenance of the closure structures would be coordinated between NYCDOT, New York Police Department (NYPD), the New York City Fire Department (FDNY), and NYC Parks, to ensure emergency access routes are maintained in a coordinated manner using alternate routes.

Other Alternatives

As with the conclusions presented above for the Preferred Alternative, Alternatives 2, 3, and 5 would not result in significant adverse traffic, transit, pedestrian, and parking effects in both the non-storm and storm conditions.

NEIGHBORHOOD CHARACTER

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. There are a number of projects planned or currently under construction in the project area, including the Pier 42 project and the Solar One Environmental Education Center project in Stuyvesant Cove Park. During a coastal storm event similar to the design storm, the protected area could experience effects similar to Hurricane Sandy. Targeted resiliency measures may reduce the effects of storms in certain locations, but they would not provide protection for the larger protected area.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Flood Protection System with a Raised East River Park Alternative (Preferred Alternative) would not result in significant adverse effects to neighborhood character within the study area. The Preferred Alternative would provide flood protection, increased access, and enhanced and reconfigured open spaces. The Preferred Alternative would provide additional protection for the majority of East River Park from coastal surge events and periodic inundation as a result of sea level rise. These resiliency measures, including elevating East River Park, would enhance park public access, operations, functionality, and usability during pre- and post-storm periods. These additional resiliency measures would not negatively alter or affect current uses or other features that define the character of neighborhoods within the study area but would enhance the long-term resiliency of a critical neighborhood asset. Therefore, the Preferred Alternative is not expected to result in substantial changes to neighborhood character.

Other Alternatives

Alternatives 2, 3, and 5 would similarly not result in significant adverse effects to neighborhood character within the study area. These alternatives deviate from the Preferred Alternative in the extent to which they enhance open space and access to open spaces and in the exact alignment of the flood protection, but none of these alternatives would significantly adversely affect any of the various elements that contribute to the character of the neighborhood.

ENVIRONMENTAL JUSTICE

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Based on the environmental analyses performed for the Preferred Alternative, no minority or low-income communities would be disproportionately or adversely impacted. In addition, all residents in the project area including minority and low-income populations would benefit from the proposed coastal flood protection. Therefore, it is concluded that the proposed project would not result in any adverse effects with respect to environmental justice.

Other Alternatives

Alternatives 2, 3, and 5 would similarly not result in significant adverse effects to with respect to environmental justice.

CONSTRUCTION

A preliminary construction schedule was developed to determine the potential construction phasing and timing for project components under each of the With Action Alternatives. The purpose in developing the construction schedule was to determine preliminary project phasing with a conservative analysis of the range of potential environmental effects anticipated during construction of the build alternatives.

Construction activities would involve earthwork (excavation and grading); drilling shafts; installation of piles, foundations, and piers; installation, replacement, and relocation of water and sewer infrastructure; paving and pouring of concrete; fabrication and installation of steel gates; flood-proofing; and installation of park amenities. Upon completion of construction activities, site restoration and decommissioning activities would commence, including final grading, installation

of erosion control or slope stabilization measures, as needed, removing barriers, seeding and planting, and replacement or reinstallation of fences and other temporarily removed obstructions. All work would be performed in accordance with applicable methods and standards approved by NYC Parks for parks in its jurisdiction and construction near street trees, the New York City Department of Environmental Protection (DEP) and the New York City Department of Design and Construction (DDC). Any required temporary lane and road closures would be coordinated with NYCDOT to ensure compliance with applicable restrictions and employment of proper methods.

The construction activities would involve the use of numerous types of equipment and vehicles. As applicable to each phase of construction, earthwork would necessitate the use of excavators, loaders, dump trucks, bulldozers, graders, and vacuum trucks. Cranes, vibratory or impact pile drivers, hydraulic press-in hammers, concrete mixers, and concrete pumps would support installation of project components. Delivery trucks would be utilized throughout the construction period to support a variety of construction activities. Barges are also expected to be used for delivery and removal of materials, and flaggers would assist with traffic control at entry and exit points.

CONSTRUCTION—SOCIOECONOMIC CONDITIONS

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is constructed in the proposed project area. Therefore, under the construction phase, no changes to socioeconomic conditions are expected to occur with the No Action Alternative.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Construction activities would, at times, affect pedestrian and vehicular access in the immediate vicinity of construction activities. However, construction activities in the project area are located at a sufficient distance from businesses such that access to businesses would not be impeded. Lane and/or sidewalk closures and construction staging areas would not obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers. Businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities. Therefore, construction activities associated with the Preferred Alternative would not generate significant adverse socioeconomic effects.

Other Alternatives

Alternatives 2, 3, and 5 would be similar to the Preferred Alternative in that they would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Overall, construction activities associated with these alternatives would not generate significant adverse socioeconomic effects.

CONSTRUCTION—OPEN SPACE

No Action Alternative (Alternative 1)

Direct Effects

With the planned construction of Pier 42 Park, Pier 35, East River Waterfront Esplanade-Phase IV, and the Rutgers Slip Open Space, the open space acreage within the ½-mile study area will increase from 85.15 acres under existing conditions to approximately 92.53 acres by the 2025 analysis year. Under the No Action Alternative, with no new comprehensive coastal protection system installed in the project area, East River Park and other open space resources in the protected area would remain vulnerable to storm damage.

Indirect Effects

Under the No Action Alternative, total open space ratios are below the Citywide Community District median ratio of 1.5 acres per 1,000.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Direct Effects

There is the potential for temporary adverse direct effects under the Preferred Alternative over multiple analysis years due to the extent of displacement of recreational facilities and open space amenities in East River Park over the 3.5-year construction period. However, once completed, the Preferred Alternative would positively affect East River Park, Stuyvesant Cove Park, Murphy Brothers Playground and Asser Levy Playground, by enhancing their design and increasing their accessibility to the public.

Predicted noise level increases during construction at these open space locations would be noticeable; however, the total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher noise levels. Maximum construction noise levels at receptors nearest floodwall construction with the Preferred Alternative would be slightly lower because pile driving at the Preferred Alternative would generally occur further from to the receptors. East River Park, Asser Levy Playground and Murphy Brothers Playground would be closed under the Preferred Alternative during the times when construction activities would occur at these park resources. Therefore, the duration of construction noise would be limited at any given area of open space that would remain open in proximity to construction activities. Furthermore, the construction noise predictions are conservative in that they consider the area of open space that remains open and accessible closest to the construction area. While construction would likely disturb the Asser Levy outdoor pool temporarily, it is anticipated that construction would take place during the off-season of the pool (mid-September to early June) and not affect the operational season of the pool. Based on these factors, the Preferred Alternative construction noise on these open space resources would not result in a significant adverse effect. However, at Asser Levy Recreation Center, construction activity including pile driving that would occur west of the FDR Drive immediately adjacent to this building would produce noise level increases considered high for this area. While the duration of maximum noise levels at this location would be limited and the receptor is typically used for active recreation with a lower sensitivity to noise, the maximum noise levels predicted by the construction noise analysis are high (i.e., in the “clearly unacceptable” range according to CEQR noise exposure guidance). Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction.

Construction of the Preferred Alternative would be required to follow the requirements of the *New York City Noise Control Code* and would use additional measures, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods) to minimize the effects of the Preferred Alternative's construction activities on the surrounding community.

Construction of the proposed project under the Preferred Alternative would adhere to Local Law 77 of 2003 for emissions reductions on non-road construction engines, *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and *New York City Administrative Code* limitations on construction-vehicle idling time. With the implementation of these measures, the detailed analysis presented in Chapter 6.10, "Construction—Air Quality," showed there would be no significant adverse air quality effects on sensitive receptors, including open space areas near the construction activities.

Indirect Effects

As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in the Preferred Alternative from the No Action Alternative. The proposed project would reduce open space ratios by a minimum of 42.57 percent in 2023 and a maximum of 49.64 percent in 2020, and therefore would result in potential temporary significant adverse indirect effects on open space resources within the study area under the Preferred Alternative. There are no significant adverse indirect effects for the 2024 and 2025 analysis years, as any remaining construction would be minimal, and the vast majority of displaced open space areas would be restored and reopened to the public with new and enhanced park features.

Other Alternative (Alternative 2): Flood Protection System on the West Side of East River Park – Baseline

Alternative 2 would involve less construction in City parkland (e.g., East River Park), resulting in less temporary displacement of recreational facilities than the Preferred Alternative. Therefore, the temporary significant adverse direct and indirect open space effects under Alternative 2 would be less than the Preferred Alternative.

Similar to the Preferred Alternative, construction activity under Alternative 2 would include pile driving that would occur west of the FDR Drive immediately adjacent to the Asser Levy Recreation Center. These activities would produce noise level increases considered high for this area and in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect during construction.

Other Alternative (Alternative 3): Flood Protection System on the West Side of East River Park – Enhanced Park and Access

Alternative 3 would involve a similar level of temporarily displaced open space as the Preferred Alternative and would therefore result in a similar significant adverse effect as compared to the Preferred Alternative for the 2020 to 2023 analysis years. However, Alternative 3 would involve a longer construction duration, resulting in prolonged significant adverse effects. As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in Alternative 3 from the No Action Alternative. Since the open space ratios would be reduced by a minimum of 44.03 percent in 2025 and a maximum of 48.18 percent in 2022, the proposed project would result in potential temporary significant adverse indirect effects on open space resources within the study area under Alternative 3. Therefore, the temporary significant

adverse direct and indirect open space effects under Alternative 3 would be greater than the Preferred Alternative.

Similar to the Preferred Alternative, construction activity under Alternative 3 would include pile driving that would occur west of the FDR Drive immediately adjacent to the Asser Levy Recreation Center. These activities would produce noise level increases considered high for this area and in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect during construction.

Other Alternative (Alternative 5): Flood Protection System East of FDR Drive

The displacement of open space necessary to accommodate construction under Alternative 5 would be comparable to the Preferred Alternative. Therefore, any potential temporary significant adverse direct and indirect open space effects identified under Alternative 5 would be of comparable magnitude as the Preferred Alternative. However, Murphy Brothers Playground would not be affected under this alternative. Similar to the Preferred Alternative, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect during construction.

Mitigation

The proposed project would introduce potential temporary significant adverse direct and indirect effects on open space during the construction period. Therefore, potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the City. The mitigation measures being explored for the Preferred Alternative include accommodating permit users at other existing facilities; identify recreational resources that can be available to the community during construction; providing alternative recreational opportunities (e.g., programs like Shape-Up classes, walking clubs, Arts, greening programs); implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; and supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. The introduction of new publicly accessible open space—such as Pier 42 Park, Pier 35, and Phase IV of the East River Waterfront Esplanade project, totaling 4.81 acres—could be considered a potential mitigation effort. In addition, there has been funding allocated for the demolition of LaGuardia Bathhouse and interim recreation improvements which will create approximately 7,000 square feet of new publicly accessible open space. The feasibility of utilizing quieter construction methods (i.e., press in pile) in the vicinity of the Asser Levy Recreation Center are being explored as potential mitigation measures. However, these measures, would only partially mitigate construction effects on open space resources.

According to the *CEQR Technical Manual*, on-site improvements are considered a mitigation measure. Although construction would temporarily displace open space resources in East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk, the end result would be a refurbished open space resource. After construction, East River Park would be newly landscaped and raised park with pathways for the Preferred Alternative, which would enhance the user experience of the park. In addition, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. The Preferred Alternative would be especially beneficial for the open space resources in East River Park, as this alternative includes reconstruction of the park, raising it by approximately eight feet to meet the design flood protection criteria while also reducing the risk for effects from future storm events. The flood

protection measures proposed to be integrated into park features aim to reduce the effects from future storm events on the community. The Preferred Alternative proposes the replacement of pedestrian crossings at Delancey Street, East 10th Street, and Corlears Hook bridges. The enhancement of pedestrian bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon project completion. The improvements to these open space resources under the proposed project would be considered partial mitigation. Additionally, as stated in the *CEQR Technical Manual*, the implementation of missing segments of the City's greenway network would be considered a mitigation strategy. By remedying a long-standing narrowed pathway at the Con Edison "pinch-point," the proposed project under all alternatives would significantly improve the usability and access to the greenway with the construction of the shared-use flyover bridge.

As discussed above, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction. The feasibility of utilizing less impactful construction methods (i.e., press in pile) are being explored to mitigate this noise effect.

CONSTRUCTION—HISTORIC AND CULTURAL RESOURCES

Archaeological Resources

Two Phase 1A Archaeological Documentary Studies were prepared for the APE in March 2016, and a Supplemental Phase 1A Archaeological Documentary Study was prepared in March 2019. The March 2016 reports identified the following broad categories of historic-period archaeological resources that could be located in the APE—river bottom remains, landfill retaining structures and landfill deposits, historic streetbed resources, and former city block resources. Because of the potential presence of these resources, as mitigation, additional archaeological investigation will be performed in accordance with Section 106 regulations, based on a scope of work reviewed and approved by LPC and SHPO; this archaeological investigation would include pre-construction testing and/or monitoring during project construction performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidelines in the *CEQR Technical Manual*. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that work be halted until the tribe is notified and the artifact can be evaluated by an archaeologist. The additional archaeological investigation will be stipulated in a PA that is being prepared and will be included in the FEIS. It is expected that the PA will be executed among HUD, OMB, NYC Parks, SHPO, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, and the Advisory Council on Historic Preservation (ACHP).

Architectural Resources

No Action Alternative (Alternative 1)

One planned NYC Parks project within Project Area One could affect architectural resources that have been determined eligible for listing on the S/NR is the construction of an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (#4). This architectural resource would be offered some protection from accidental damage through Building Code Section BC 3309: Protection of Adjoining Property.

In addition, three projects within the 400-foot portion of the Primary APE could affect architectural resources in the No Action Alternative—reconstruction of the Baruch Playground within the Bernard Baruch Houses (#9, S/NR-eligible), resiliency measures at the Baruch Houses (#9, S/NR-eligible), and rehabilitation work at the Asser Levy Public Baths (#12, NYCL, S/NR).

Preferred Alternative (Alternative 4): Flood Protection System with A Raised East River Park

Construction of the Preferred Alternative would directly affect the FDR Drive, which is an architectural resource that has been determined eligible for listing on the S/NR (#1, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement a CPP for the FDR Drive to avoid inadvertent construction-period damage from ground-borne vibrations (i.e., from pile driving), falling debris, collapse, dewatering, subsidence, or construction equipment. The plan would be expected to follow the guidelines of DOB's *TPPN #10/88*, which "requires a monitoring program to reduce the likelihood of construction damage to adjacent historic structures and to detect at an early stage the beginnings of damage so that construction procedures can be changed." It is expected that the CPP will also be prepared in accordance with LPC's guidance document *Protection Programs for Landmarked Buildings* and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. In addition, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Construction under the Preferred Alternative would occur within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement Construction Protection Plans (CPPs) for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

Other Alternatives

As under the Preferred Alternatives, construction under Alternatives 2, 3, and 5 would directly affect the FDR Drive and within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be

stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these architectural resources under the Other Alternatives to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

Mitigation

Archaeological Resources

As will be stipulated in the PA, additional archaeological investigation prior to or during construction will be performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*, and such scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work If significant archaeological resources are identified during testing and/or monitoring, further archaeological testing and/or mitigation would be completed.

Architectural Resources

As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for architectural resources located within 90 feet from the construction area of the proposed project to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

CONSTRUCTION—URBAN DESIGN AND VISUAL RESOURCES

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to views or view corridors are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with A Raised East River Park

Construction of the Preferred Alternative would require the closure of East River Park for the 3.5-year construction duration, although the City is investigating opening portions of the park as completed. It is anticipated that the entirety of East River Park would be fenced off for construction to keep the public out of the working areas. The closed and fenced East River Park during construction would obstruct views from the FDR Drive and the upland neighborhood towards the East River. Therefore, construction of the Preferred Alternative could detract the experience of pedestrians in the vicinity and would have temporary adverse visual effects. In addition, the pedestrian experience in the vicinity of the existing bridge landings would temporarily be adversely affected during construction and views of the East River would be temporarily blocked. Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Playground, and a portion of Captain Patrick J. Brown Walk would be closed and temporarily fenced off during construction. Closure of these open space resources would detract from the experience of pedestrians in the immediate vicinity and would also cause temporary adverse effects on the urban visual context.

Other Alternatives

Alternatives 2, 3, and 5 would be similar in terms of their potential to obstruct views from the FDR Drive and the upland neighborhood towards the East River and detract the experience of pedestrians in the vicinity and would have temporary adverse visual effects during construction. However, since the flood protection and enhanced park and access features for these alternatives are expected to be completed over a 5-year construction period as compared to the 3.5-year period

for the Preferred Alternative, the temporary adverse visual effects during construction would be longer for these alternatives.

CONSTRUCTION—NATURAL RESOURCES

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. Therefore, no changes to natural resources are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Construction of the Preferred Alternative would be performed in accordance with all applicable rules and regulations of USACE, EPA, National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), NYSDEC, DEP, DDC, and other regulatory agencies and procedures, as applicable.

Construction of the Preferred Alternative includes the following in-water elements: the use of construction barges, the installation of shafts and footings to support a shared-use flyover bridge, the reconstruction of sewer outfalls, the demolition of the existing bulkhead for the installation of a new cut-off wall, and the demolition of the existing embayments and existing piles and formwork associated with the esplanade in these areas. These construction activities have the potential to result in temporary adverse effects to NYSDEC littoral zone tidal wetlands and USACE Waters of the United States, surface water resources, benthic resources, essential fish habitat (EFH), and threatened and endangered species. Turbidity curtains, water-tight cofferdams, and debris nets would be used as applicable to minimize the potential for these effects.

Although consultation with NOAA's National Marine Fisheries Service (NMFS) identified both shortnose sturgeon and Atlantic sturgeon as potentially occurring within the study area, shortnose sturgeon rarely leave tidal river habitat (e.g., the Hudson River) and on the rare occasions when shortnose sturgeon have been documented migrating to other tidal rivers such as the Connecticut River, their presence in the East River would be transient (see **Appendix G**). Additionally, the East River contains no submerged aquatic vegetation and limited benthic resources. Therefore, due to the transient nature of shortnose sturgeon in the East River, the lack of suitable habitat, and the sturgeon's ability to avoid the affected area, no significant adverse effects to shortnose sturgeon from construction activities under any alternative are anticipated.

The Atlantic sturgeon is known to utilize the East River as a migratory route between spawning grounds in the Hudson River and suitable marine habitats, primarily between the months of March through October. Atlantic sturgeon is uncommon in the East River (Tomechik et. al., 2015). When present, Atlantic sturgeon may forage opportunistically; however, there are limited benthic resources and submerged aquatic vegetation in the East River, thus their presence would primarily be transient. The potentially affected area represents a small portion of overall habitat available in the East River.

Construction of the in-water elements associated with the Preferred Alternative produces noise that has been known to affect Atlantic sturgeon. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of a cushion block, and gradually ramping up pile driving. With these conservation measures in place, Atlantic sturgeon may be discouraged from utilizing the near-shore environment in the East River, and the proposed project

would not be anticipated to significant adversely affect the Atlantic sturgeon population. A consultation has been reinitiated with NOAA NMFS and any conservation measures identified as a result of that consultation will be included in the Final EIS.

Upon completion of construction, the spuds, barges, turbidity curtains and debris nets would be removed, and the affected area would be allowed to naturally restore to pre-construction conditions. Therefore, while there would be adverse effects to NYSDEC and USACE regulated tidal wetlands resulting from construction of the Preferred Alternative, they would not significantly adversely affect natural resources in the area.

In addition, temporary adverse effects to terrestrial resources due to the removal of trees are anticipated as a result of both construction of the proposed project and to accommodate the proposed design for the Preferred Alternative. The project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. Therefore, no significant adverse effects to terrestrial resources are anticipated as a result of construction of the Preferred Alternative. No significant adverse effects to other natural resources are anticipated.

Other Alternatives

Construction of all With Action Alternatives would be performed in accordance with all applicable rules and regulations as stated for the Preferred Alternative. Alternatives 2 and 3 do not propose the reconstruction of the sewer outfalls, the removal of the existing bulkhead to be replaced by a new cut-off wall, or the relocation of two embayments within East River Park. The in-water construction elements are limited to the installation of the flyover bridge shafts and footings and the use of construction barging. In addition, tree removals under these alternatives would be reduced compared to the Preferred Alternative, although East River Park would remain vulnerable to design storm events and sea level rise inundation over the long-term. Therefore, no significant adverse effects to natural resources are anticipated.

Alternative 5 includes all the components of the Preferred Alternative and increases the potential for temporary adverse effects to tidal wetlands (littoral zone), surface water resources, benthic and essential fish habitat, and Atlantic sturgeon habitat due to the installation of the support structure for the raised FDR Drive. This additional adverse effect to NYSDEC and USACE regulated tidal wetlands would be subject to the same regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions.

CONSTRUCTION—HAZARDOUS MATERIALS

No Action Alternative (Alternative 1)

Under the No Action Alternative, no new comprehensive coastal flood protection systems would be implemented within the project area. However, several projects planned or under construction in the project area might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure. These projects are subject to applicable regulatory requirements.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative has the potential to disturb subsurface hazardous materials, as it would involve demolition and excavation activities. However, with the implementation of appropriate measures governing the construction (such as air monitoring, proper storage and handling of

materials, and, if required, odor suppression), the potential for significant adverse effects related to hazardous materials would be avoided.

Other Alternatives

Alternative 2, 3, and 5 would be similar in terms of all having the potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for construction-phase effects would be avoided in the same manner as described for the Preferred Alternative. However, the level of disturbance within East River Park and the importation of fill materials would be substantially less for Alternatives 2 and 3 as compared to the Preferred Alternative.

CONSTRUCTION—WATER AND SEWER INFRASTRUCTURE

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, no changes to water and sewer infrastructure are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Construction of the Preferred Alternative would be performed in accordance with all methods and standards approved by NYSDEC, DEP, DDC and other appropriate regulatory agencies and procedures. Prior to excavation, interferences with existing water and sewer infrastructure would be identified. Existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work. Water mains and sewers will be replaced, where required, per DEP and DDC standards. All construction activity associated with drainage isolation, drainage management, infrastructure reconstruction, or relocation/replacement of existing water and sewer infrastructure would be undertaken without affecting the conveyance of flow through the water or combined sewer system. This work would be performed throughout the duration of construction in accordance with methods and standards approved by DEP and DDC. Therefore, no disruption to existing water or sewer services is anticipated, and no adverse impacts to water or sewer infrastructure would occur.

Other Alternatives

Similar to the Preferred Alternative, no significant adverse effects to the existing water supply or combined sewer services is anticipated, and no impacts to water and sewer infrastructure would occur under Alternatives 2, 3, and 5 during construction.

CONSTRUCTION—ENERGY

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to energy are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with A Raised East River Park

The Preferred Alternative would involve excavation, pile driving, and other potentially disruptive construction activities in proximity to existing energy transmission and generation infrastructure. To avoid potential adverse effects, protective measures would be implemented to ensure that construction of the proposed project would not disrupt the function of this infrastructure and the electrical supply in Lower Manhattan.

Other Alternatives

Alternative 2, 3, and 5 would be similar in terms of their potential to disturb existing energy transmission and generation infrastructure, as they all involve excavation, pile driving, and other potentially disruptive construction activities. Any potential for construction-phase effects would be avoided in the same manner as described for the Preferred Alternative.

CONSTRUCTION—TRANSPORTATION

No Action Alternative (Alternative 1)

Under the No Action Alternative, no new comprehensive coastal protection system is installed in the proposed project area, and no new trips are generated by the proposed project. There are a number of projects planned or under construction within a ½-mile of the project area that are expected to be complete by 2025. These projects will generate traffic, transit, pedestrian trips, and parking demands that are background growth not associated with the proposed project.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Traffic

Construction of the Preferred Alternative would generate 251 passenger car equivalents (PCEs) during the 6:00 to 7:00 AM peak hour and 131 PCEs during the 3:00 to 4:00 PM peak hour, exceeding the *CEQR Technical Manual* analysis threshold of 50 vehicle trips. Based on this trip generation, traffic assignments were prepared and six intersections for the AM peak hour and one intersection for the PM peak hour were selected for detailed traffic analysis. The analysis disclosed temporary significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the AM peak hour. However, these effects could be fully mitigated by implementing standard traffic mitigation measures (e.g., signal timing changes). Additionally, with the full reconstruction of East River Park under this alternative, barging of fill materials to East River Park could be employed, thereby reducing the volume of truck trips from what would otherwise be needed to reconstruct and raise the park.

Parking

An inventory of on- and off-street parking within a ¼-mile radius of the project area showed approximately 70 on-street parking spaces available near Project Area One and 30 on-street parking spaces available near Project Area Two. The off-street survey showed approximately 60 spaces available near Project Area One and 800 spaces available near Project Area Two.

Construction under the Preferred Alternative is anticipated to generate a maximum parking demand of 92 spaces for Project Area One and 52 spaces for Project Area Two. The Project Area Two parking demand would be fully accommodated by the large inventory of available on- and off-street parking spaces near the project area. The Project Area One demand would not be fully accommodated within ¼-mile and could result in a parking shortfall of up to approximately 35 spaces. It is expected that excess parking demand within Project Area One would need to be accommodated by on-street parking or off-street parking beyond a ¼-mile walk from the project area. Alternatively, motorists could choose other modes of transportation. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, construction of the preferred Alternative would not result in any significant adverse parking effects.

Transit

Construction of the Preferred Alternative would generate 144 transit trips (total of Project Area One and Project Area Two) during the peak hour of the peak construction period, below the *CEQR Technical Manual* analysis threshold of 200 transit trips. Therefore, construction of this alternative would not result in any significant adverse transit effects.

Pedestrians

Construction under the Preferred Alternative would generate 200 pedestrian trips for Project Area One and 112 pedestrian trips for Project Area Two. Given the number of available pedestrian routes to/from area parking facilities and transit services and the various access/egress points to the East River Park, no sidewalks or crosswalks are expected to experience 200 or more pedestrian trips during an hour. However, because this alternative would require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, the Preferred Alternative would require the development and implementation of a rerouting plan.

Other Alternative (Alternative 2): Flood Protection System on the West Side of East River Park – Baseline

Alternative 2 is expected to yield comparable worker and truck estimates during peak construction as the Preferred Alternative, therefore would have the potential to result in significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction peak hour. However, these significant adverse effects could be fully mitigated by implementing standard traffic mitigation measures (e.g., signal timing changes). This alternative would not have any significant adverse transit, pedestrian, or parking effects.

Other Alternative (Alternative 3): Flood Protection System on the West Side of East River Park – Enhanced Park and Access

Traffic

Peak construction activities under Alternative 3 would generate 153 passenger car equivalents (PCEs) during the 6:00 to 7:00 AM peak hour and 85 PCEs during the 3:00 to 4:00 PM peak hour, exceeding the *CEQR Technical Manual* analysis threshold of 50 vehicle trips during the peak hour. Based on this trip generation, traffic assignments were prepared and six intersections for the AM peak hour and one intersection for the PM peak hour were selected for detailed traffic analysis. Similar to the Preferred Alternative, significant adverse traffic effects were identified at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the AM peak hour. However, these effects could be fully mitigated by implementing standard traffic mitigation measures (e.g., signal timing changes).

Parking

Construction under Alternative 3 is estimated to generate a maximum parking demand of 55 spaces for Project Area One and 31 spaces for Project Area Two. Similar to the Preferred Alternative, the Project Area Two parking demand would be fully accommodated by the large inventory of available on- and off-street parking spaces near the project area and the Project Area One demand could result in a parking shortfall within ¼-mile. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, it is concluded that construction of Alternative 3 would not result in any significant adverse parking effects.

Transit

Construction of Alternative 3 would generate 86 peak hour transit trips (total for Project Areas One and Two) during the peak construction period, which is well below the *CEQR Technical Manual* analysis threshold of 200 transit trips. Therefore, construction under Alternative 3 would not result in any significant adverse transit effects.

Pedestrians

Construction of Alternative 3 would generate 188 peak hour pedestrian trips during the peak construction period, below the *CEQR Technical Manual* analysis threshold of 200 pedestrian trips. Therefore, construction under Alternative 3 would not result in any significant adverse pedestrian effects. However, because this alternative may require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, Alterative 3 would require the development and implementation of a rerouting plan for the full 5-year construction duration through 2025.

Other Alternative (Alternative 5): Flood Protection System East of FDR Drive

Alternative 5 aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Captain Patrick J. Brown Walk to the north and raises the northbound lanes of the FDR Drive by approximately six feet between East 13th Street and Avenue C, thereby placing the line of protection generally on the east side of the FDR Drive in this segment. Construction of Alternative 5, would require either a temporary full 24-hour closure of the FDR Drive in the northbound direction and one-lane closure in the southbound direction for two consecutive months or partial closure in both directions. Both of these scenarios have the potential to result in significant adverse traffic effects beyond those identified above for the Preferred Alternative. The use of Traffic Enforcement Agents (TEAs) would help mitigate any additional significant adverse traffic effects that could occur due to the closure of the FDR Drive; however, as a result of the closure, some effects could remain unmitigatable.

Mitigation

As described above, the proposed project would require mitigation for temporary construction traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C, temporary closures of bikeway/walkway along the proposed project area to inland routes and closure of the FDR Drive under Alternative 5.

For the proposed project, the temporary significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Second Avenue could be fully mitigated by implementing standard traffic mitigation measures (e.g., signal timing changes).

Because the proposed project may require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, the proposed project would require the development and implementation of a rerouting plan.

For Alternative 5, the effects due to the closure of the FDR Drive would be mitigated through the development of a detailed NYCDOT-approved Traffic Management Plan and deployment of NYPD TEAs that would manage traffic and pedestrian circulation at the intersections that are temporarily and significantly affected near the project area. Additional mitigation measures are expected to include transportation management on an area-wide level with public outreach and the use of variable message signs and other measures to alert motorists. If a construction plan can

be developed that does not require full closure of the FDR Drive, the potential significant adverse transportation effects could be reduced. Since the Preferred Alternative and Alternatives 2 and 3 would not require a 24-hour closure of the FDR Drive, a Traffic Management Plan is not needed for those alternatives.

CONSTRUCTION—AIR QUALITY

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. No changes to air quality are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes as well as New York City Local Law 77. These include dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies. With the implementation of these emission reduction measures, construction of the Preferred Alternative would not result in any predicted concentrations above the National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2), carbon monoxide (CO), and particulate matter (PM_{10} or the *de minimis* thresholds for $PM_{2.5}$) from nonroad and on-road sources. Therefore, no significant adverse air quality impacts are predicted from the construction of the Preferred Alternative.

Annual emissions from nonroad and on-road sources over the scheduled construction duration would not exceed any of the *de minimis* criteria defined in the general conformity regulations. Therefore, construction of the Preferred Alternative would conform to the relevant State Implementation Plan (SIP) and does not require a general conformity determination.

Other Alternatives

Alternative 2, 3, and 5 would implement measures to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes as well as New York City Local Law 77. With the implementation of these emission reduction measures, construction would not result in significant adverse effects with respect to air quality. As with the Preferred Alternative, construction under these alternatives would conform to the relevant SIP and does not require a general conformity determination.

The magnitude of construction activities during the peak construction period of Alternative 2 would be the same or lower than the Preferred Alternative and any air quality effects identified under Alternative 3 would be similar to those identified under the Preferred Alternative. Alternative 5 would require extensive work within and adjacent to the FDR Drive and could require full closure of the FDR Drive northbound lanes for a period of two months. Therefore, construction activities under Alternative 5 may have the potential for short-term effects on local air quality due to changes in traffic patterns and diversions.

CONSTRUCTION—GREENHOUSE GAS

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. No changes to greenhouse gases are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The total fossil fuel use in all forms associated with construction under the Preferred Alternative would result in up to approximately 48,889 metric tons of CO_2e emissions. Potential measures for further reductions of emissions from construction of the Preferred Alternative are under consideration and may include the use of biodiesel, expanded use of recycled steel and aluminum, as well as expanded construction waste reduction.

Other Alternatives

The magnitude of construction activities for Alternative 2 would be substantially lower than the Preferred Alternative, resulting in fewer on-road trips and on-site use of nonroad engines, requiring less materials, and resulting in the removal of fewer trees. Overall, less greenhouse gases would be emitted under Alternative 2 as compared to the Preferred Alternative.

The total fossil fuel use in all forms associated with construction under Alternative 3 would result in up to approximately 48,652 metric tons of CO_2e emissions. This estimate is similar to the total fossil fuel use projected for the Preferred Alternative.

Alternative 5 aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Avenue C to the north as opposed to the west side of the FDR Drive for the Preferred Alternative and is expected to result in similar greenhouse gas emissions as the Preferred Alternative. However, Alternative 5 would require extensive work within the FDR Drive and could require full closure of the FDR Drive northbound lanes for a period of two months, which could result in increased congestion and ensuing greenhouse gas emissions as compared to the Preferred Alternative.

CONSTRUCTION—NOISE AND VIBRATION

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. No changes to noise and vibration are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

Construction of the Preferred Alternative is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, 520 East 23rd Street, 123 Mangin Street, and the Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of limited duration and would be up to the mid 80s dBA during daytime construction and up to the mid 70s dBA during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which

would be considered acceptable according to CEQR criteria. The buildings at 621 Water Street, 605 Water Street, 765 FDR Drive, 819 FDR Drive, 132 Avenue D, 465 Avenue D, 123 Mangin Street, and the Asser Levy Recreation Center appear to have monolithic glass (i.e., non-insulating) and would consequently be expected to experience interior $L_{10(1)}$ values up to the high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

Construction of the Preferred Alternative is expected to occur over a 3.5-year duration as compared to the 5-year duration for Alternatives 2, 3, and 5. This shorter construction duration for the Preferred Alternative primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive. In addition, compared to Alternatives 2 and 3, maximum construction noise levels at receptors nearest floodwall construction within East River Park for the Preferred Alternative would be slightly lower, because pile driving for the Preferred Alternative would occur further from the receptors.

At other receptors near the project area, including open space, residential, school, and hospital receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would generally not exceed typical noise levels in the general area and so would not rise to the level of a significant adverse noise effect.

Vibration resulting from construction of the proposed project would not result in exceedances of the acceptable limit, including for historic structures. However, vibration monitoring would be required for all historic structures within 90 feet of the project work areas according to the project's Construction Protection Plan (CPP) to ensure vibration does not exceed the acceptable limit at any of these historic structures. In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location. While the vibration may be noticeable at times, it would be temporary and would consequently not rise to the level of a significant adverse effect.

Other Alternatives

Construction of Alternative 3 is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street, and Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of limited duration and would be up to the high 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to City Environmental Quality Review (CEQR) criteria. Under Alternatives 2 and 5, significant adverse construction noise effects are expected to be similar to those under Alternative 3 and the Preferred Alternative, respectively.

Any potential vibration effects for Alternatives 2, 3, and 5 are expected to be similar to those identified for the Preferred Alternative.

Mitigation

Source or path controls beyond code requirements would be considered and implemented during construction of the proposed project to minimize the effects of noise. To that end, the mitigation measures being explored by the City include:

- Using a hydraulic press-in pile installation method instead of the standard impact pile driving provides a large reduction in noise from pile installation, which would result in a substantial reduction in overall construction noise because pile installation is the dominant source of construction noise at most receptors.
- Hanging noise barriers or curtains made from mass-loaded vinyl around the pile driving head to shield receptors from noise of impact pile driving.
- Enclosing the concrete pump and concrete mixer trucks at any time that the mixer barrels would be spinning in a shed or tunnel including 2 or 3 walls and a roof, with the opening or openings facing away from receptors.
- Using barging for deliveries of construction materials (including concrete) and importing of fill to the project sites, rather than trucks on roadways to from the construction work areas.
- Selecting quieter equipment models for equipment (i.e., cranes, generators, compressors, and lifts).

CONSTRUCTION—PUBLIC HEALTH

No Action Alternative (Alternative 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. No changes to public health are expected to occur with the No Action Alternative during construction.

Preferred Alternative (Alternative 4): Flood Protection System with a Raised East River Park

The Preferred Alternative would not result in unmitigated significant adverse effects in air quality, water quality, or hazardous materials, but could potentially result in unmitigated significant adverse construction-period noise effects at receptors in the vicinity of the proposed project's construction work areas. However, construction of the proposed project would not result in chronic exposure to high levels of noise, prolonged exposure to noise levels above 85 dBA, or episodic and unpredictable exposure to short-term effects of noise at high decibel levels, as per the *CEQR Technical Manual*. Consequently, construction of the proposed project would not result in a significant adverse public health effect.

Other Alternatives

Similar to the Preferred Alternative, no significant adverse public health effects would occur under Alternatives 2, 3, and 5 during construction.

INDIRECT AND CUMULATIVE EFFECTS

The proposed project would not result in indirect adverse effects generated by induced or secondary growth. In consideration of the range of technical analyses presented in this EIS, the proposed project has little or no potential to result in any cumulative effects, except in the following areas: visual resources—by blocking views to the waterfront and East River from multiple locations—and open space during construction periods by temporarily displacing open space resources. ✷

Chapter 1.0: Purpose and Need

A. INTRODUCTION

On October 29, 2012, Hurricane Sandy made landfall, greatly impacting the east side of Manhattan and highlighting the need for the City of New York (the City) to increase its efforts to protect vulnerable populations and critical infrastructure during extreme coastal storm events (the 100-year flood events with Sea Level Rise projections to the 2050s[1]), referred to herein as the design storm event. Hurricane Sandy, a presidentially declared disaster, caused extensive coastal flooding, resulting in significant damage to residential and commercial property, open space, and critical transportation, power, and water and sewer infrastructure, which in turn affected medical and other essential services. As part of its plan to address vulnerability to such major flooding, the City is proposing the East Side Coastal Resiliency (ESCR) Project, which involves the construction of a coastal flood protection system along a portion of the east side of Manhattan (see **Figure 1.0-1**) and related improvements to City infrastructure (the proposed project).

The area that would be protected under the proposed project (the protected area) includes lands within the Federal Emergency Management Agency (FEMA) 100-year special flood hazard area (SFHA), as well as those projected to be within the 100-year flood hazard area in the 2050s, taking into account the 90th percentile projection for sea level rise (see **Figure 1.0-2**). This includes portions of the Lower East Side and East Village neighborhoods, Stuyvesant Town, Peter Cooper Village, as well as East River Park and Stuyvesant Cove Park. Within the project area, the City is proposing to install a flood protection system generally located within City parkland and streets, which would consist of a combination of floodwalls, levees, closure structures (e.g., floodgates), and other infrastructure improvements to reduce the risk of flooding. In addition to providing a reliable coastal flood protection system for this area, another goal of the proposed project is to improve open spaces and enhance access to the waterfront, including John V. Lindsay East River Park (East River Park) and Stuyvesant Cove Park.

The proposed project area begins at Montgomery Street to the south and extends north along the waterfront to East 25th Street and is composed of two sub-areas: Project Area One and Project Area Two. Project Area One extends from Montgomery Street on the south to the north end of East River Park at about East 13th Street. Project Area One consists primarily of the Franklin Delano Roosevelt East River Drive (the FDR Drive) right-of-way, a portion of Pier 42, Corlears Hook Park, and East River Park. The majority of Project Area One is within East River Park and includes four existing pedestrian bridges across the FDR Drive to East River Park (Corlears Hook, Delancey Street, East 6th Street, and East 10th Street bridges) and the East Houston Street overpass. Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the

[1] Sea level rise estimate represents the 90th percentile value for 2050 as presented by the New York City Panel on Climate Change. See Chapter 2.0, "Project Alternatives," for additional details on design principals and sea level rise.

Proposed Project Area

0 1 MILES

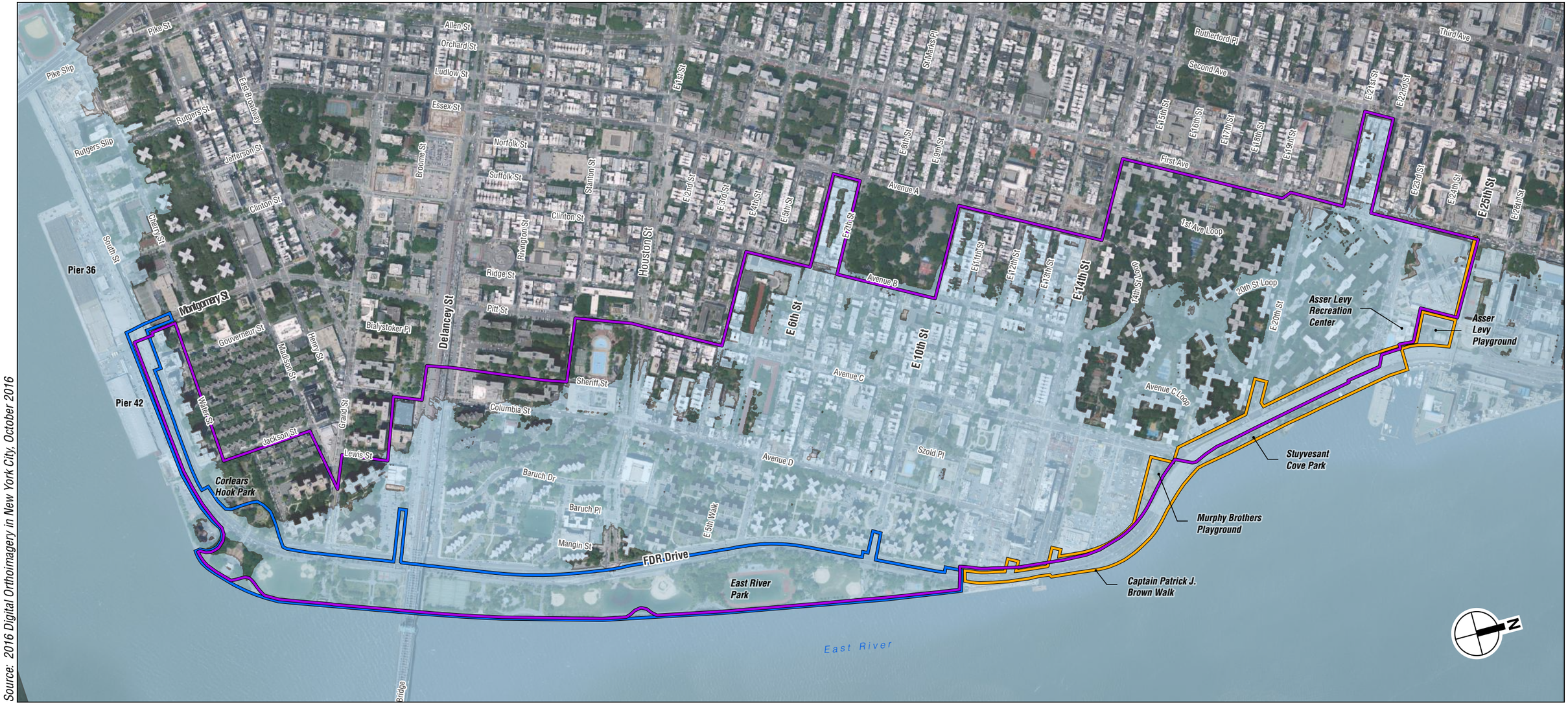
Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Regional Location

Figure 1.0-1

Source: 2016 Digital Orthoimagery in New York City, October 2016



Project Area One

Project Area Two

Protected Area

100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Protected Area Aerial Map

Figure 1.0-2

Consolidated Edison Company of New York (Con Edison), the East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreational Center and Playground, the VA Medical Center, and in-street segments along East 20th Street, East 25th Street, and along and under the FDR Drive. **Figure 1.0-3** is an aerial map depicting the limits of Project Area One and Project Area Two.

To implement the proposed project, the City and its federal partners have committed approximately $1.45 billion in funding. The City has entered into a grant agreement with the U.S. Department of Housing and Urban Development (HUD) to disburse $338 million of Community Development Block Grant-Disaster Recovery (CDBG-DR) funds for the design and construction of the proposed project. The City is the grantee of CDBG-DR funds related to Hurricane Sandy for the development of a coastal flood protection system, which would be provided to the City through the New York City Office of Management and Budget (OMB), acting under HUD's authority.

This chapter provides a brief background of the development of this project, and identifies the underlying purpose and need for the project. This chapter also identifies the primary objectives of the proposed project, along with its principal design and implementation considerations.

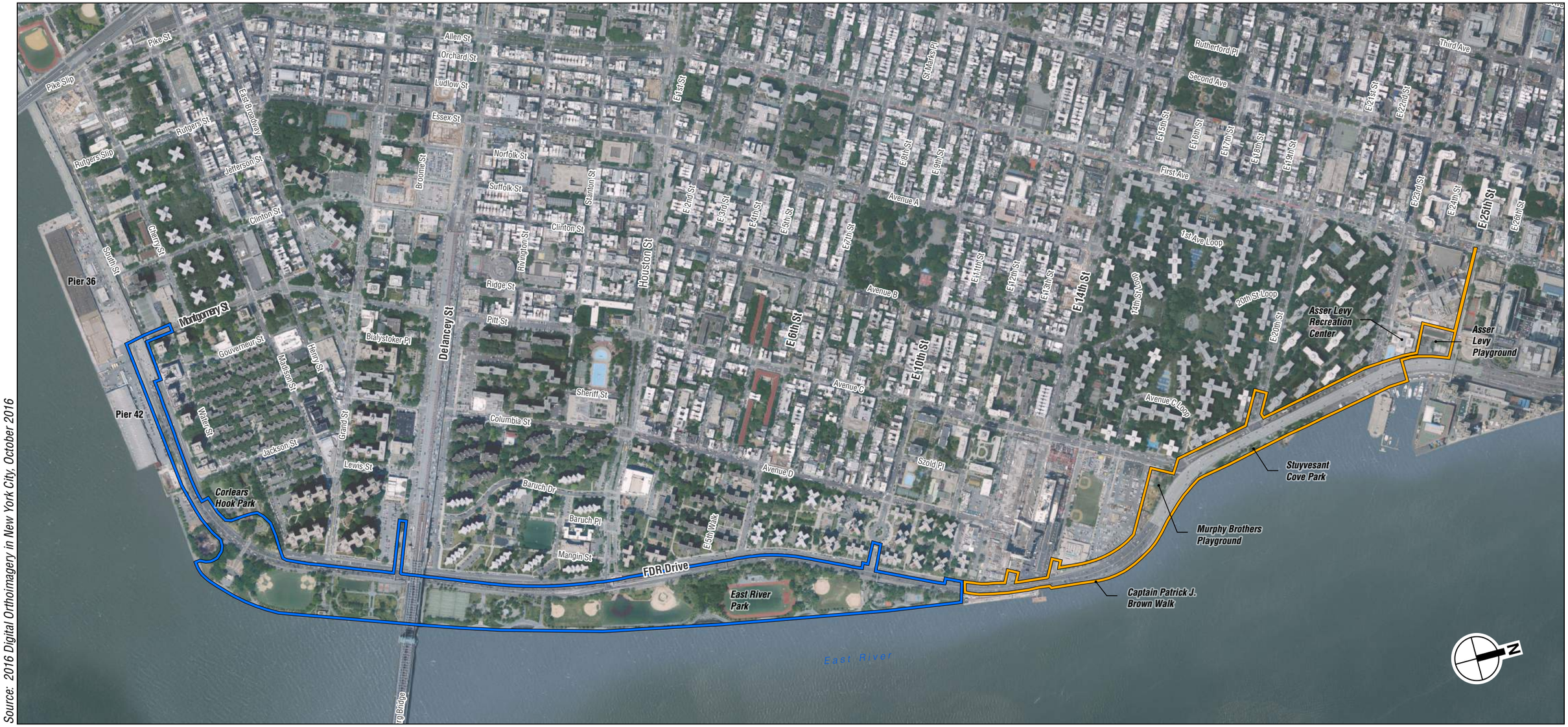
B. BACKGROUND OF THE PROPOSED PROJECT

When Hurricane Sandy hit New York City in 2012, the resulting waves and storm surge battered the City's coastline, leading to 43 deaths, the destruction of homes and other buildings, and severe damage to critical infrastructure. The damage was particularly intense in neighborhoods across Southern Manhattan, Southern Queens, Southern Brooklyn, and the eastern and southern shores of Staten Island.

During Hurricane Sandy, Manhattan's East River waterfront between East 42nd Street and the Brooklyn Bridge experienced extensive coastal flooding, which affected millions of square feet of built space, including residential and commercial buildings, parks, and critical infrastructure. The East River storm surge overtopped the bulkhead, inundated East River Park, crossed the FDR Drive, and flowed inland two blocks and down Avenue C, with water depths of up to four feet reported along Avenue C. **Figure 1.0-4** shows the extent of Hurricane Sandy flooding. This flooding damaged critical mechanical systems within numerous buildings, including fire safety, life safety, and heating and cooling systems.

Hurricane Sandy also resulted in significant damage to critical elements of the City's utility infrastructure, including the energy grid, water supply and sewer service facilities, and transportation systems. As Hurricane Sandy approached New York City, Con Edison preemptively shut down two electrical networks in Lower Manhattan (the area south of the Brooklyn Bridge) to minimize the damage to their facilities and critical infrastructure. Nonetheless, the surge damaged substation facilities located at both East 13th Street and the South Street Seaport, shutting down electrical service to much of Manhattan below 34th Street for nearly four days after the storm.

Surge waters also damaged two New York City Department of Environmental Protection (DEP) wastewater facilities serving Southern Manhattan, including the Avenue D Pump Station (also referred to as the Manhattan Pump Station or the 13th Street Pump Station), located at East 13th Street and the FDR Drive, and the Canal Street Pump Station, located near the intersection of Canal and Varick Streets. The Manhattan Pump Station experienced service outages and was shut down for more than a day, exacerbating combined sewer overflow (CSO) discharges into the East



Source: 2016 Digital Orthoimagery in New York City, October 2016

Project Area One

Project Area Two

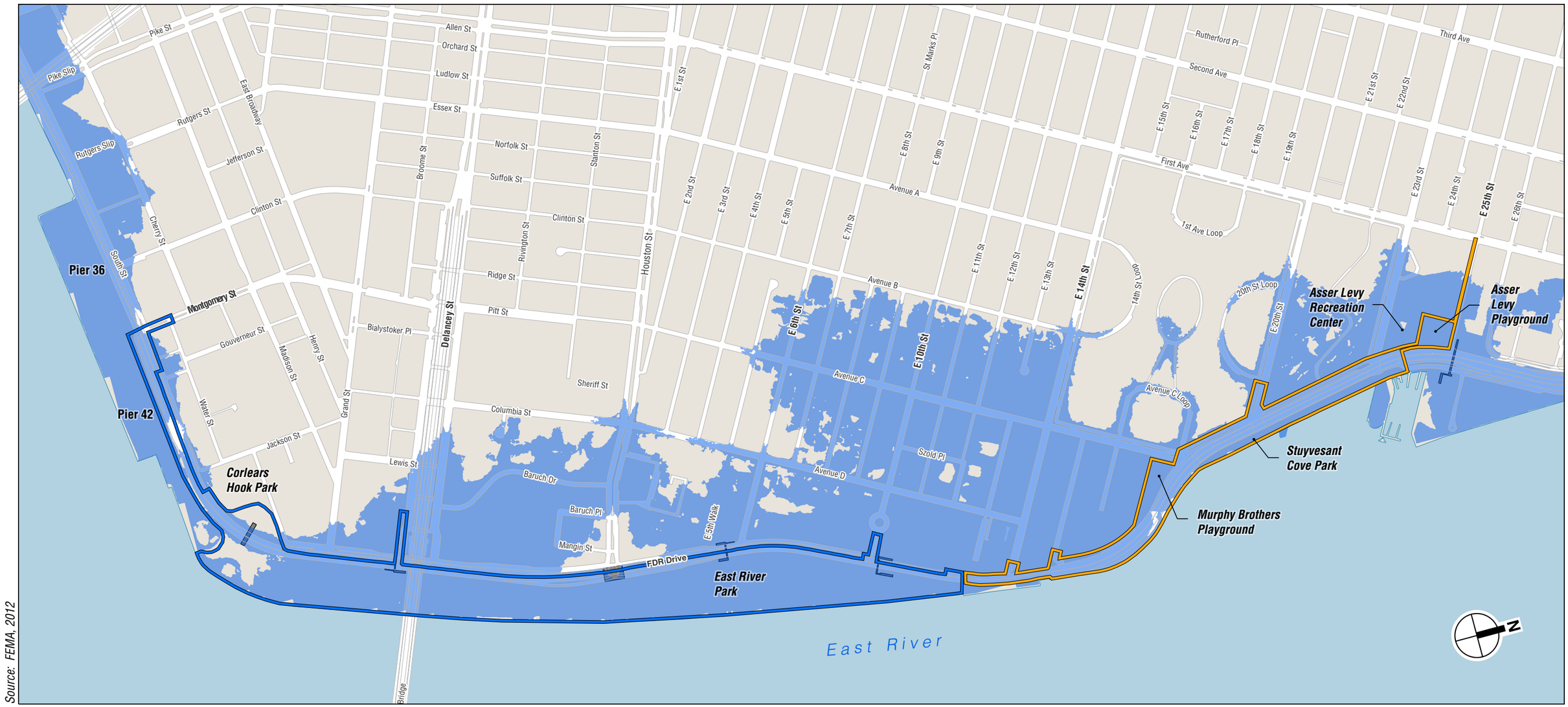
0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Proposed Project Area Aerial Map

Figure 1.0-3



Source: FEMA, 2012

Project Area One

Project Area Two

Hurricane Sandy Flooding Extent

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Extent of Hurricane Sandy Flooding

Figure 1.0-4

River during that time. Flooding also affected seven subway tunnels, including the 14th Street Tunnel for the L line (BMT-Canarsie Line). Damage to these tunnels resulted in their closure for up to a week after the storm.

In Hurricane Sandy's aftermath, the City formed the Special Initiative for Rebuilding and Resiliency (SIRR) to analyze the impacts of the storm on the City's buildings, infrastructure, and people; to assess climate change risks in the near term (2020s) and long term (2050s); and to outline strategies for increasing resiliency citywide. The PlaNYC report, "*A Stronger, More Resilient New York*," released in June 2013, was the result of that effort and contains Community Rebuilding and Resiliency Plans (CRRP) for five particularly vulnerable neighborhoods in the City, including Southern Manhattan.

The CRRP for Southern Manhattan outlines specific initiatives to address coastal defenses for buildings and critical infrastructure coupled with post-storm community and economic recovery. With respect to coastal protection, the City's proposals were based on a multi-faceted analysis that considered the types of coastal hazards and their likelihood of occurrence, the potential impact of these hazards on the built environment and on critical infrastructure, and the likely effectiveness of proposed measures to address these hazards. In addition, the coastal defense measures were informed by the New York City Department of City Planning's (DCP) *Urban Waterfront Adaptive Strategies* (UWAS) study, published in June 2013, and funded by a HUD Sustainable Communities Regional Planning Grant. The UWAS study examined the underlying geomorphology of the various regions, including categorizing each coastal reach of the City's shoreline by geomorphic type. The UWAS study provided an assessment of coastal resiliency measures that would be appropriate for each geomorphologic type along the City's shoreline. The CRRP built upon the results of the UWAS study to recommend coastal initiatives for Southern Manhattan's coastline, which includes the proposed project area.

Coastal Protection Initiative 21 of the CRRP calls for an integrated flood protection system in Lower Manhattan, extending from East 14th Street to Battery Park City, the first phase of which is intended to protect the Lower East Side and parts of Chinatown. Generally defined as the area south of East Houston Street and east of the Manhattan Bridge between the Bowery and the FDR Drive, the Lower East Side and Chinatown are home to a large residential population, including one of the greatest concentrations of low- and moderate-income households in the City, with over 9,000 New York City Housing Authority (NYCHA) housing units. In addition, critical infrastructure—including the City's subway system, Con Edison substations, the Manhattan Pump Station, and the FDR Drive—are all located here. It was recognized in the CRRP that potential storm damage to these critical assets would result in citywide impacts on thousands of housing units, transportation systems, parks, and the economy.

In June 2013, HUD launched the Rebuild by Design (RBD) competition to respond to Hurricane Sandy's devastation. Through this competition, which was funded using foundation and private-sector resources, selected proposals were identified for further analysis with the goal of identifying projects for implementation. In June 2014, following a year-long process during which the design teams met with regional experts—including government agencies, elected officials, community organizations, local groups, and individuals—HUD announced six winning proposals that included projects throughout the Hurricane Sandy-impacted area, including Long Island, New Jersey, the Bronx, Staten Island, and Manhattan. The concept for Manhattan was named "the Big U," which focused on a flood protection system around Manhattan extending along the Hudson River from West 57th Street to the Battery, and then north up the East River to East 42nd Street. As part of the RBD process, a more focused proposal was developed to reduce the flood risk for

vulnerable communities along the East Side. This proposal identified three waterfront compartments between the Battery and East 23rd Street. These compartments were determined based on the 100-year mapped SFHA (see **Figure 1.0-5**), topography, and sea level rise projections developed by the New York City Panel on Climate Change. Although the compartments were conceptualized together, each could provide flood protection independently of the others. CDBG-DR funds were subsequently allocated by HUD for the design and construction of the Montgomery Street to East 23rd Street compartment, which is the basis for the proposed project area. As design for this compartment advanced, the project area was extended north to East 25th Street and included the historic Asser Levy Recreational Center.

The importance of this project to the City was emphasized in "*One New York: The Plan for a Strong and Just City*," (*OneNYC*) released in April 2015. In *OneNYC*, the City identified the proposed project as one of several vital projects to be completed throughout all five boroughs that would strengthen coastal defenses, building a stronger, more resilient New York City that is prepared for the impacts of climate change. Specifically, Vision 4 of *OneNYC* noted that the proposed project would benefit thousands of public housing and other residents of a particularly vulnerable part of Manhattan and would demonstrate a new model for integrating coastal protection into neighborhoods, consistent with the City's resiliency vision.

C. PURPOSE AND NEED FOR THE PROPOSED PROJECT

As established above, Hurricane Sandy underscored the City's need to bolster its resiliency efforts to protect property, vulnerable populations, and critical infrastructure during design storm events. The need to protect the area is magnified by the potential for more frequent flooding events and would align with resiliency planning goals described in *OneNYC* and *A Stronger, More Resilient New York*. To that end, the purpose of the proposed project is to address this coastal flooding vulnerability in a manner that reduces the flooding risk while enhancing waterfront open spaces and access to the waterfront.

Absent the proposed project's coastal flood protection measures, residents, businesses, critical infrastructure, and valuable open space amenities within the protected area will remain vulnerable to flooding during design storm events. Although some resiliency measures are expected to be completed at NYCHA's Baruch Houses, Wald Houses, Riis Houses, and other developments, these areas as well as the broader protected area will continue to be vulnerable to flood damage during future storm events, and responders' access to the dwellings would continue to be compromised during flood events. Additionally, residents in market rate and affordable dwellings in Stuyvesant Town and Peter Cooper Village, and many dwellings east of Avenue B, will remain vulnerable. Further, existing businesses, especially ground floor establishments along Avenues B, C, and D would remain vulnerable through potential loss of customers during flood events, and possibly by water damage to property. This outlines the importance of the proposed project which is needed to strengthen coastal defenses in this area in order to prepare for the impacts of climate change.

The principal objectives of the proposed project are as follows:

- Provide a reliable coastal flood protection system against the design storm event for the protected area;
- Improve access to and enhance open space resources along the waterfront, including East River Park and Stuyvesant Cove Park;

Source: FEMA Preliminary Flood Insurance Rate Maps, 1/30/2015

Pike Slip
Rutgers Slip
South St
Cherry St
Pier 36
Pier 42
Montgomery St
Rutgers St
Jefferson St
Clinton St
East Broadway
Gouverneur St
Madison St
Henry St
Jackson St
Grand St
Corlears Hook Park
Orchard St
Ludlow St
Essex St
Norfolk St
Suffolk St
Broome St
Rivington St
Stanton St
Ridge St
Pitt St
Bialystoker Pl
Delancey St
Clinton St
Houston St
Sheriff St
Columbia St
E 1st St
E 2nd St
E 3rd St
E 4th St
E 5th St
E 6th St
E 7th St
E 8th St
E 9th St
St Marks Pl
Avenue A
Avenue B
Avenue C
Avenue D
E 6th St
E 10th St
Baruch Dr
Baruch Pl
Mangin St
Szold Pl
E 5th Walk
FDR Drive
East River Park
East River
Williamsburg Bridge
Rutherford Pl
Second Ave
First Ave
1st Ave Loop
E 14th St
14th St Loop
E 15th St
E 16th St
E 17th St
E 18th St
E 19th St
E 20th St
20th St Loop
Avenue C Loop
E 21st St
E 22nd St
E 23rd St
E 24th St
E 25th St
E 26th St
Third Ave
Asser Levy Recreation Center
Asser Levy Playground
Stuyvesant Cove Park
Murphy Brothers Playground

Project Area One
Project Area Two
Protected Area
500-Year Flood Hazard Area (0.2% Annual Chance)
100-Year Flood Hazard Area (1% Annual Chance) / Special Flood Hazard Area
100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise

0 1,000 FEET

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FEMA Preliminary
Flood Hazard Areas (2015)
Figure 1.0-5

- Respond quickly to the urgent need for increased flood protection and resiliency, particularly for communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and
- Achieve implementation milestones and comply with the conditions attached to funding allocations as established by HUD, including scheduling milestones.

Additionally, design considerations for the proposed project include the following:

- Reliability of the proposed coastal flood protection system;
- Urban design compatibility and enhancements;
- Improving the ecology and long-term resiliency of East River Park;
- Minimizing environmental impacts, including construction-related effects and disruptions to public right of way;
- Constructability;
- Operational needs;
- Maintenance needs;
- Minimizing use of pre-storm event deployable structures;
- FEMA accreditation;
- Scheduling that meets HUD milestones; and
- Cost effectiveness.

The City evaluated and reviewed conceptual designs against these principal objectives and design considerations and selected a Preferred Alternative for the proposed project. As described in detail in Chapter 2.0, "Project Alternatives," under the Preferred Alternative, East River Park would experience significant risk reduction from flooding and inundation from sea level rise in addition to substantial enhancements to its value as a recreational resource and providing flood protection to the inland communities. Park user experience would be enhanced with the reconstruction of East River Park and the reconstruction of pedestrian bridges to improve access, which would enhance the park user experience. Additionally, a long-standing deficiency along the East River Greenway at the Con Edison 13th Street Generating Station would be remedied with the construction of a shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Patrick J. Brown Walk, substantially improving the City's greenway network. In addition, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground would be reconstructed and improved, resulting in enhanced recreational spaces throughout the project area. The selection of the Preferred Alternative also allows for a shorter construction duration and park closure, earlier deployment of the flood protection system (which is expected to be completed in mid-2023), and reduced construction disruption along the FDR Drive. ✷

A. INTRODUCTION

This chapter describes how alternatives for the East Side Coastal Resiliency (ESCR) Project (the proposed project) were developed, considered, and reviewed, and then selected for analysis in this Draft Environmental Impact Statement (DEIS).

B. BACKGROUND OF DESIGN AND ALTERNATIVES DEVELOPMENT

INTRODUCTION

This section describes the process that led to the development of alternatives to the proposed project and summarizes the planning background relevant to the development of various coastal protection, resiliency, and waterfront access measures that have been under consideration for the proposed project area and vicinity both before and after Hurricane Sandy. This section also discusses the related plans and policies in existence prior to Hurricane Sandy, and those that evolved post-hurricane and how these initiatives, plans, and policies shaped the development of alternatives to the proposed project.

One purpose of the proposed project is to integrate coastal flood protection with waterfront open space improvements. For decades, the City has been committed to improving public access to its waterfront, including along the proposed project area. Before Hurricane Sandy, several initiatives were developed for this stretch of the East River waterfront that were aimed at improving and expanding public open spaces and recreational opportunities. Among these initiatives were the East River Esplanade Project, *A People's Plan for the East River Waterfront*, and the community engagement and planning design for a Pier 42 Park. After Hurricane Sandy, these waterfront open space planning studies served as the starting point for coastal resiliency and flood protection planning along the proposed project area.

PRE-HURRICANE SANDY WATERFRONT PLANNING

EAST RIVER WATERFRONT ESPLANADE PROJECT

The design for the East River Waterfront Esplanade was developed by the New York City Economic Development Corporation (NYCEDC) in consultation with the City's Departments of City Planning (DCP), Transportation (NYCDOT), and Parks and Recreation (NYC Parks), along with the local community and their elected officials, civic associations, and City and New York State (State) agencies. During the course of developing the East River Waterfront Esplanade Project, the design and City teams participated in over 70 separate meetings with community boards, tenant associations, civic leaders, maritime experts, and elected officials.

The East River Waterfront Esplanade concept was to create a continuous, publicly accessible walkway extending for approximately two miles along the East River from The Battery on the south to Pier 42 north of Jackson Street on the north with pavilions below the elevated Franklin

Delano Roosevelt East River Drive (FDR Drive) to house community programs and activities. The design also included an "eco-park" at Pier 35, improvements to waterfront blocks of streets that connect to the river, and a public park at Pier 42. The first phase of the esplanade, along the East River waterfront of Lower Manhattan (i.e., south of the Manhattan Bridge to approximately the Battery Maritime Building), was completed in 2011, and the section to the north, between Pike Slip and Pier 35, is currently under construction. The Pier 42 improvements are also in the design stages in preparation for implementation (see below).

A PEOPLE'S PLAN FOR THE EAST RIVER WATERFRONT

The People's Plan for the East River Waterfront (*the People's Plan*) was developed by Organizing and Uniting Residents (O.U.R.) Waterfront, a coalition of community-based organizations and tenant associations representing residents of the Lower East Side and Chinatown, including: the Committee Against Anti-Asian Violence (CAAAV), Organizing Asian Communities, the Urban Justice Center's Community Development Project (UJC), Good Old Lower East Side (GOLES), Jews for Racial and Economic Justice (JFREJ), Public Housing Residents of the Lower East Side (PHROLES), Hester Street Collaborative, the Lower East Side (LES) Ecology Center, Two Bridges Neighborhood Council, and University Settlement.

The People's Plan focused on Piers 35, 36, and 42, and called for free and low-cost sports and recreation opportunities, open space, education and community services, and space for appropriate low-cost businesses to meet resident needs. This plan also highlighted the need for activities, programs, space, and events along the waterfront that celebrate the cultural diversity of the neighborhood and improve local health and quality of life. *The People's Plan* proposed a park along the three piers connecting to the East River Waterfront Esplanade that features multi-use courts, a filtered river water pool, a community center, open spaces, water access, education space, community gardens, and restrooms. As a result of this plan, NYC Parks advanced comprehensive reuse and park designs for these three piers, only one of which (Pier 42) is located within the project area (see below).

PIER 42 PROJECT

At the southern end of Project Area One, NYC Parks is proposing to construct Pier 42 as a public waterfront open space that would increase accessible open space within the study area. For many years, the Pier 42 property consisted of warehouse space and parking, located just south of East River Park between the East River and the FDR Drive. A masterplan for the overall redevelopment of Pier 42 as an open space was approved by a Community Board 3 sub-committee and the New York City Public Design Commission (PDC). Phase 1A of the Pier 42 redevelopment included the demolition of the pier shed. Phase 1B will include the redevelopment of the upland park (north and east of Phase 1A) with amenities such as an entry garden in the western section, a playground, a comfort station, a grassy knoll rising approximately seven feet above grade, solar powered safety lighting throughout the park, and access from the shared-use path along the FDR Drive service road or Montgomery Street. The Pier 42 project will introduce approximately 2.93 acres of new passive open space to the study area by 2021.

POST-HURRICANE SANDY WATERFRONT PLANNING AND DESIGN

COMMUNITY REBUILDING RESILIENCY PLANS (CRRP) AND COASTAL PROTECTION INITIATIVE 21

Following Hurricane Sandy, the City formed the Special Initiative for Rebuilding and Resiliency (SIRR) to analyze the impacts of the hurricane on the City's buildings, infrastructure, and people;

to assess climate change risks in the near (2020s) and long term (2050s); and to outline strategies for increasing resiliency citywide. The SIRR identified citywide strategies to protect people, investments, and infrastructure from the impacts of coastal storms and climate change. The culmination of that work is contained in the report *PlaNYC—A Stronger, More Resilient New York*, released in June 2013, which provides CRRP for five particularly vulnerable neighborhoods in the City, including Southern Manhattan and the neighborhoods adjacent to the project area.

The CRRP recommendations for Southern Manhattan outline specific coastal protection measures for buildings and critical infrastructure coupled with community and economic recovery measures. With respect to coastal protection, the proposals were based on a multi-faceted analysis that considered the various types of coastal hazards and their likelihood of occurrence, the potential impact of these hazards on the built environment and critical infrastructure, and the likely effectiveness of proposed measures to address these hazards. In addition, the coastal protection measures presented in *PlaNYC* were informed by DCP's *Urban Waterfront Adaptive Strategies* (UWAS) study, published in June 2013. The UWAS study examined the underlying geomorphology of the various stretches of shoreline, categorized each coastal reach by geomorphic type, and provided an evaluation of coastal resiliency measures that would be appropriate for each reach. The CRRP then built upon the results of the UWAS study to recommend coastal initiatives for each reach, including the proposed project area.

Coastal Protection Initiative 21 (Initiative 21) of the CRRP affirmed the City's commitment to establishing an integrated coastal flood protection system for Southern Manhattan and calls for an integrated coastal flood protection system for targeted reaches along the East River shoreline from Battery Park City on the south to East 14th Street on the north. The first phase of Initiative 21 was identified as the reach from the Brooklyn Bridge north to East 14th Street. This area is home to a large residential population, including one of the greatest concentrations of low- and moderate-income households in the City, with over 12,700 New York City Housing Authority (NYCHA) housing units. In addition, critical infrastructure, including Con Edison substations, the New York City Department of Environmental Protection's (DEP) Manhattan Pump Station, and the FDR Drive are all located along this reach. Storm damage to these critical public and private assets, as occurred with Hurricane Sandy, has significant economic, fiscal, and social impacts on the City.

Initiative 21 proposed integrated coastal flood protection for the Lower East Side that would eventually become part of an integrated coastal flood protection system for all of Southern Manhattan. It stated that the City would consider extending the integrated coastal flood protection system south from the Brooklyn Bridge to Lower Manhattan and the waterfront along the Financial District, extending the system along South Street to Battery Park, with a small section running across West Street, north of Battery Park City. Initiative 21 also expressed the City's commitment and support for the Rebuild by Design (RBD) competition, which ultimately shaped the proposed project (see the discussion below).

REBUILD BY DESIGN (RBD) PROCESS

To develop more efficient and effective designs for coastal flood protection in the New York City region affected by Hurricane Sandy, the United States Department of Housing and Urban Development (HUD), in conjunction with the Rockefeller Foundation and others supporting organizations, launched the global RBD competition in June 2013. This competition solicited proposals from around the world with the objective of identifying innovative and implementable coastal flood protection solutions that would respond to the devastation wrought by Hurricane Sandy. Other sponsoring and participating organizations involved with RBD included the Institute

for Public Knowledge at New York University, the Municipal Art Society, the Regional Plan Association, and the Van Alen Institute.

The BIG U Proposal

The BIG U Proposal evolved from a comprehensive examination of the history of resiliency planning in the tri-state area and elsewhere. The research, including the plans and proposals described above, revealed that former resiliency planning initiatives evaluated current conditions, but failed to provide for the growth and changes that are likely to occur in communities over time. As such, the BIG U team, led by the architecture firm Bjarke Ingels Group (BIG), developed designs that were aimed not only at solving current coastal protection and waterfront planning needs, but addressing future issues as well.

The focus of the BIG U Proposal was to evaluate how coastal flood protection infrastructure can both enhance and stabilize underserved neighborhoods, not only protecting this densely populated City against flooding and stormwater, but also providing social, economic, and environmental benefits to the community.

Because physical and social conditions vary in Southern Manhattan, the BIG U team created three compartments that, while connected, could function independently to provide flood protection while blending in with the neighborhood landscape. Each compartment would then be equipped with a variety of design features that respond to the particular need and wishes of that particular community. Along the East River waterfront of Manhattan, these compartments included the following:

- Compartment 1—Lower East Side North (East 23rd Street to Montgomery Street)
- Compartment 2—Two Bridges (Montgomery Street to the Brooklyn Bridge)
- Compartment 3—Battery Park Financial District (Brooklyn Bridge to Battery Place)

The design development process involved several workshops per compartment, in which initial workshops consisted of discussing possible design solutions, followed by design solutions proposals suited to each location. In addition, the team incorporated various waterfront access and open space designs, as well as coastal flood protection alternatives previously developed by the City and local communities. These alternatives included beautifying the affordable housing community, increasing green infrastructure and linkages to the waterfront and park, and augmenting community programs, such as adding a community pool and free-to-low-cost recreational activities.

The BIG U design focused on combinations of berms, bridging berms, and closure structures (i.e., a floodgate across a street or sidewalk that is deployed during a storm event) to provide flood reduction. The design also proposed improving the connectivity of the adjacent residential neighborhood to the waterfront. Key design objectives included providing access to East River Park through gentle ramps, enhancing park access through improved landscaping; providing a new shared and meandering multi-purpose path along the waterfront; addressing safety concerns by improving lighting; providing new signage; and reprogramming the land beneath the elevated sections of the FDR Drive.

For Compartment 1, closure structures were contemplated in the East 23rd Street area given the number of street and FDR Drive access connections. Moving south, a series of pavilions were programmed under the elevated FDR Drive to provide various commercial functions with closure structures linking these pavilions. Near the Con Edison plant, a new bridge structure with a berm was proposed to provide a new link to East River Park via a proposed berm along the service road

in East River Park that parallels the FDR Drive. The berm was shaped to preserve the existing recreational fields in the park with landscaped bridges connecting East River Park to the inland community. The coastal flood protection would then continue southward to Montgomery Street where a closure structure was proposed to be installed beneath the FDR Drive at the ramp entrance and also along South Street. Other alternatives considered during this process were coastal flood protection alignments located along the west side of the FDR Drive, decking over the FDR Drive to create a large, new open space as part of East River Park, and elevating the waterfront edge of East River Park.

Throughout the visioning sessions and public engagement workshops, with assistance from GOLES, the community identified various existing constraints to public access and enjoyment of East River Park, including access limitations due to the FDR Drive, which physically separates the park from the residential neighborhoods to the west. While the existing pedestrian bridges into East River Park provide limited access, a landscaped bridging berm, as envisioned by the BIG U, would allow for additional points of access, increasing the connectivity between the residential community and East River Park.

The BIG U identified the existing accessway to the Delancey Street pedestrian bridge as particularly deficient for both pedestrians and bicyclists due to its minimal signage, lighting, landscaping, and a narrow width that both restricts two-way pedestrian and bicycle traffic and is challenging for strollers and wheelchair accessibility. In addition, sharp turns on the ramps severely limit bicycle travel and require bicyclists to either partially or fully dismount. The aesthetic quality of the bridge is also compromised by high chain-link fencing. Finally, the landing in East River Park is adjacent to the FDR Drive, which constrains and detracts from the experience of arriving at an open space.

In addition, the BIG U recognized the existing East Houston Street overpass as difficult to navigate with its series of road crossings, absence of traffic signals, and substantial vehicular and pedestrian conflicts resulting from limited space (i.e., existing access to East River Park via the overpass is only through a single, three-foot-wide cut in a concrete barrier).

Selection of the RBD Project

In June 2014, following a year-long process during which the design teams met with regional experts, including government agencies, elected officials, community organizations, local groups, and individuals, HUD announced the winning RBD projects located throughout the Hurricane Sandy-affected area. The winning proposal for Manhattan was the BIG U—specifically, Compartment 1, from Montgomery Street on the south to East 23rd Street on the north. This compartment was selected for funding that would advance it through conceptual design and then to implementation and represents the subject area for this Environmental Impact Statement (EIS).

EXAMINATION OF POTENTIAL COASTAL FLOOD PROTECTION APPROACHES

Prior to initiation of the proposed project's design in late 2014, the City evaluated and reviewed the coastal protection initiatives that were considered for New York City, Southern Manhattan, and the proposed project area, including those described above to identify any potential fatal flaws of the initiatives or incompatibility with the objectives of the proposed project. This review and comparison formed the basis of the screening process that identified initial alternatives for potential coastal protection measures as part of the proposed project.

Flood protection strategies developed by the United States Army Corps of Engineers (USACE) were reviewed and compared with initiatives that the City had considered as part of its post hurricane coastal planning to increase resiliency. The *North Atlantic Coast Comprehensive Study:*

Resilient Adaptation to Increasing Risk was a comprehensive study that examined opportunities for reducing flood risks to vulnerable coastal populations, promoting resilient coastal communities, and maintaining a sustainable and robust coastal system.[1] The report identified a total of 20 different strategies within three categories for managing risk of future coastal floods: non-structural, structural, and natural/nature-based strategies:

NON-STRUCTURAL STRATEGIES

- Acquisition and Relocation (i.e., of individuals and properties out of the coastal flood risk area)
- Building Retrofit
- Enhanced Flood Warning and Evacuation System
- Land Use Management
- Zoning
- Flood Insurance

STRUCTURAL STRATEGIES

- Closure Structures
- Floodwalls and Levees
- Seawalls
- Revetments
- Bulkheads
- Storm Surge Barriers

NATURAL AND NATURE BASED FEATURES

- Beach Nourishment/Restoration
- Dune Construction and Replenishment
- Beach Restoration and Off-Shore Breakwaters
- Beach Restoration and Groins
- Drainage Improvements
- Overwash Fans
- Submerged Aquatic Vegetation
- Wetlands, Reefs, and Living Shorelines

SUMMARY OF USACE RESILIENT ADAPTATION STUDY SCREENING PROCESS

The review of the coastal protection strategies listed above revealed that non-structural measures, such as acquisition and relocation, are neither appropriate nor implementable in a densely populated urban setting such as the proposed project area. Additionally, the City and region already have advance storm warnings and emergency preparedness plans. The City already

[1] https://www.nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf, last visited 1/29/19.

participates in the National Flood Insurance Program[2] and is also implementing zoning policies[3] as one strategy aimed at reducing flood risk in the neighborhoods adjacent to the proposed project area; these measures alone, however, cannot fully address the coastal protection needs of these neighborhoods. Similarly, the natural and nature-based approaches would not be suitable along the proposed project area, which is juxtaposed between a developed urban setting and the East River. Certain structural approaches, such as seawalls, are typically large structures that could not be integrated into East River Park and Stuyvesant Cove Park, or revetments that would require extensive filling of the East River.

Floodwalls, levees, and closure structures were identified as viable flood protection strategies for the proposed project area. Multi-purpose raised landscapes can support other uses such as open space and were identified as appropriate approaches to providing coastal flood reduction along the proposed project area as part of the *PlaNYC: A Stronger, More Resilient New York* planning process, and were also identified in the BIG U proposal. These coastal protection systems would then be supported by improvements to the existing in-place drainage infrastructure, described further below.

DEVELOPMENT OF COASTAL FLOOD PROTECTION DESIGNS

As refined through the City's efforts during the development of the *PlaNYC* plan and the HUD selection of the Big U Compartment 1 proposal, the coastal flood protection measures that were deemed suitable to use in the development of designs included:

- Floodwalls;
- Levees;
- Closure structures; and
- Drainage improvements.

These elements would be coupled with additional urban design and open space enhancements to integrate the flood protection system into the urban setting that characterizes the 2.4-mile-long project area.

DESIGN PROCESS

To advance the BIG U Compartment 1 plan, the City initiated a design process in December 2014 that examined combinations of coastal flood protection systems in greater detail from planning, urban design, and engineering perspectives. This design process included three phases: conceptual design, preliminary design, and final design. The conceptual design process continued until the winter of 2015 and resulted in the identification of four design alternatives for the portion of the project area in East River Park, and three design alternatives for the portion of the project area between East 13th Street and East 25th Street. The conceptual design process also confirmed the design storm for the proposed project, which corresponds to the United States Federal Emergency Management Agency (FEMA) 100-year flood event with 90th percentile 2050s sea level rise

[2] Participation in the National Flood Insurance Program satisfies the non-structural flood protection approach of insuring vulnerable properties against damage resulting from coastal flooding events.

[3] Examples include provisions in the New York City Waterfront Revitalization Program policies, and new Buildings Department regulations requiring that construction in a FEMA Flood Hazard Area raise critical service/infrastructure elements, like building boilers, above specified flood elevations.

assumptions (protected area).[4] The protected area is shown on **Figure 2.0-1**. Following selection of a final conceptual design approach, the preliminary design process conducted additional site investigations and used that information to further refine and develop the proposed design, spanning from fall 2016 through spring 2018. In spring 2018, a constructability review was conducted to assess options to reduce construction risks associated with the proposed approach. As a result, in October 2018, a design update was developed for Project Area One that involves integrating flood protection with the raising and reconstruction of East River Park. This design update includes additional access improvements and the reconstruction of East River Park to protect this valuable resource from flooding during coastal storm events as well as inundation from sea level rise, which would enhance its value as a recreational resource in addition to providing flood protection to the inland communities.

Identification of project alternatives and design refinement went through a process that integrated input from the community outreach program while further examining site constraints, engineering challenges, cost, constructability, and other factors. Guidance on operations and maintenance was also provided during review meetings with multiple City, State, and federal agencies, as well as local stakeholders, and the preliminary recommendations were included in the design reports.

PROJECT AREAS AND DESIGN REACHES

As part of the design process, the proposed project area was divided into 2 project areas and 16 design reaches (see **Figure 2.0-1**). Project Area One comprises 10 design reaches and extends from Montgomery Street on the south to the north end of East River Park (or about East 13th Street). The southerly reaches include City streets, such as Montgomery and South Streets, as well as a segment under the elevated FDR Drive with the majority of Project Area One being within East River Park. Project Area One also includes four existing pedestrian bridges across the FDR Drive to East River Park (the Corlears Hook, Delancey Street, East 6th Street, and East 10th Street bridges) and the East Houston Street overpass. Project Area Two comprises seven design reaches (Reach J spans both Project Areas One and Two) and extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Con Edison East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, street segments along and under the FDR Drive and Asser Levy Playground, and the Veteran Affairs (VA) Medical Center. The 16 reaches comprising the project area are described below, segregated into Project Area One and Project Area Two.

Project Area One Design Reaches

Reaches A and B: Montgomery Street Tie-Back and Pier 42. Reaches A and B extend from Montgomery Street in the south to the park maintenance area located just north of Jackson Street and Pier 42. This reach includes a southward extension of East River Park adjacent to the FDR Drive.

Reaches C and D: Amphitheater and South Ballfields. Reaches C and D extend from the south end of East River Park, north to Ball Fields Nos. 1 and 2 and the shared-use path just south of the Delancey Street pedestrian bridge. This reach also includes the LES Ecology Center, the Corlears Hook bridge, and the amphitheater.

Reach E: East River Park—Delancey Street Pedestrian Bridge and Tennis Courts. Reach E extends from the volleyball courts in the park adjacent to the pathway between the shared-use path

[4] Sea level rise estimate represents the 90th percentile value for the 2050s as presented by the New York City Panel on Climate Change. See below for additional details on design principals and sea level rise.

Project Area One
Project Area Two
Protected Area
Proposed Project Design Reaches
Existing Pedestrian Bridges

0 1,000 FEET

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Proposed Project Area and Design Reaches
Figure 2.0-1

and promenade, north to the tennis court complex located just north of the Williamsburg Bridge, and includes the Delancey Street pedestrian bridge.

Reaches F and G: East River Park—Reflections Labyrinth and East Houston Street Ballfields. Reaches F and G extend northward from the tennis court complex to Ball Fields Nos. 3, 4, 5, and 6, and includes the East Houston Street overpass.

Reach H: East River Park—Track and Field Complex. Reach H extends from the northern edge of Ball Field No. 6 to a park maintenance area located just north of the Track and Field Complex and includes the East 6th Street pedestrian bridge.

Reaches I and J: East River Park—East 10th Street Ballfields and Children's Playground. Reaches I and J extend from Ball Fields Nos. 7 and 8 just north of the Track and Field Complex to the north end of East River Park at approximately East 13th Street and includes the East 10th Street pedestrian bridge and the barbeque areas.

Project Area Two Design Reaches

Reaches J and K: FDR Drive Crossing to Con Edison East River Generating Station. Reaches J and K include crossing the FDR Drive, the FDR Drive right-of-way in front of the Con Edison East 13th Street Substation and the crossing of East 14th Street and connections to the flood protection system in Con Edison's East River Generating Station. This design reach includes the FDR Drive (which is at-grade in this design reach) and the Con Edison facilities bounded by East 13th Street on the south and East 15th Street on the north.

Reaches L and M: East 15th Street to Murphy Brothers Playground. Reaches L and M include the parking lot north of the Con Edison East River Generating Station to Murphy Brothers Playground, Captain Patrick J. Brown Walk, and the adjacent FDR Drive.

Reach N: FDR Drive Crossing and Stuyvesant Cove Park. Reach N begins at the intersection of the FDR Drive and East 18th Street and includes the design reach under the FDR Drive (the FDR Drive is elevated in this design reach) between Avenue C and Stuyvesant Cove Park and continues northward in Stuyvesant Cove Park to just north of East 20th Street.

Reach O: Stuyvesant Cove Park and Solar One. Reach O begins north of the East 20th Street between the East River and Avenue C, and runs along the northern portion of Stuyvesant Cove Park, ending just south of the intersection of East 23rd Street and the FDR Drive ramps (the FDR Drive is elevated in this design reach).

Reach P: East 25th Street Tie-Back. Reach P begins at the intersection of East 23rd Street and the FDR Drive ramps and continues north along the FDR Drive service road, where it turns inland (west) and includes the northern portion of Asser Levy Playground and the connection to the existing VA Medical Center proposed floodwall that continues along East 25th Street.

COMPONENTS OF THE PROPOSED PROJECT

The proposed project incorporates a combination of coastal flood protection components comprised of floodwalls, levees, and closure structures, with infrastructure improvements. Provided below are descriptions of these systems.

Coastal Flood Protection System Components

Floodwall. Floodwalls are narrow, vertical structures with a below-grade foundation that are designed to withstand both tidal storm surges and waves. They are typically constructed of steel, reinforced concrete, or a combination of materials with a reinforced concrete cap. Floodwalls can be used where there are horizontal space limitations for levees and where there is a design

objective to have a narrow footprint of the flood protection system. Typical floodwall designs include I-walls (partially embedded in the ground) and L-walls (foundation base slab supported by a pile foundation), each providing differing degrees of structural protection to withstand tidal surge and wave forces (see **Figure 2.0-2** for a cross section of a typical floodwall).

Levee. Levees elevate the existing topography forming a barrier or line of coastal flood protection. In general, levees have a relatively wide footprint when installed. They are typically constructed of a core of compacted fill material, capped by stiff clay to withstand storm waves, along with a stabilizing landscaped cover. The slopes are designed to maintain the structural stability of the levee under design loading conditions, considering drainage and utilities. To avoid seepage, the coastal flood reduction levee has an interior cutoff wall that is constructed of either a stiff clay or slurry (see **Figure 2.0-3** for a cross section of a typical levee).

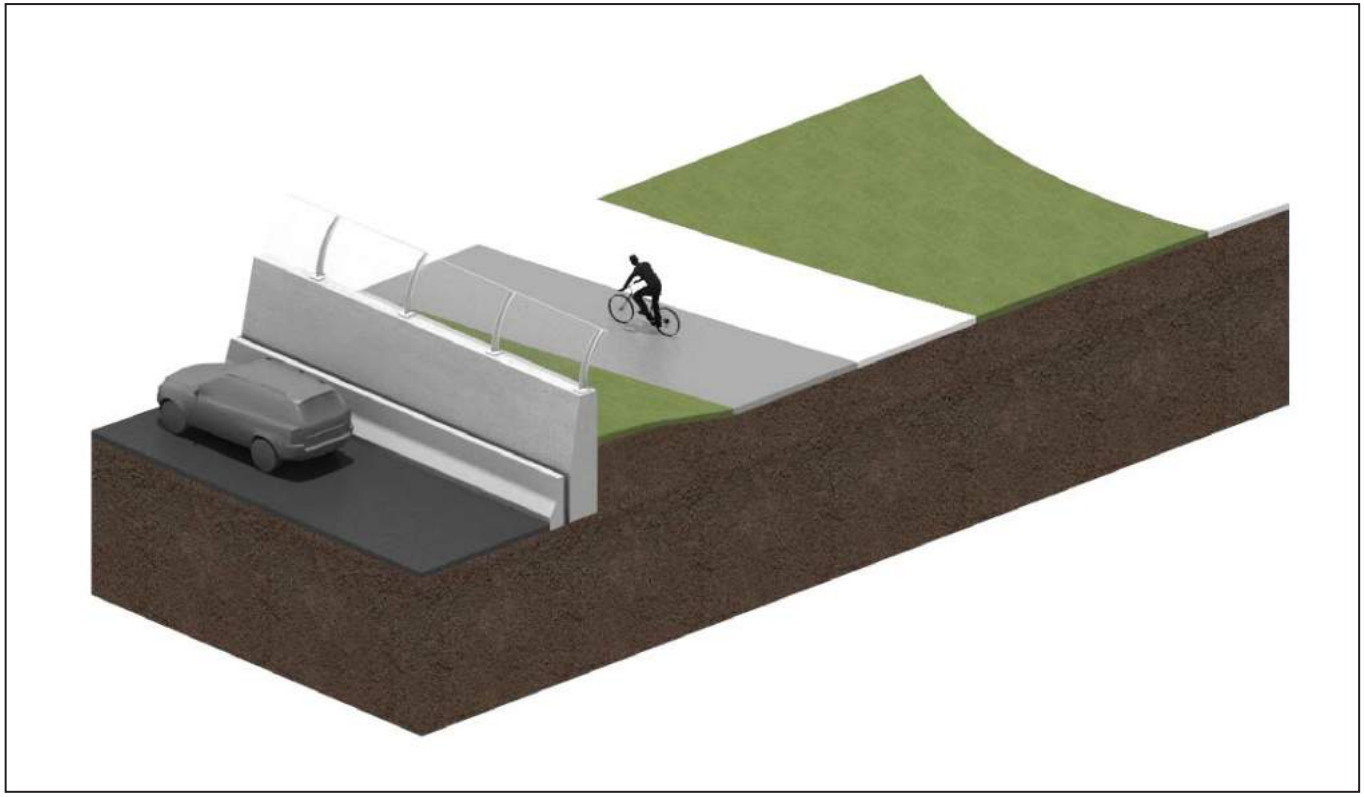
Closure Structure. In many flood protection systems, it is necessary to provide an opening to accommodate day-to-day vehicular or pedestrian circulation along a street or sidewalk. In these instances, closure structures are installed to close the openings prior to the anticipated arrival of a design storm event and require active deployment. There are two types of closure structures that have been considered as part of the proposed project, each of which is made of steel and structurally reinforced. These closure structures include the following deployable gates:

- **Swing Floodgates.** Swing floodgates operate like hinged doors and are moved to the closed position prior to the anticipated arrival of a design storm event. The span limit for these systems is generally around 40 feet (see **Figure 2.0-4** for a cross section of a typical swing floodgate). This type of floodgate is a site fixture, meaning it remains on-site and is kept in the open position when not in use.
- **Roller Floodgates.** Roller floodgates are closure structures that can be used in openings with spans up to 72 feet. They are stabilized with a single or double line of wheels and are slid into their protection position prior to the anticipated arrival of a design storm event (see **Figure 2.0-5** for a cross section of a typical roller floodgate). This type of floodgate is kept in the open position when not in use.

Other Components

Infrastructure Improvements. The flood protection components described above would prevent coastal flooding from entering the protected area. The protected area lies within a large sewershed served by a combined sewer system that conveys a combination of sanitary sewage and stormwater through a network of pipes to the Manhattan Pump Station where it is then pumped to the Newtown Creek Wastewater Treatment Plant (WWTP) for treatment and discharge to the East River. Additional improvements are required to modify the existing combined sewer infrastructure to hydraulically isolate the protected area (drainage isolation) as well as to protect against inland flooding during the simultaneous occurrence of a rain event with a storm surge event (drainage management) (see **Figure 2.0-6** for an overview of infrastructure improvements).

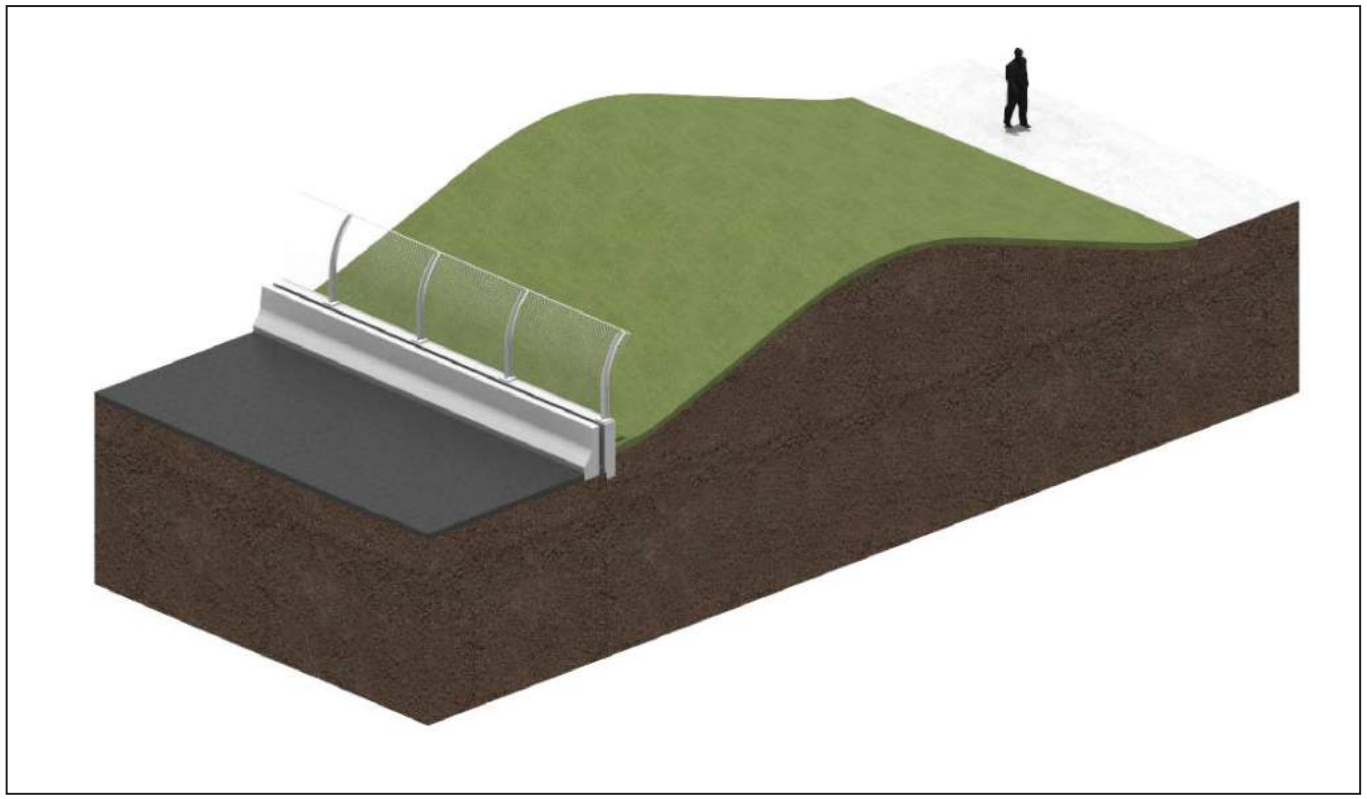
- **Drainage Isolation.** Modifications to existing sewer infrastructure would ensure that this infrastructure would not act as a conduit through which tidal surge water from the East River can enter the protected area. These modifications include installing gates on the existing large-diameter sewer pipe (interceptor) that collects and conveys flow through the system and flood-proofing components of the existing sewer infrastructure (such as catch basins and manholes) on the unprotected side of the proposed flood protection system.
- **Drainage Management.** During a design storm event, depending on the nature of coincident rainfall, and with the tide gates closed, the sewer system conveyance pipes can reach capacity,



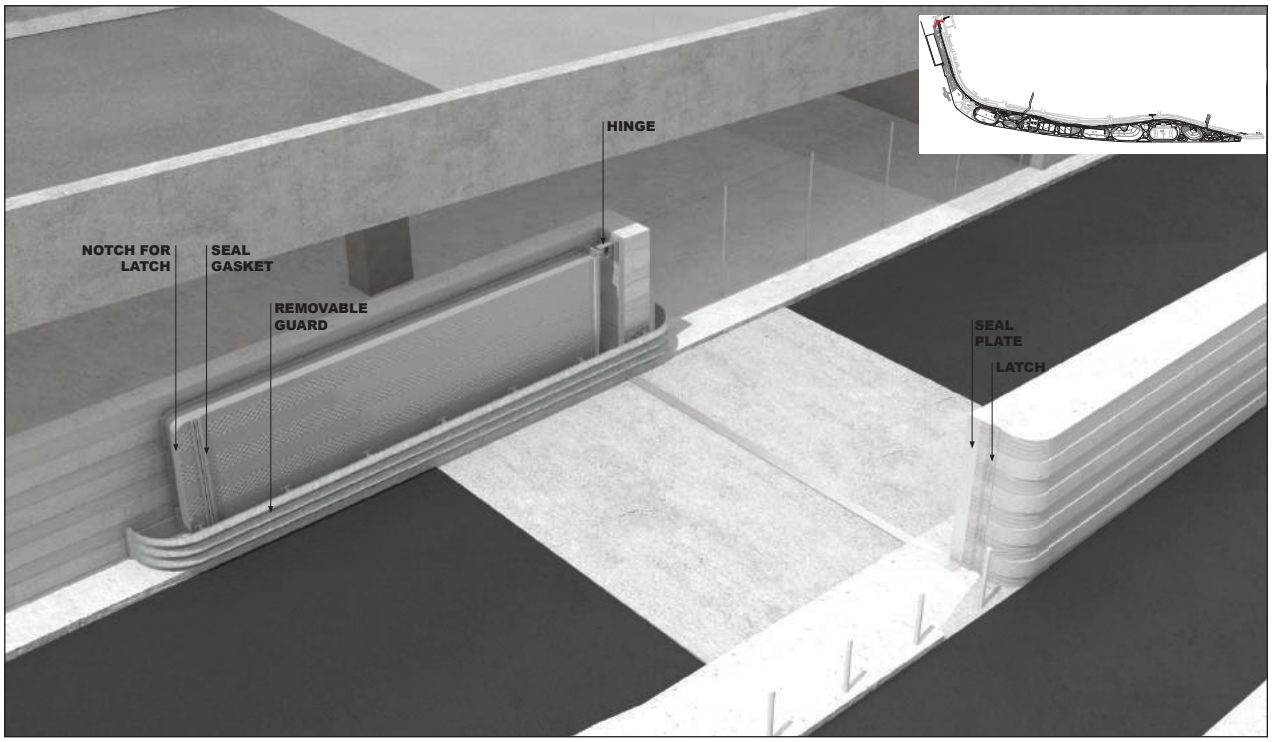
NOTE: Preliminary Illustrative Design Concept

Capital Project: SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

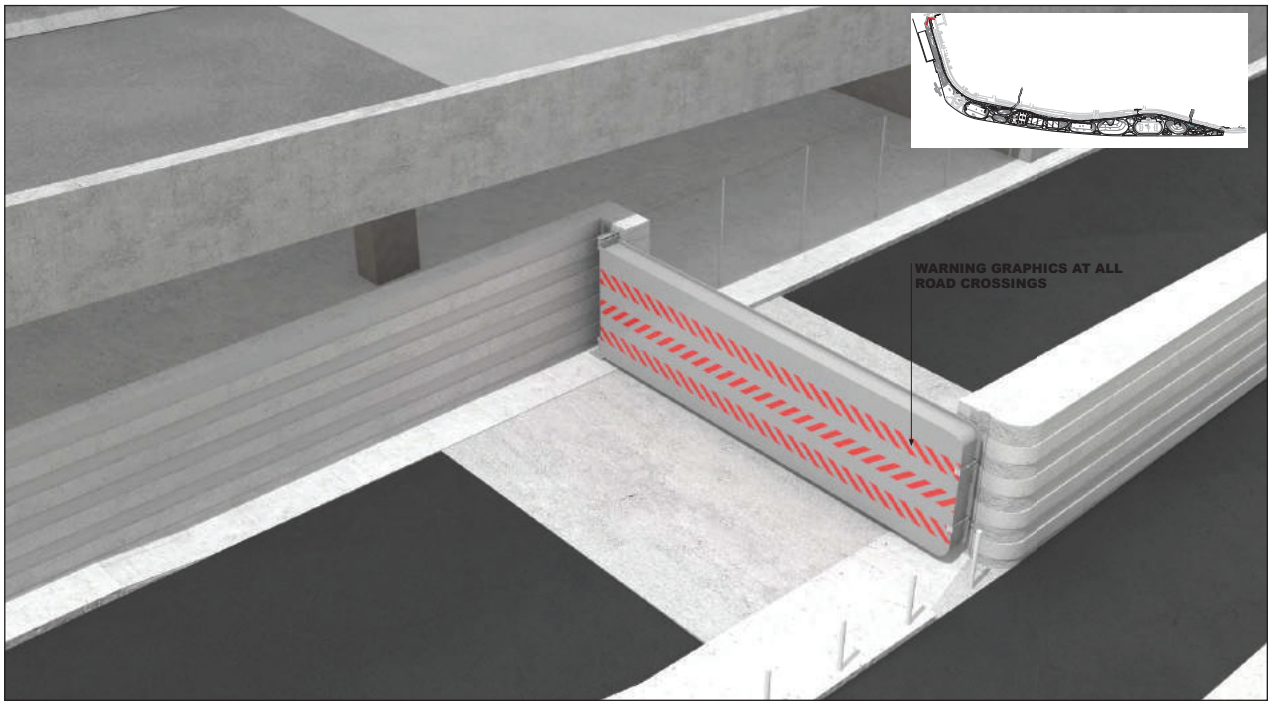
Typical Floodwall (Illustrative)
Figure 2.0-2



NOTE: Preliminary Illustrative Design Concept.

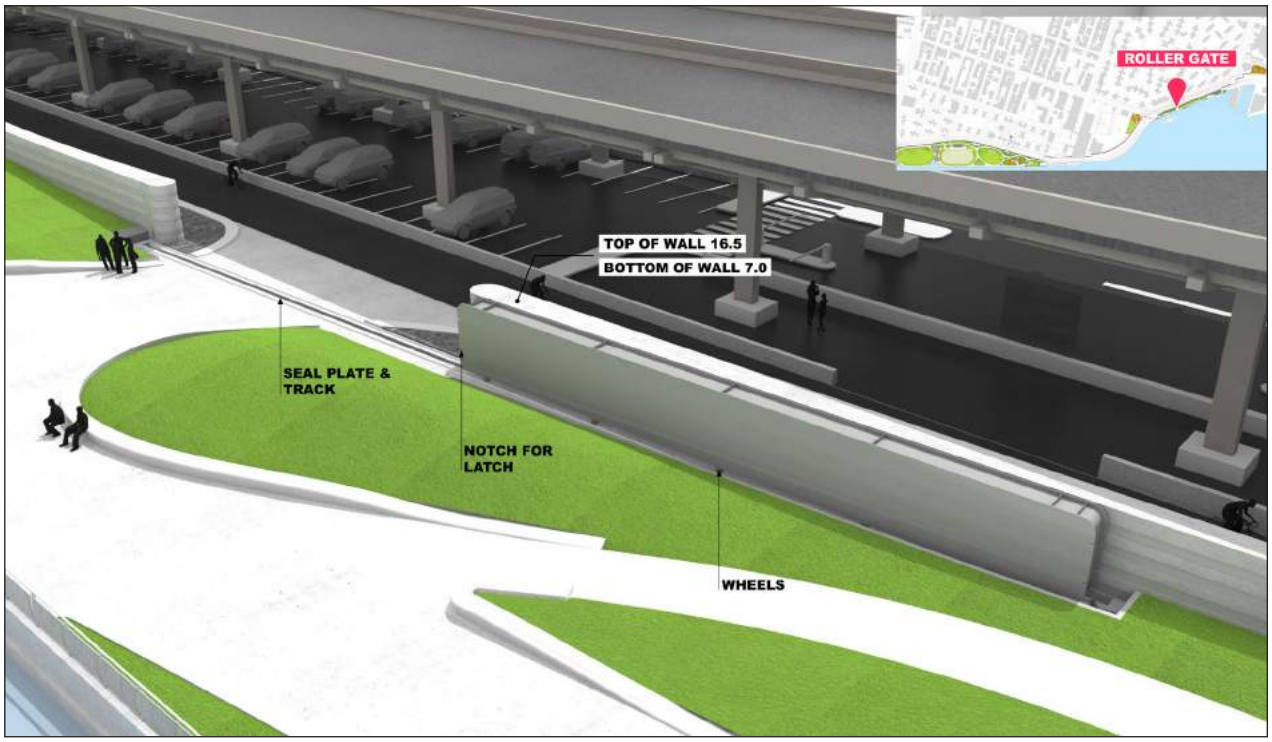


Open position

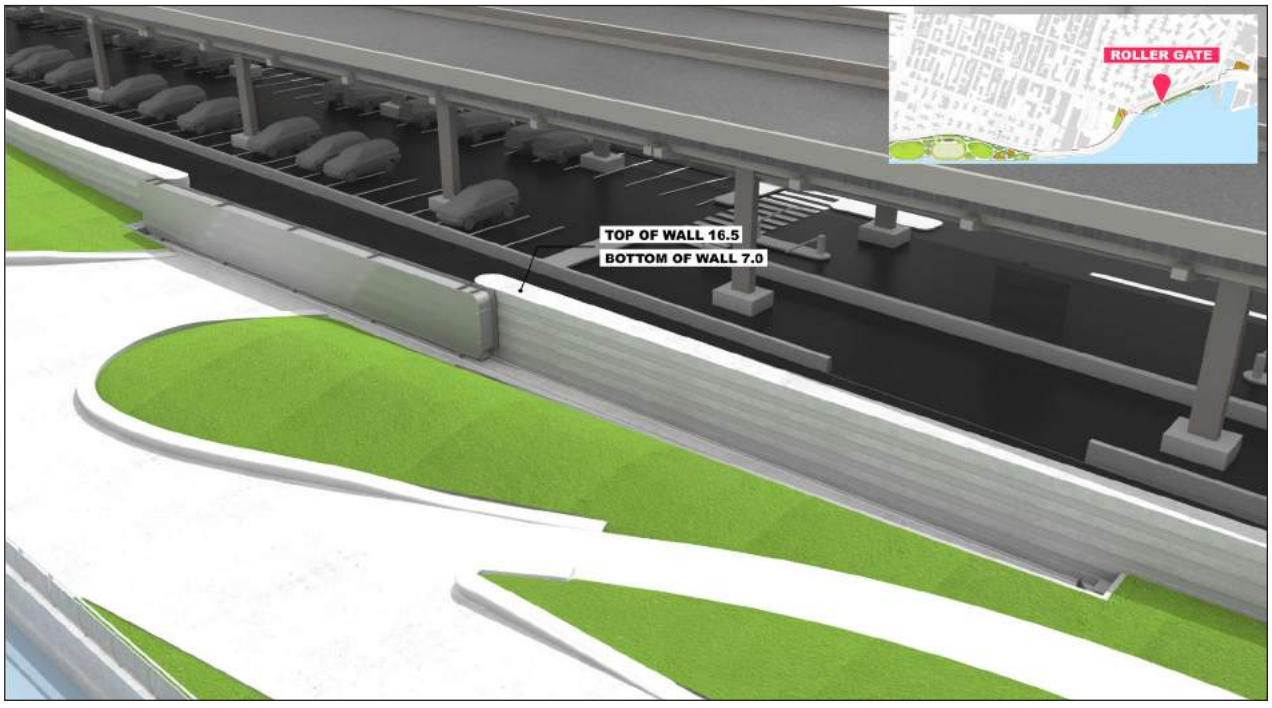


Closed position

NOTE: Preliminary Illustrative Design Concept



Open position



Closed position

NOTE: Preliminary Illustrative Design Concept

Source: NYCDEP

Project Area One
Project Area Two
Protected Area
Sewershed Limits
Regulator Sub-Drainage Areas
Flood Protection System
Manhattan Pump Station
Regulators
Outfalls
Interceptor

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Study Area Sewershed and Associated Regulators
Figure 2.0-6

potentially resulting in backups that cause inland flooding. Measures to address the potential flooding include the installation of additional parallel conveyance pipes and other improvements to enhance the existing conveyance capacity of the sewer system.

- **Infrastructure Reconstruction within East River Park.** The infrastructure within East River Park—including outfalls and regulators and other infrastructure, as well as the park's drainage collection system and water supply system—is proposed to be reconstructed under the Preferred Alternative and Alternative 5.

Con Edison high-voltage transmission lines within the project area present a variety of challenges to the design and construction of flood protection measures. These lines are currently buried at a depth that allows effective heat dissipation, which is critical to the efficient functioning of electrical transmission in Lower Manhattan. During construction of the proposed project, Con Edison would undertake the wrapping of their existing live transmission lines located belowground in a protective carbon fiber material. The carbon fiber wrapping approach would protect the transmission lines during construction and ensure long-term viability and access.

DEVELOPMENT OF PREFERRED ALTERNATIVE

The City evaluated and reviewed the proposed alternatives' conceptual design against the principal objectives for the project, including providing a reliable flood protection system for the protected area, improving access to and enhancing open space resources along the waterfront, and meeting HUD funding deadlines for federal spending, along with the goal to minimize potential environmental effects and disruptions to the community. With the implementation of the Preferred Alternative, which is described in further detail below, East River Park would experience significant risk reduction from flooding and inundation from sea level rise in addition to substantial enhancements to its value as a recreational resource and providing flood protection to the inland communities. Park user experience would be enhanced with the reconstruction of East River Park and the reconstruction of pedestrian bridges to improve access. Additionally, a long-standing deficiency along the East River Greenway at the Con Edison 13th Street Generating Station would be remedied with the construction of a shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Patrick J. Brown Walk, substantially improving the City's greenway network. In addition, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground would be reconstructed and improved, resulting in enhanced recreational spaces throughout the project area. The selection of this alternative also allows for a shorter construction duration and park closure, earlier deployment of the flood protection system (which is expected to be completed in mid-2023), and reduced construction disruption along the FDR Drive.

C. ALTERNATIVES ANALYZED IN THE EIS

This section describes the alternatives to the proposed project that are evaluated in this EIS. Each of the With Action alternatives (i.e., all alternatives except the No Action Alternative), assume the no action projects identified in **Appendix A1**, and propose varying configurations and combinations of the coastal flood protection components described above. The With Action Alternatives were developed to meet the project purpose and need (as outlined in Chapter 1.0, "Purpose and Need") to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm and improve access to and enhance open space resources along the waterfront. These build alternatives vary in the degree to which the coastal flood protection system is integrated with the park landscape enhancements and improvements to neighborhood connections. As described in further details below, the Flood Protection System on the West Side

of East River Park Baseline Alternative (Alternative 2) would provide flood protection but with limited open space improvements. The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3) builds upon Alternative 2 with additional enhancements to open spaces and improvements to access to these open spaces. The Flood Protection System with a Raised East River Park Alternative (Alternative 4 – the Preferred Alternative) would integrate the flood protection in Project Area One within an elevated East River Park, providing the opportunity for a holistic reconstruction, reimagining, and expansion of the types of user experiences in the park, while also enhancing neighborhood connectivity and resiliency. The Flood Protection System East of FDR Drive Alternative (Alternative 5) is similar to the Preferred Alternative but would shift the alignment of a portion the flood protection system in Project Area Two from west of the FDR Drive to the east of the FDR Drive. In addition, since the line of protection would be closer to the shoreline under the Preferred Alternative and Alternative 5, the majority of East River Park would be protected from design storm events and inundation from sea level rise.

The build year for the proposed project is 2025. Under the Preferred Alternative, the flood protection, reconstruction of three existing pedestrian bridges, foundations for a new shared use flyover bridge, and park access features are expected to be completed in 2023, which would provide the flood protection in an accelerated timeframe compared to other alternatives that would have flood protection installed by 2025. Under the Preferred Alternative, the superstructure of the shared-use flyover bridge would then be completed in 2025.

This shorter construction duration for the flood protection under the Preferred Alternative is primarily due to elimination of the need of the majority of flood protection construction be performed during night-time single-lane closures of the FDR Drive and in close proximity to sensitive Con Edison transmission lines, since the flood protection alignment under this alternative is primarily along the existing esplanade of East River Park. Closures of the FDR Drive would need to meet requirements set forth by NYCDOT and would be limited to approximately 6 hours of single-lane closure of the FDR Drive per night.

Below is a description of the alternatives that are analyzed in this EIS.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area by the 2025 analysis year presented in this EIS. The No Action Alternative establishes the context to assess and compare the effects among the alternatives. In the absence of this system, the existing neighborhoods within the protected area would remain at risk to coastal flooding during design storm events. Independent of the proposed project, there would be limited improvements to open space resources and access to both East River Park and the East River waterfront from other planned projects or targeted resiliency projects. Specific improvements in the project area anticipated to occur in the absence of the proposed project include the Pier 42 project and the Solar One Environmental Education Center project in Stuyvesant Cove Park.

The No Action Alternative describes the conditions that would exist in the future without the proposed project by 2025 analysis year. In an urban environment such as the protected area, there are both broad development trends and site-specific development projects that would affect conditions in the future. This additional development (i.e., the No Action projects) includes projects currently under construction or in development that can reasonably be expected to be constructed by 2025 due to their status in the planning and public approval process, along with

proposals for rezoning and public policy initiatives likely to be undertaken. The No Action projects relevant for analyses within this EIS include various improvements to existing facilities, amenities, and infrastructure; site-specific resiliency projects; and development projects. The full range of planned and potential development projects and proposed actions are provided in **Appendix A1**.

IMPROVEMENTS TO EXISTING FACILTIES, AMENITIES AND INFRASTRUCTURE

Several projects to upgrade or improve existing facilities, amenities, and infrastructure within the protected area that are expected to be completed by 2025 include the following: reconstruction of Pier 42 as publicly accessible open space (2020), creation of the LES Ecology Center Compost Facility (2023), renovation of the Fireboat House (2019), and the redevelopment of the Solar One Environmental Education Center (2019). These projects are discussed further below.

As described above, at the southern end of Project Area One, NYC Parks is proposing to construct Pier 42 as a public waterfront open space that would increase accessible open space. For many years, the Pier 42 property consisted of warehouse space and parking, located just south of East River Park between the East River and the FDR Drive. A masterplan for the overall redevelopment of Pier 42 as an open space was approved by a Community Board 3 sub-committee and PDC. Phase 1A of the Pier 42 redevelopment included the demolition of the pier shed. Phase 1B will include the redevelopment of the upland park (north and east of Phase 1A) with amenities such as an entry garden in the western section, a playground, a comfort station, a grassy knoll rising approximately seven feet above grade, solar powered safety lighting throughout the park, and access from the shared-use path along the FDR Drive service road or Montgomery Street. The Pier 42 project will introduce approximately 2.62 acres of new passive open space by 2020.

A capital project is funded to upgrade the existing composting operations in the area, which is now operated by the LES Ecology Center. This proposed facility will improve the composting site by formalizing and containing the composting components and provide educational and public access opportunities.

The Fireboat House is located within East River Park near Grand Street. This NYC Parks project will involve the construction of an Americans with Disabilities Act (ADA) entrance ramp and the installation of solar panels at this building.

Stuyvesant Cove Park, located in Project Area Two, is home to the Solar One organization, which provides environmental education programs to create a more sustainable and resilient urban environment. Solar One's mission is to provide education on energy, sustainability, and resilience. Solar One is proposing an upgrade to their Solar One Environmental Education Center. Located at the northern end of Stuyvesant Cove Park, the existing facility is proposed to be replaced with a new green arts and energy education center.

SITE-SPECIFIC RESILIENCY PROJECTS

Projects to upgrade or improve existing facilities, amenities, and infrastructure within and near the protected area that are expected to be completed by 2025, including those proposed at nearby NYCHA properties and the adjacent Lower Manhattan Coastal Resiliency (LMCR)-Two Bridges project. These projects are discussed further below. In addition, there are several resiliency projects that have been completed at the Con Edison East River Generating Facility and the VA Medical Center.

NYCHA Resiliency Projects

The NYCHA Manhattan Campus project proposes resiliency measures at multiple NYCHA campuses within the protected area that were damaged during Hurricane Sandy: the Bernard Baruch Houses, Lillian Wald Houses, Jacob Riis Houses, and Jacob Riis II Houses, as well as Campos Plaza II. At the Bernard Baruch Houses, NYCHA proposes to install a floodwall along the west side of Baruch Drive, individually floodproof the buildings east of Baruch Drive, construct an electrical annex to each building east of Baruch Drive, and construct a new boiler plant in the center of the housing complex. At the Lillian Wald, Jacob Riis, and Jacob Riis II Houses, NYCHA proposes to floodproof each building and construct an electrical annex to each building. At Campos Plaza II, NYCHA proposes to floodproof the building and install stand-by generators. Site restoration will also be undertaken at each housing complex.

Overall, these resiliency projects would help prevent coastal flooding only in certain parts of the protected area but would not prevent coastal flooding for the remainder of the neighborhood within the current and future FEMA 100-year flood plain, accounting for projections of sea level rise.

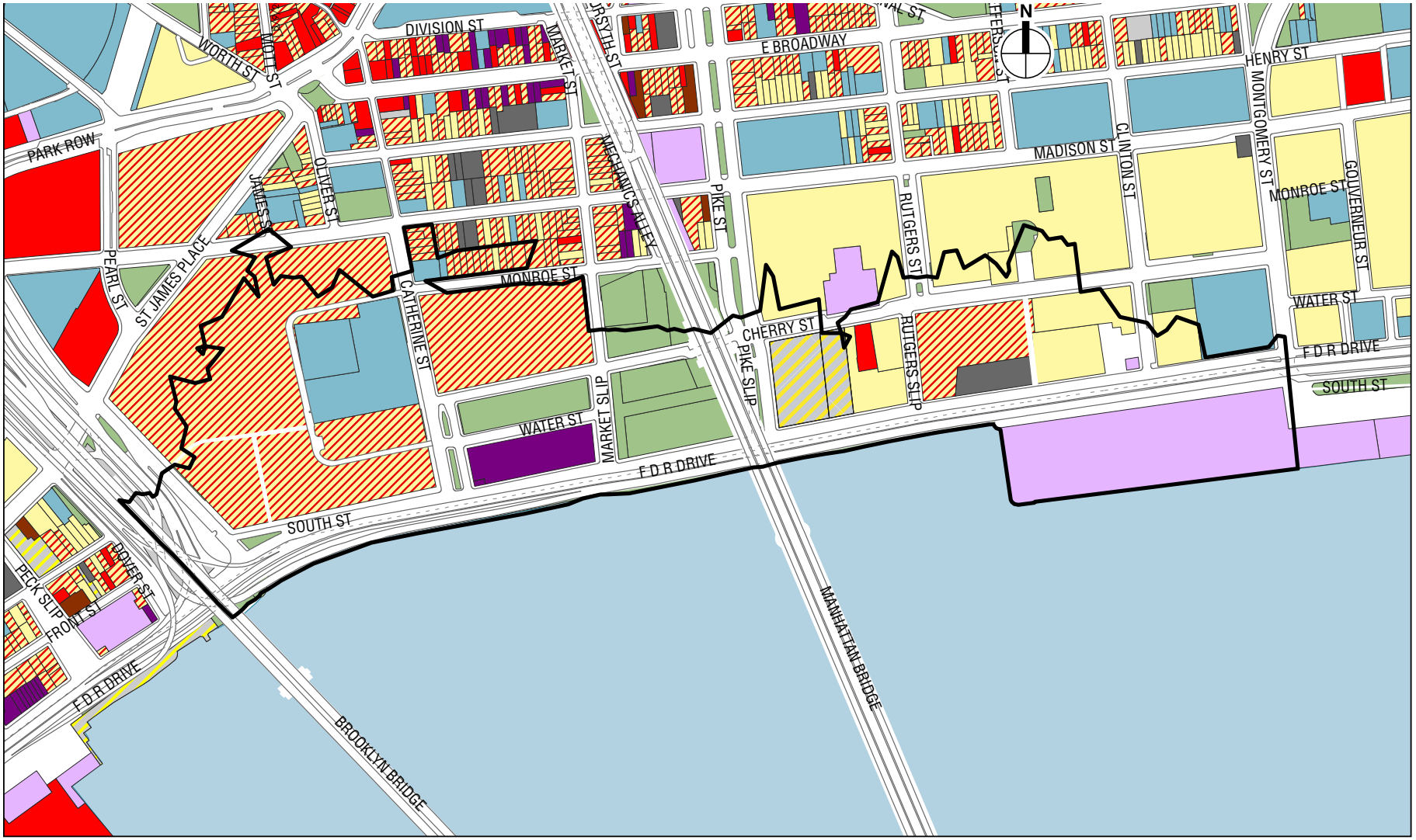
Lower Manhattan Coastal Resiliency (LMCR) – Two Bridges Project

In addition to the proposed project, resiliency measures are being developed for the Two Bridges neighborhood immediately south of the proposed project area. The study area for the Two Bridges project is bounded by Montgomery Street on the north and the Brooklyn Bridge to the south and includes the esplanade under the FDR Drive, two crossings across South Street for the tie-backs, Pier 35/36, and the East River Waterfront (see **Figure 2.0-7**). The City received funding through HUD's National Disaster Resilience Competition (NDRC) to initiate a coastal flood mitigation project in this area. The LMCR-Two Bridges Project is in the early design phase. It proposes improvements that would similarly protect from coastal flooding and would create opportunities for new programming and enhanced community access (where possible) in the Two Bridges neighborhood. The approaches to providing flood protection with this project are assumed to be similar to those under the proposed project and would include floodwalls and closure structures.

Additionally, as part of the LMCR-Two Bridges Project and funded by HUD's NRDC, the Trust for Public Land (TPL) school playground project consists of renovation and improvement of existing playground facilities at two public schools, Public School 2 (P.S. 2) – Meyer London and Public School 184 (P.S. 184) – Shuang Wen, in the Two Bridges neighborhood. This project would result in redesigned play spaces, which may include features such as running tracks; athletic courts; upgraded play equipment; trees, gardens and plantings; gazebos; outdoor classrooms; benches and other seating; game tables; student artwork; signage; trash and recycling receptacles; and drinking fountains. This project would also incorporate green infrastructure features—such as artificial turf fields with gravel underlays, bioswales, permeable pavers, and rain gardens—into the project design. The build year would be approximately 2021 for this TPL school playground project.

DEVELOPMENT PROJECTS

In 2008, the City rezoned portions of the East Village and Lower East Side to facilitate the development of new residential projects with ground-floor retail. The limits of these rezoning actions were between East 13th Street on the north; Avenue D to the east; East Houston Street, Delancey Street, and Grand Street on the south; and the Bowery and Third Avenue on the west. According to the 2008 *East Village/Lower East Side Rezoning Final Environmental Impact Statement (FEIS)*, there are an estimated 770 potential mixed-use development projects resulting from the rezoning. As shown in **Appendix A1**, there are a number of projected development sites



- Study Area
- Commercial and Office Buildings
- Hotels
- Industrial and Manufacturing
- Open Space and Outdoor Recreation
- Parking Facilities
- Public Facilities and Institutions
- Residential
- Residential with Commercial Below
- Transportation and Utility
- Vacant Land
- Under Construction

Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Lower Manhattan Coastal Resiliency (LMCR) - Two Bridges

Project Location and Land Use

Figure 2.0-7

identified in the 2008 *East Village/Lower East Side Rezoning FEIS* that are relevant to the analyses in this EIS, the majority of which are residential projects.

Large-Scale Development Projects outside the Protected Area

In addition to the No Action projects described above, there are three major projects just outside the protected area that have been considered as part of the background condition for the analyses in this EIS: City University of New York (CUNY) Hunter Brookdale Campus, Alexandria Center for Life Sciences, and Essex Crossing.

CUNY Hunter Brookdale Campus

The City of New York is redeveloping the block generally bounded by First Avenue, East 25th Street, FDR Drive, and a private drive (formerly East 26th Street). The property is currently the Brookdale Campus of Hunter College (CUNY Hunter). The New York City Department of Sanitation (DSNY) is proposing to use the central portion of the site to construct a garage complex to store equipment and provide personnel support services for Manhattan Districts 6 and 8, support street cleaning for Districts 3, 6, and 8, and house the Manhattan Borough Command Offices. The remainder of the site will be a commercial development or mixed-use development in accordance with a request for proposals managed by NYCEDC.

Alexandria Center for Life Sciences

The Alexandria Center for Life Sciences, at East 29th Street and the FDR Drive, is proposing a third building of approximately 550,000 square feet. Additionally, a City-owned building at East 26th Street and First Avenue is proposed to be converted to a bioscience research center with lab space.

Essex Crossing

At full buildout, the Essex Crossing project, which is a phased development project, would result in approximately 2 million gross square feet of mixed-use development on nine separate sites located along Essex, Grand, and Delancey Streets. The Essex Crossing project would provide residential units, some of which would be affordable units and affordable senior housing units. In addition, the proposed Essex Crossing program would introduce commercial space and other commercial uses that include commercial office space, a gym, a bowling alley, and a movie theater. There would also be community facility uses and publicly accessible open space on Broome Street between Suffolk and Clinton Streets.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

DESIGN OBJECTIVES

The Preferred Alternative is a flood protection system comprised of a combination of floodwalls, 18 closure structures (i.e., swing and roller floodgates), and supporting infrastructure improvements that together would reduce risk of damage from coastal storms in the area proposed for protection. The inland limits of the proposed protection area are generally along First Avenue, Avenue B, Avenue C, Avenue D, and Columbia Street and includes private and public properties and streets within the Lower East Side, East Village, Stuyvesant Town, Peter Cooper Village and Kips Bay communities that are currently in the East River coastal flood hazard area. The design flood elevation for the project is 16.5 feet NAVD88, which is generally 8 to 9 feet above the existing land surface along the project alignment but diminishes in height along the inland alignments (e.g., along Montgomery Street). This design elevation was developed based on the

100-year FEMA flood level and adding to that wave effects and the 90th percentile projection for sea level rise through to the 2050s (30 inches).

As described in greater detail below, a key element of the Preferred Alternative is elevating and reconstructing John V. Lindsay East River Park (East River Park) to make it more resilient to coastal storms, The proposed project also includes integrating flood protection with open space improvements at other parks along the flood protection alignment including Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground, with an improved shared use path (bikeway/walkway) along the entire project length (from East 23rd Street to Montgomery Street), and a new shared-use flyover bridge (see **Figures 2.0-8 and 2.0-9**) to address the narrow and substandard waterfront public access along the segment at the Con Edison facility (on the east side of the FDR Drive) known as the "pinch point."

Also proposed are redesigned and enhanced connections to the waterfront and East River Park, with the reconstruction of the Corlears Hook Bridge, the replacement of the Delancey and East 10th Street bridges, and the above-mentioned flyover bridge. These proposed bridge improvements would create more inviting and accessible crossings over the FDR Drive to the reconstructed East River Park and the East River waterfront, including the waterfront shared-use path. With the proposed project, the reconstructed bridges at Delancey and East 10th Street have also been designed to provide more community-oriented access that supports and encourages public access to the waterfront with gentler grades that are consistent with the principle of universal access. Within the park, the bridge landings would provide an elevated gateway with expanded views of the reconstructed park and the river.

FLOOD PROTECTION ALIGNMENT AND DESIGN

The description below summarizes flood protection alignment and design for the Preferred Alternative. **Figure 2.0-10** shows the proposed alignment and schematic layout of Preferred Alternative e, Conceptual design sections of the Preferred Alternative are provided in **Appendix C1**, which show approximate elevations and heights at numerous locations in each of the project reaches.

Project Area One – South of East River Park

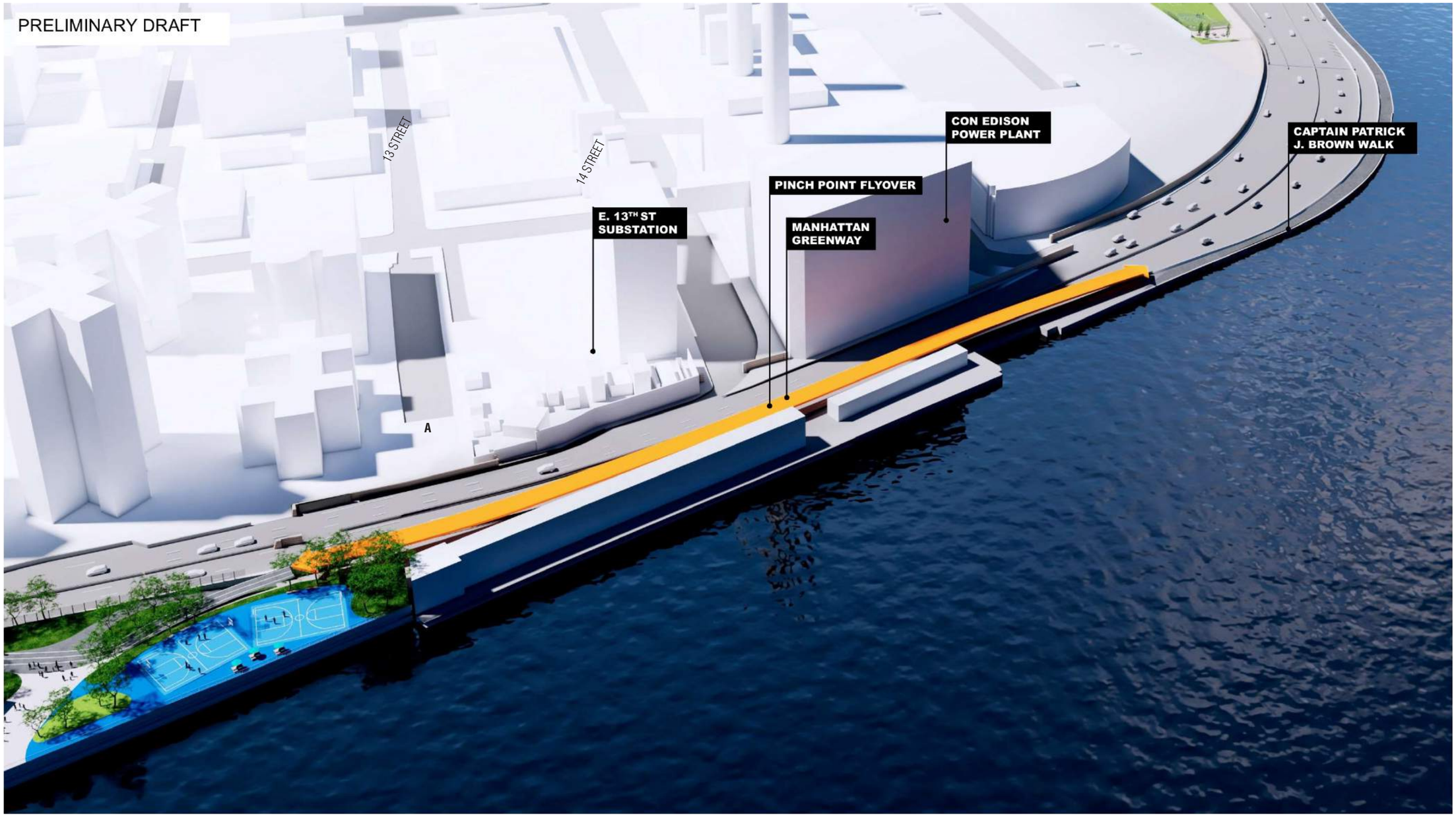
The proposed flood protection alignment begins at its southerly tieback along Montgomery about 130 feet west of South Street; at South Street the system turns north along for a distance of about 50 linear feet and then east, crossing under the FDR Drive to the east side of the highway with a pair of swing floodgates. Once on the east side of the highway, the flood protection system turns north and runs adjacent to the FDR Drive, continuing north into East River Park.

Project Area One – East River Park

Once in East River Park, the proposed flood protection alignment starts to turn east towards the East River, near the existing amphitheater. From here, the alignment continues north and the system parallels the East River Park bulkhead.

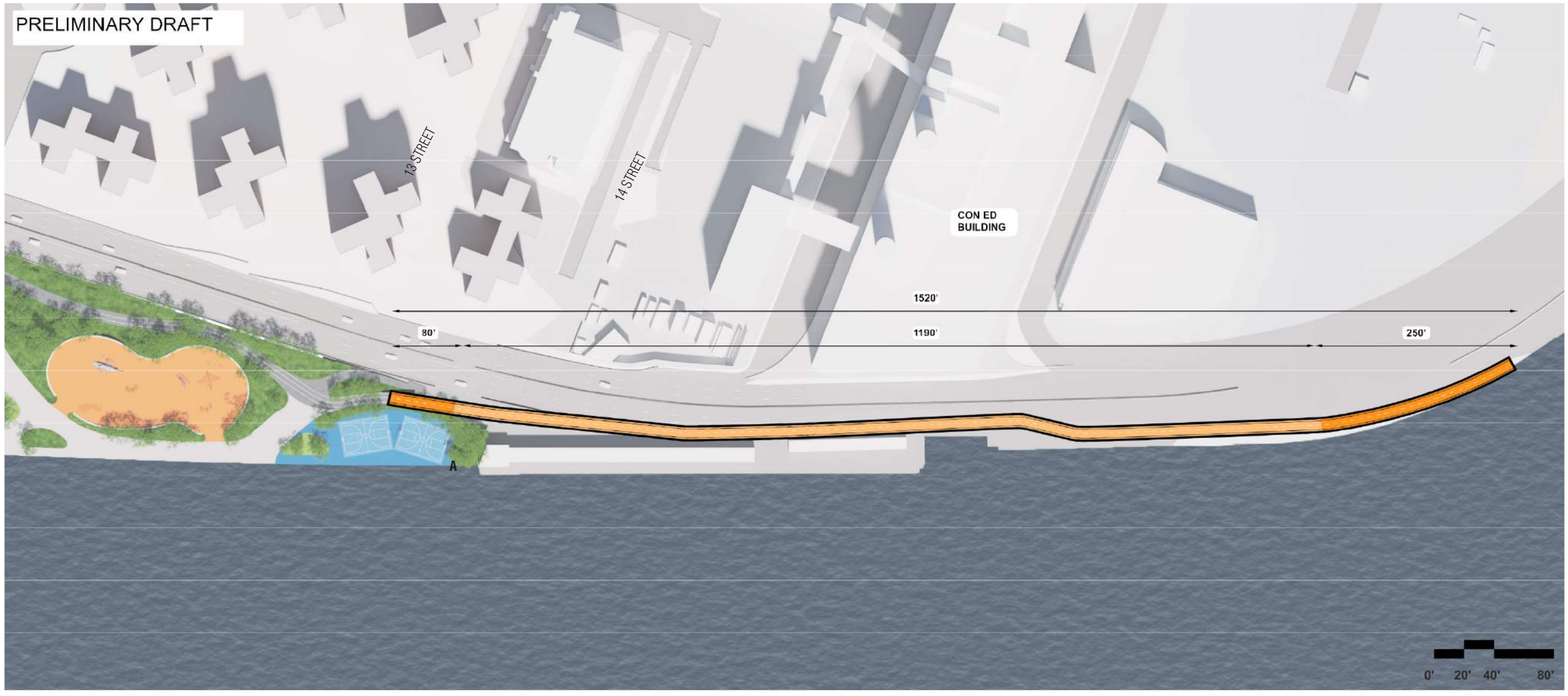
Within East River Park, the proposed project includes the following key design elements:

- Installing a below-grade flood protection structure (i.e., floodwall) running parallel to the existing East River Park bulkhead coupled with the elevation of a majority of East River Park (with the exception of the Fireboat House), generally beginning at the existing amphitheater and continuing northward to the northern end of the park near East 13th Street, thereby



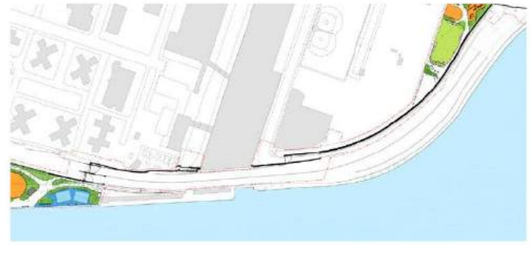
NOTE: Preliminary Conceptual Design

Shared-Use Flyover Bridge - Aerial View
Figure 2.0-8



FLYOVER BRIDGE

BRIDGE APPROACH



NOTE: Preliminary Conceptual Design

Project Elements

Proposed Floodwall

Redesigned Open Spaces

NOTE: Based on Preliminary Draft Design Concept. See Appendix C3 for additional design details on this alternative. Design includes flyover bridge.

Schematic of Preferred Alternative:
Flood Protection System with a Raised
East River Park
Figure 2.0-10

protecting park facilities and recreational spaces from design storm events and sea level rise inundation;

- Installing the floodwall below-grade to soften the visual effect of the flood protection system;
- Raising the majority of park grade with an increase in elevation from west (the FDR Drive) to east (the East River bulkhead) to attain the flood protection design elevation, accompanied by the reconstruction of the park open space including all fields and passive spaces, and incorporating resilient landscaping and substantial tree replanting that envisions a more diverse, resilient, and ecologically robust habitat;
- Reconstructing the Tennis House, Track and Field House and comfort stations;
- Reconstructing the East River Esplanade to increase the deck elevation to match the raised park and protect the esplanade from design storms and sea level rise;
- Improving north/south access along the waterfront with a new shared-use flyover bridge connecting the north end of East River Park with Captain Patrick J. Brown Walk;
- Improving access to the waterfront by reconstructing the Corlears Hook Bridge over the FDR Drive and replacing the existing Delancey Street and East 10th Street Bridges to be universally accessible;
- Creating an expanded and reconfigured park-side East Houston Street landing and entryway to the waterfront; and
- Relocating the two existing embayments in the park with the objective of repurposing the filled areas as open space that allows for improved recreational programming and creating two new compensatory embayments;
- Reconstructing the amphitheater as an outdoor theater space; and
- Reconstructing all water and sewer infrastructure in the park, some of which is reaching the end of the serviceable life, including the outfalls and associated pipes that cross the park to the East River bulkhead.

It is an objective of the design to improve the ecology of East River Park, which is susceptible to the effects of sea level rise, storm surge, and heavy rainfall events. Storm surge from severe events like Hurricane Sandy can overwhelm the park. Moreover, the threat from gradually increasing sea level rise adds to the risk of more frequent flooding from everyday storms or high tides. This flooding not only interrupts the ability for parks visitors to enjoy and utilize the amenities within East River Park, but also affects its ecology. In 2014, NYC Parks removed 258 trees from East River Park due to salt water damage from Hurricane Sandy.

The Preferred Alternative's landscaping and planting plan is reflective of the popular styles of the late 1930s, when the Park was first designed and completed. The planting design is formal, with a focus on tree geometry and placement that maximizes open spaces for active recreation. Species diversity and ecology were not priorities of the original landscape design: over half of the current tree canopy is comprised of just two species. In the original design, plant selection relied heavily on canopy trees, such as London plane, a non-native species, and oaks. London plane trees in particular were significantly affected by salt inundation post Hurricane Sandy and have comprised most of the tree removals in East River Park since then.

In contrast, the proposed landscaping plan incorporates park resiliency through a design that can withstand a changing climate and consideration of species diversity, habitat, salt spray, wind, maintenance, and care. The landscape plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resiliency and adaptive capacity in a plant

ecosystem. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that have flexibility and plant communities that together improve ecological richness. By elevating the majority of the park and its landscape, and diversifying plant species, the landscape in the park will be more resistant to salt spray exposure and improve resiliency and post-storm functionality over the long term.

Project Area Two

North of East River Park, the proposed flood protection system includes a closure structure across the FDR Drive. Two swing floodgates that when deployed would close this segment of the flood protection system across the highway, but in non-storm conditions would be recessed to the sides of the highway. From there, the floodwall continues northward and aligns along the west (southbound) side of the FDR Drive, connecting into the flood protection system at the Con Edison East River Generating Station (between East 14th and East 15th Streets). A closure structure adjacent to East 14th Street near the FDR Drive would also be installed to allow Con Edison operational access. North of the East River Generating Station, a closure structure is proposed across the FDR Drive East 15th Street ramp, and the floodwall continues northward along the FDR Drive to Murphy Brothers Playground.

At Murphy Brothers Playground the proposed floodwall is aligned along the east side of the park, which would also be reconstructed with new ballfields, active recreational spaces, grading and landscaping.

Beginning at the northeast corner of Murphy Brothers Playground, the proposed flood protection system turns east along Avenue C, heading towards the East River, crossing the FDR Drive ramps (two swing gate closure structures are proposed here) and under the FDR Drive into Stuyvesant Cove Park. Within Stuyvesant Cove Park, the proposed flood protection system turns northward, where it is comprised of a combination of floodwalls with closure structures (roller gates) at the southerly entrance (from Avenue C) and at the East 20th Street entrance to allow public access into the park to the waterfront esplanade during non-storm conditions; design of this segment is also being coordinated with the new design for Solar One Environmental Education Center and existing Citywide Ferry Service ferry landing.

North of Stuyvesant Cove Park, the system again turns west and back under the elevated FDR Drive at East 23rd Street. In this segment, a combination of floodwalls and closure structures (a combination of roller and swing gates) are needed to maintain vehicular and pedestrian circulation through this intersection during non-storm conditions, including: vehicle access to the FDR Drive ramps and service roads; pedestrian and cyclist access to and along the East River shared-use path; and, vehicle and pedestrian access to Waterside Plaza (including the U.N. School and the British International School of New York), the Skyport Marina and parking garage, and a BP service station. These closure structures are to be recessed except under storm conditions when they would be deployed to provide the proposed flood protection.

North of East 23rd Street and west of the FDR Drive, the proposed flood protection system continues northward along the sidewalk of the southbound FDR Drive service road. The proposed system then turns westward into and across the Asser Levy Park Playground (between the Asser Levy Recreation Center and the outdoor recreational space). Similar to Murphy Brothers Playground, the outdoor recreational space at Asser Levy Playground would be redesigned and reconstructed and a roller floodgate is proposed to connect to the VA Medical Center floodwall. The flood gate would maintain the connection between the playground and the Asser Levy Recreation Center and during a storm condition it would be deployed. The VA Medical Center

flood protection system extends north and then west along East 25th Street to complete the northern tieback at First Avenue.

DRAINAGE SYSTEM MODIFICATIONS

Drainage system modifications are also proposed as part of the Preferred Alternative, including measures to control flow into the drainage protected area[5] from the larger sewershed (i.e., drainage isolation) and measures to manage flooding within the drainage protected area (i.e., drainage management). These modifications would reduce the risk of flooding in the protected area during extreme storm events coincident with rainfall events. As part of the Preferred Alternative, the water and sewer infrastructure would be reconstructed and reconfigured where necessary to ensure that it could withstand the additional loading from the added fill materials once the Park is raised. A summary of each of these measures is provided below.

Drainage Isolation

Measures to isolate the drainage protected area from the unprotected portions of the larger sewershed would be implemented to eliminate potential pathways for storm surge waters to inundate the existing sewer system and flood inland areas. The measures include: (1) installing interceptor gates on the existing 108-inch diameter interceptor at the northern and southern extremes of the drainage protected area sewershed, generally in the vicinity of East 20th Street and Avenue C to the north and between Corlears Hook Park and the FDR Drive to the south; (2) floodproofing the regulators, manholes, and other combined sewer infrastructure on the unprotected side of the flood protection system; (3) replacing existing tide gates on the combined sewer outfall pipes that serve the drainage protected area and rerouting storm drainage; and (4) installing one isolation gate valve in the existing Regulator M-39, located within Asser Levy Playground, to isolate a branch interceptor that crosses the flood protection system alignment at the northern boundary of the drainage protected area. These measures would prevent storm surge water from entering the sewer system through existing combined sewers, the outfall pipes, or through at-grade access points (i.e., manholes and hatches) for existing sewer infrastructure on the portion of the drainage protected area that is unprotected from overland coastal surge events.

Two interceptor gates are proposed to prevent floodwaters from entering the protected area through the sewer system during a design storm event. The southernmost interceptor gate is proposed in Project Area One, just south of the Corlears Hook Bridge, and would be sited within an existing sidewalk and lawn along the western edge of the FDR Drive right-of-way. The northern interceptor gate in Project Area Two is proposed in the right-of-way and median of East 20th Street, just west of the intersection with Avenue C. During a design storm event, these gates would be operated to allow DEP to control flow from outside the protected area into the protected area via the interceptor sewer. Once the storm surge recedes, the interceptor gates would be returned to their open positions to resume normal operations of the sewer system. While mostly below grade, the interceptor gates each would each require a single-story building adjacent to the chamber that contains the controls, electrical, hydraulic, and other ancillary components to operate the interceptor gates.

Drainage isolation for the regulators and other sewer structures would involve replacing each of their existing vented access hatches with lockable vented hatches that could be sealed (i.e.,

[5] The drainage protected area encompasses the project protected area as well as the lateral sewers, regulators, outfalls, and other sewer infrastructure that serve or are tributary to those that serve the project protected area.

floodproofed) to prevent floodwater water from entering the system. In addition, each regulator would be improved, as needed, which may include lining, patching, jet-grouting, sheet piling, or reinforcing the walls of the structure. There may also be installation of a reinforced concrete slab above each structure and of low-infiltrating fill around each structure. Manhole covers on unprotected sewers would also be floodproofed to protect against loss and/or leakage during a storm event. Manholes that are less structurally stable would be either partially or fully replaced in addition to the replacement of the frame and cover. Manholes requiring additional support would follow the methods described above for external strengthening of the regulators.

To ensure proper functioning of the tide gates during the design storm event, it is proposed that the existing tide gates on the combined sewer outfall pipes that serve the drainage protected area be replaced as part of the Preferred Alternative. In addition, storm drainage that currently connects to the combined sewer system that would be located on the unprotected side of the flood protection system would be rerouted and connected to the outfalls downstream of the tide gates. This would ensure the storm drainage system is isolated from the combined sewer system within the protected area and would eliminate the need for floodproofing storm drains on the unprotected side of the flood protection system.

The Preferred Alternative also proposes that an isolation gate valve be installed within regulator M-39 on an existing sewer segment that crosses from the protected to the unprotected side of the flood protection system at the northern end of the drainage protected area. This conduit has the potential to convey floodwaters from unprotected sewers into the protected area under a design storm event.

Drainage Management

In addition to the isolation measures outlined above, the Preferred Alternative includes drainage management elements to ameliorate the reduced sewer capacity due to outfall closure during a design storm event. The proposed drainage management would reduce the risk of sewer backups and associated flooding within the drainage protected area during a design storm. These drainage elements include installing additional combined sewers, termed “parallel conveyance,” within the drainage protected area to augment the capacity of the existing sewer system. Specifically, nine parallel conveyance connections are proposed.

Parallel conveyance pipes are proposed at 9 locations, for regulators M-22, M-23, M-27, M-28, M-31, M-37, M-38, M-38A, and M-38B, to convey excess combined sewer flows to the interceptor. Each parallel conveyance pipe would consist of a new upstream connection to a regulator or lateral sewer, a downstream connection to the interceptor, and a connecting length of pipe. The parallel conveyance pipes would range in diameter from 18 to 48 inches and require no above ground features. The parallel conveyance would be sited within City rights-of-way with one exception where some parallel conveyance infrastructure is proposed on private property. The parallel conveyance pipes and connections would include manholes for access, similar to the existing sewer pipes, generally every 200 to 250 feet, at pipe bends, and at all connections to allow access for maintenance and repairs, as needed, and would be sited within streets and paved surfaces (e.g., parking), where possible.

In addition, similar to the parallel conveyance, this alternative also proposes to increase the size of the branch interceptor in order to increase the conveyance capacity to the Manhattan Pump Station for three sub-drainage areas within the protected area: M-33, M-34, and M-35.

These proposed drainage management system improvements would not alter daily operation of existing sewer infrastructure under non-storm conditions. Under rainfall events or periods of high

sewer flow, combined sewer flow would be conveyed to the interceptor via the existing branch interceptors and potentially also via the parallel conveyance.

East River Park Infrastructure Reconstruction

The Preferred Alternative also includes reconstructing the water and sewer infrastructure within the portion of East River Park that would be elevated, including the outfalls, regulators, and sewers and water supply infrastructure, to withstand the added loads of the proposed flood protection system and elevated parkland. The outfalls and regulators within the portion of East River Park to be elevated are also proposed for replacement. In most cases, the existing infrastructure would be abandoned in place and the new infrastructure would be reconstructed adjacent to the existing locations, although the outfalls would be relocated slightly along the East River Park bulkhead. Of the existing 11 outfalls, two would be combined as part of the outfall reconstruction effort.

SYSTEM OPERATION AND MAINTENANCE

An operations and maintenance manual will be developed for the proposed system to identify the procedures for deploying, inspecting, testing, and maintaining each element of the proposed flood protection system to ensure that the floodwalls, levees, and closure structures remain in proper working order and are ready to perform in advance of a design storm event.

Operation and maintenance of the proposed parallel conveyance and interceptor gates would require periodic inspection and maintenance of the piping and mechanical equipment. These inspections would be in accordance with standard operation and maintenance procedures for the City's sewer infrastructure and a pre-approved operations and maintenance protocol developed for the proposed project.

As discussed below in Section D, "Operations and Maintenance Program," upon completion of construction of the proposed project, the City would submit engineering plans, design modifications during construction, supporting materials (i.e., design criteria, geotechnical data, hydraulic modeling, etc.), a final operations and maintenance plan, and relevant construction data to FEMA to demonstrate compliance with requirements listed in Chapter 44 of the Federal Code of Regulations, Section 65.10 for FEMA accreditation.

CONSTRUCTION

The flood protection system and raised East River Park proposed under this alternative would be constructed in 3.5-years and completed in 2023. The foundations for the shared-use flyover bridge would also be completed in 2023. Subsequently, a prefabricated bridge span would be installed and completed in 2025. East River Park is anticipated to be closed for the entire 3.5-year construction duration but access to the Corlears Hook ferry landing would be maintained. Construction activities would require the use of barges and trucks for material deliveries. Approximately 600,000 cubic yards of fill is estimated to be required for the construction under the Preferred Alternative, and an average of 3 barge trips per day are anticipated throughout the 3.5-year construction period.

CAPITAL COSTS

The estimated capital cost for the Preferred Alternative is approximately $1.45 billion.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would provide flood protection in Project Areas One and Two using a combination of floodwalls, levees, and closure structures (i.e., deployable gates) from Montgomery Street to East 25th Street. **Figure 2.0-11** shows the proposed alignment of Alternative 2. Scaled conceptual designs of Alternative 2 for each of the project reaches are provided in **Appendix C2.**

FLOOD PROTECTION ALIGNMENT AND DESIGN

Project Area One

In Project Area One, the line of flood protection would generally be located on the west side of East River Park. Protection would be provided by a concrete floodwall starting at Montgomery Street within the sidewalk adjacent to the Gouverneur Gardens Cooperative Village. The floodwall would then cross under the FDR Drive with closure structures across the FDR Drive's South Street off- and on-ramps. A combination of floodwalls and levees would then run along the west side of East River Park for the length of the entire park. The park-side landings for the Delancey Street and East 10th Street bridges would be rebuilt within East River Park to accommodate the flood protection system. As with the Preferred Alternative, a shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

Project Area Two

In Project Area Two, the flood protection alignment would be similar to that proposed under the Preferred Alternative. However, the portions of Murphy Brothers Playground and Asser Levy Playground that are affected by construction of the floodwall would be replaced in kind rather than redesigned and reconstructed.

DRAINAGE SYSTEM MODIFICATIONS

Similar to the Preferred Alternative as described above, this alternative also includes modifications of the existing sewer system, including installing gates underground near the northern and southern extents of the project area within the existing large capacity sewer pipe (interceptor) and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment to control flow into the project area from the larger combined sewer drainage area. Installation of additional sewer pipes and, in one location, enlarging existing sewer pipes, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a design storm event.

SYSTEM OPERATION AND MAINTENANCE

Operations and maintenance of Alternative 2 would be similar to those described above under the Preferred Alternative and would involve periodic inspections, testing, and maintenance to the flood protection system elements, including floodwalls, closure structures, levees and drainage components.

CONSTRUCTION

The flood protection alignment proposed in Alternative 2 would require that the majority of flood protection construction be performed during night-time single-lane closures of the FDR Drive and

Project Elements

- *Proposed Floodwall*
- *Proposed Levees or Raised Landscapes*
- *Proposed Deployable Systems*
- *Proposed Reconstructed Shared Use Path*

NOTE: Based on Preliminary Draft Design Concept. See Appendix C1 for additional design details on this alternative. Design includes flyover bridge.

SOURCES: East Side Coastal Resiliency Project, Project Area One Conceptual Design Report, November 2015. East Side Coastal Resiliency Project, Project Area Two Conceptual Design Report, November 2015.

Capital Project: SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Schematic of Alternative 2:
Flood Protection System on the West Side of
East River Park – Baseline
Figure 2.0-11

in close proximity to sensitive Con Edison transmission lines. Given the related construction complexities and logistical considerations, the flood protection system and associated components under this alternative are assumed to be constructed in 5-years and completed in 2025.

CAPITAL COSTS

The estimated cost of construction for Alternative 2 is approximately $445 million.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER DRIVE – ENHANCED PARK AND ACCESS

FLOOD PROTECTION ALIGNMENT AND DESIGN

Alternative 3 provides flood protection using a combination of floodwalls, levees, and closures structures in Project Areas One and Two. **Figure 2.0-12** shows the proposed alignment of Alternative 2. Scaled conceptual designs of Alternative 3 for each of the project reaches are provided in **Appendix C3**.

As with Alternative 2, the line of protection in Project Area One would be generally located on the western side of East River Park. However, compared to Alternative 2, there would be more extensive use of berms and other earthwork in association with the flood protection along the FDR Drive to provide for more integrated access, soften the visual effect of the floodwall on park users, and introduce new types of park experience. The landscape would generally gradually slope down from high points along the FDR Drive towards the existing at-grade esplanade at the water's edge. Due to the extent of the construction of the flood protection system, compared to Alternative 2, this alternative would include a more extensive reconfiguration and reconstruction of the bulk of East River Park and its programming, including landscapes, recreational fields, playgrounds, and amenities. Specifically, the following park facilities would be raised above the current grade by approximately 2 to 3 feet:

- Multi-Purpose Turf Field south of the Williamsburg Bridge;
- Basketball Courts south of the Williamsburg Bridge;
- Ball Fields Nos. 3, 4, 5, 6, and 7 north of the Williamsburg Bridge; and
- 10th Street Playground near the base of East 10th Street bridge landing.

In addition, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to provide universal access, and a new raised and landscaped park-side plaza landing would be created at the entrance to the park from the East Houston Street overpass. As with the Preferred Alternative, a shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

Project Area Two

In Project Area Two, the flood protection alignment would be similar to that proposed in the Preferred Alternative.

DRAINAGE SYSTEM MODIFICATIONS

Similar to the Preferred Alternative as described above, this alternative also includes modifications of the existing sewer system, including installing gates underground near the northern and

Project Elements

Proposed Floodwall

Redesigned Open Spaces

NOTE: Based on Preliminary Draft Design Concept. See Appendix C2 for additional design details on this alternative. Design includes flyover bridge.

Schematic of Alternative 3:
Flood Protection System on the West Side of East River Park – Enhanced Park and Access

Figure 2.0-12

southern extents of the project area within the existing large capacity sewer pipe (interceptor) and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment to control flow into the project area from the larger combined sewer drainage area. Installation of additional sewer pipes and, in one location, enlarging existing sewer pipes, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a design storm event.

SYSTEM OPERATION AND MAINTENANCE

Operations and maintenance of Alternative 2 would be similar to those described above under the Preferred Alternative and would involve periodic inspections, testing, and maintenance to the flood protection system elements, including floodwalls, closure structures, levees and drainage components.

CONSTRUCTION

Alternative 3 would involve construction of the flood protection system alignment along the FDR Drive and in close proximity to sensitive Con Edison transmission lines. Given the associated complexities and logistical considerations involved when working in and around these facilities, a 5-year construction duration is assumed, with the proposed project estimated to be completed in 2025.

CAPITAL COSTS

The estimated capital cost for Alternative 3 is approximately $1.2 billion.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

FLOOD PROTECTION ALIGNMENT AND DESIGN

Alternative 5 proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need for gates crossing the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property and Murphy Brothers Playground.

As with the Preferred Alternative, this alternative would also include the construction of the shared-use flyover bridge to address the Con Edison pinch point.

RAISED FDR DRIVE PLATFORM WITH FLOODWALL PROTECTION

The floodwall system constructed along the elevated FDR Drive platform would connect to the proposed floodwall in East River Park to the south and to the closure structures at the entrance to Stuyvesant Cove Park to the north. To create the platform, drilled shafts would be installed in the middle lane of the FDR Drive northbound lanes extending to bedrock at intervals of approximately 125 feet (with one shaft potentially needed between Con Edison's intake tunnels that run under the FDR) from approximately East 14th Street to East 17th Street in Reaches K through M (see **Figure 2.0-13** for approximate location of shafts). It is estimated that approximately 12 shafts would be necessary along this design segment. A precast, pre-stressed box structure/raised platform would then rest on the piers supported by the shafts, and a new paved roadway for the

Project Elements

- *Proposed Elevated FDR Drive Roadway & Floodwall*
- *Transition Slab with "L" Floodwall*
- *Proposed Realigned North Bound FDR Exit Ramp*
- *Existing Wall Enclosure Under FDR Drive*
- *Proposed Floodwall*
- *3' - 6' High Floodwall Attached to East Side of Bridge*
- *Proposed Deployable Systems*
- *Proposed Fly-Over Bridge*
- *FDR Drilled Shaft with Pier Cap (125' Apart)*

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Schematic of Alternative 5: Flood Protection Alignment
East of FDR Drive with Flyover Bridge Alternative
Figure 2.0-13

northbound FDR Drive would then be supported by the box/platform structure. Along the river side of the raised platform, a floodwall would be installed below the elevated FDR Drive to the necessary flood protection design height.

Under this alternative, the elevated FDR Drive structure would remain completely independent of the Con Edison facilities and infrastructure located west of the FDR Drive. Further, the raised platform and floodwall would provide flood protection on the east edge of the FDR Drive, minimizing the number of closure structures needed for this reach, protecting and improving emergency access along the FDR Drive during a design storm event, and would avoid the disruptions associated with the testing and maintenance of closures strictures in this segment.

In the design segment north of the proposed raised platform between approximately East 17th and 18th Streets along the waterfront in Captain Patrick J. Brown Walk within Reach M, a floodwall would be affixed to the existing FDR Drive abutment along the northbound service road to the Avenue C Viaduct. This floodwall would then connect to the closure structure proposed at the existing FDR Drive off-ramp at the south end of Stuyvesant Cove Park within Reach N. The flood protection system at and north of Stuyvesant Cove Park would be identical to that for Alternatives 2, 3, and 4.

DRAINAGE SYSTEM MODIFICATIONS

Similar to the Preferred Alternative as described above, this alternative also includes modifications of the existing sewer system, including installing gates underground near the northern and southern extents of the project area within the existing large capacity sewer pipe (interceptor) and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment to control flow into the project area from the larger combined sewer drainage area. Installation of additional sewer pipes and, in one location, enlarging existing sewer pipes, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a design storm event. As with the Preferred Alternative, the water and sewer infrastructure within East River Park would be reconstructed.

SYSTEM OPERATION AND MAINTENANCE

Operations and maintenance of Alternative 2 would be similar to those described above under the Preferred Alternative and would involve periodic inspections, testing, and maintenance to the flood protection system elements, including floodwalls, closure structures, levees and drainage components.

CONSTRUCTION

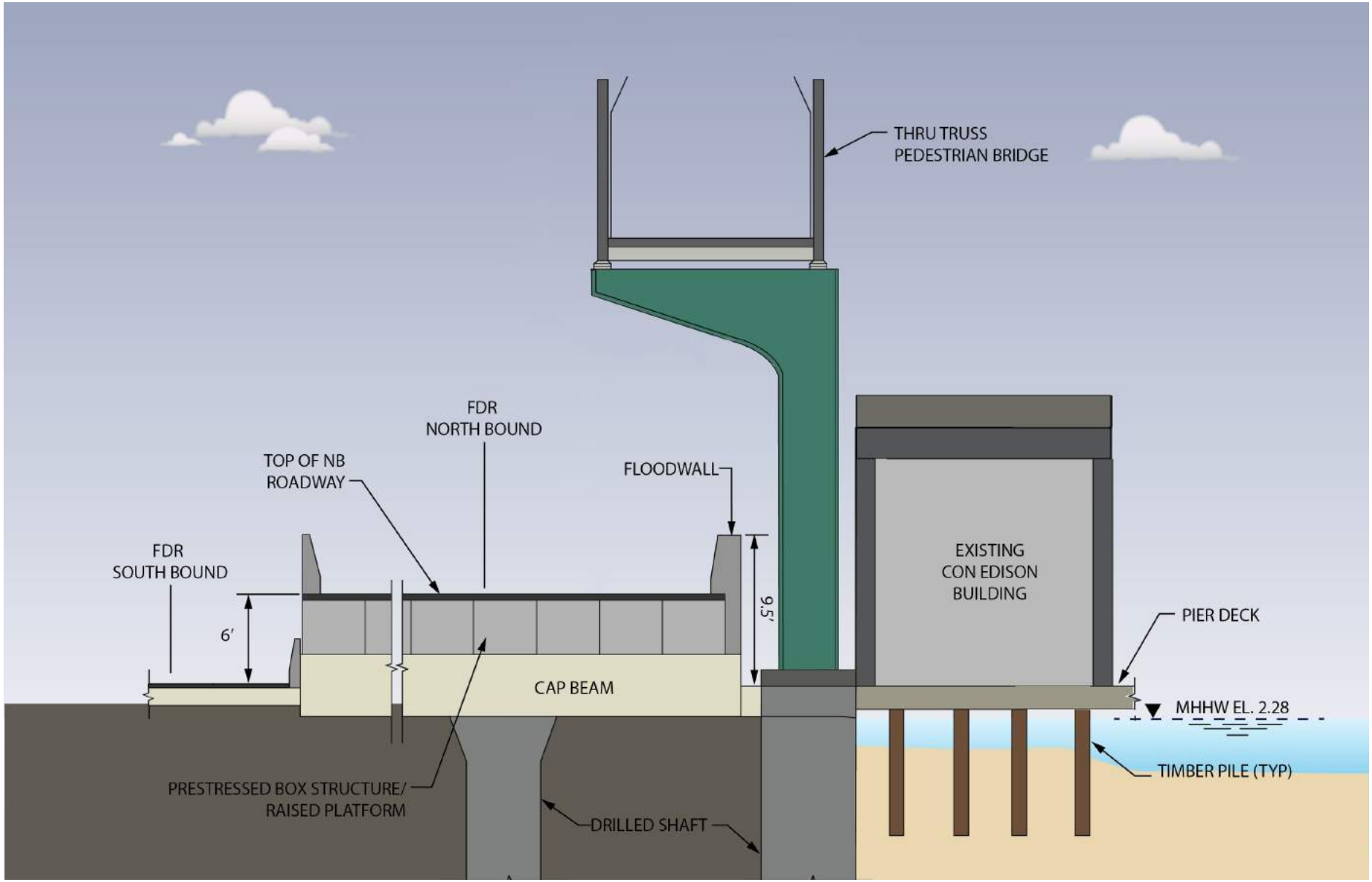
Alternative 5 is anticipated to be constructed in 5-years and completed in 2025 and this duration is driven by construction of the raised northbound lanes of the FDR Drive and the adjacent shared-use flyover bridge in this same footprint. **Figures 2.0-13 and 2.0-14** show a schematic of Alternative 5 and a typical cross section of the proposed raised FDR Drive, respectively.

CAPITAL COSTS

The overall estimated cost for Alternative 5 is approximately $1.59 billion.

D. OPERATIONS AND MAINTENANCE PROGRAM

Activation of the flood protection system under pre-storm event conditions would involve emergency preparedness planning and implementation across multiple City, State, and federal agencies responsible for managing the proposed flood protection system, street traffic, drainage



Note: Based on Preliminary draft design concept, NYCDOT, August 2016

Alternative 5
Typical Cross Section of the proposed FDR Drive
Figure 2.0-14

management, and emergency access and services before a storm event. To that end, many City departments would be involved during the emergency operations phase, including but not limited to the New York City Police Department (NYPD), the Fire Department (FDNY), NYCDOT, DEP, NYC Parks, DSNY, New York City Office of Emergency Management (NYCEM), along with State agencies such as the MTA which operates the transit systems (buses and subways) and the nearby Midtown Tunnel (entrances at 34th Street), Con Edison, and the VA Medical Center. Activating the proposed flood protection system would involve synchronizing both the storm surge flood protection and the drainage components of the protection system to manage or prevent combined flow from the larger sewershed within the protected area. As an imminent storm approaches, street closures would be implemented for public safety, flood protection system closure structures would be activated, and personnel would seek protected locations. Pre-storm measures would also involve close monitoring of weather patterns in advance of predicted heavy winds and storm surge, to ensure pre-storm activities lead to successful flood protection operation during a storm event. Among the key requirements are activation of closure structures, closure of outfalls, and controlled and eventual closure of the interceptor gates.

Given the number of agencies involved, the range of activities required, and the importance of their implementation during a coastal storm event, comprehensive training and emergency preparedness exercises would serve to provide a state of readiness to execute the necessary actions during the pre-storm conditions. To that end, the operations and maintenance manual that will be developed is a critical element for effective deployment of the proposed flood protection system. The manual will address each flood protection system component and the agency responsible for the components deployment during a flood event, along with a pre-storm timeline for its deployment.

FEMA ACCREDITATION

Upon completion of construction of the proposed project, the City would submit engineering plans, design modifications during construction, supporting materials (i.e., design criteria, geotechnical data, hydraulic modeling, etc.), a final operations and maintenance plan, and relevant construction data to FEMA to demonstrate compliance with requirements listed in Chapter 44 of the Federal Code of Regulations, Section 65.10 for FEMA accreditation.

Prior to the completion of the construction activities and the initial step towards accreditation, the City will submit a Conditional Letter of Map Revision for FEMA review. The final submission would include as-built plans, including any major deviations from the original design and specifications and an updated operations and maintenance manual.

As part of achieving FEMA accreditation (recognition of the proposed project on Flood Insurance Rate Maps [FIRMs]), the City would submit documentation that the entire length of the flood protection system has been adequately designed, and that operation and maintenance systems are in place to provide reasonable assurance the system would be able to perform as designed throughout the accreditation period and identification of any known risks. The FEMA accreditation process considers all components of the flood protection system, including elements for resisting storm induced surge (storm tide) and the existing and proposed alterations to the interior drainage system for removing all interior waters (rainfall and dry weather flow) from the protected area.

POST-STORM ACTIONS

Deactivating Closure Structures

Post storm, the closure structures would be returned to their open positions and debris removal would begin as soon as possible. Initiating these activities would commence once the storm surge has receded, the floodwaters have subsided, and NYCEM with the guidance of the National Weather Service (NWS) determines there is no threat of future flooding, tidal surge, or high wind conditions. It is expected that re-opening the gates would take approximately the same time as deployment, with contingencies for unforeseen conditions. Subsequent to the closure structures being returned to their open positions, any street obstructions and accumulated debris would be removed by DSNY and normal traffic circulation patterns would gradually be restored.

Deactivating Drainage Management

Post storm, the branch interceptor isolation gate valve and interceptor gates would be returned to their open position to the normal functioning and performance of the sewer system. As the storm surge recedes, and the outfall tide gates would open to allow the release of drainage collected in the sewer system. The Manhattan Pump Station would also be reset to normal pumping operations. ✷

Chapter 3.0: Process, Coordination, and Public Participation

A. INTRODUCTION

In the development of the proposed project, the City has engaged project stakeholders in an ongoing dialogue regarding project goals, the definition of the project alternatives, and an assessment of potential adverse environmental effects of these alternatives. The agency coordination and public involvement program is being conducted as part of the project's environmental review process to inform interested parties of the progress of the project and to encourage agency and community involvement in the decision-making process. To date, the City has conducted numerous outreach events tailored specifically to the interested public, residents, elected officials, community groups, and agencies. This approach informed and involved these groups at various points in the project lifecycle by presenting project information and updates, and obtaining feedback.

The agency coordination and public involvement program has also included specific steps to comply with the National Environmental Policy Act (NEPA) of 1969 requirements for public scoping (outlined below).

The following chapter outlines the overall approach to agency coordination and public involvement undertaken as part of the proposed project.

B. ENVIRONMENTAL REVIEW PROCESS

The environmental review process provides decision-makers with the necessary information to systematically consider the proposed project's potential adverse environmental effects. This includes evaluating the potential adverse environmental effects from reasonable alternatives, and identifying and mitigating, where practicable, the effects identified as part of this process. The development and evaluation of project alternatives is central to the NEPA and State Environmental Quality Review Act (SEQRA) processes. The New York City Office of Management and Budget (OMB) and Department of Parks and Recreation (NYC Parks), as NEPA and SEQRA/City Environmental Quality Review (CEQR) Lead Agencies, respectively, have determined that the proposed project has the potential to result in significant adverse environmental effects. Therefore, at OMB's request, the U.S. Department of Housing and Urban Development (HUD) issued a Notice of Intent to Prepare an Environmental Impact Statement (EIS) in accordance with 24 CFR Part 1502.[1] In addition, OMB and NYC Parks prepared a Draft Scope of Work to describe the proposed content of the Draft Environmental Impact Statement (DEIS), to explain the

[1] HUD, which grants OMB the authority under 24 CFR Part 58, to serve as the responsible entity under NEPA and in accordance with 24 CFR 58.2(a)(7) as the lead agency responsible for environmental review, decision-making, and action under 42 U.S.C. § 5304(g), determined that the proposed project has the potential to result in significant adverse environmental impacts. Pursuant to the HUD NEPA implementing procedures, OMB, as responsible entity, must certify that it has complied the related laws and authorities identified by 24 C.F.R. § 58.5 and must consider the criteria, standards, policies and regulations of these laws and authorities.

methodologies to be used in the impact analyses, and to allow for public and stakeholder participation in accordance with 24 Code of Federal Regulations (CFR) Part 58, 40 CFR Parts 1500-1508 and 6 NYCRR Part 617.

A Draft Scope of Work for the DEIS was published on October 30, 2015, and a public scoping meeting was held on December 3, 2015, with a public input and review period that remained open until December 21, 2015. A Final Scope of Work, which reflected public comments made on the Draft Scope, was issued on April 3, 2019**.** This DEIS is based upon the Final Scope of Work. As stated above, the DEIS and subsequent Final EIS (FEIS) will serve to fulfill the statutory obligations of NEPA, SEQRA, and CEQR.

A Notice of Availability (pursuant to NEPA) and a Notice of Completion (pursuant to CEQR) for this DEIS was issued on April 5, 2019. Publication of the DEIS and the Notices initiates the public review period. The public review period for the DEIS will open for a minimum of 45 days. During this period, the public has the opportunity to comment on the DEIS in writing or at a public hearing. After the DEIS public comment period has closed, an FEIS will be prepared, which will include a summary of the comments received on the DEIS, responses to all substantive comments, and any necessary revisions to the DEIS to address those comments. No sooner than 45 days after publishing the FEIS, OMB, as NEPA Lead Agency, will prepare a Record of Decision that will describe the Preferred Alternative for the proposed project, its environmental impacts, and any required mitigation. Similarly, NYC Parks, as the SEQRA/CEQR Lead Agency, will prepare a Statement of Findings, demonstrating that it has reviewed the impacts, mitigation measures, and alternatives in the FEIS as part of its decision-making process. OMB can proceed with the federal action of requesting release of Community Development Block Grant-Disaster Recovery (CDBG-DR) grant funds from HUD once the environmental review process is concluded.

C. AGENCY CONSULTATION

Implementation of the proposed project involves a number of federal, state, and local approvals. The federal, state, and City agencies that are involved in the environmental review and regulatory permitting processes are as follows:

FEDERAL

- U.S. Department of Housing and Urban Development (HUD) – Disbursement of funds, administration of CDBG-DR grant to the City of New York, review of Action Plan Amendments.
- U.S. Army Corps of Engineers (USACE) – Permits or authorizations for the discharge of dredged or fill material into Waters of the United States (Section 404 of the Clean Water Act) or structures within navigable waters (Section 10 of the Rivers and Harbors Act).
- U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) – Advisory agencies to the environmental review process focusing on activities that affect wetlands, water quality, protected plant and wildlife species, and essential fish habitat.
- U.S. Coast Guard (USCG) – Coordination and authorization regarding placement of construction barges and underwater work.
- Federal Emergency Management Agency (FEMA) – Review of flood protection design and potential changes to Flood Insurance Rate Maps (FIRM).

- Advisory Council on Historic Preservation (ACHP) – Advisory role in federal review process pursuant to Section 106 of the National Historic Preservation Act (NHPA).
- U.S. Department of Veterans Affairs (VA Medical Center) – Coordination and authorization regarding flood protection design proposed to connect to the VA Medical Center.

STATE OF NEW YORK

- Department of Environmental Conservation (NYSDEC) – Permits related to activities in tidal wetlands or adjacent areas (Article 25) or protection of waters (Article 15), Water Quality Certification (Section 401); endangered species protection if an incidental take is determined; permits related to the State Pollutant Discharge Elimination System (SPDES) program; approvals related to the handling and transport of hazardous materials and soils.
- Department of State (NYSDOS) – Review of Coastal Zone Consistency.
- Office of General Services (NYSOGS) – Permits related to State Owned Land under Water.
- Office of Parks, Recreation, and Historic Preservation (OPRHP) – Advisory role as the State Historic Preservation Office (SHPO) in federal review process pursuant to Section 106 of the NHPA with respect to designated and protected properties on the State and National Registers of Historic Places and properties determined eligible for such listing.
- Department of Transportation (NYSDOT) – Review of flood protection design and approvals related to construction activities along and adjacent to segments of the Franklin Delano Roosevelt East River Drive (FDR Drive) under NYSDOT jurisdiction.

CITY OF NEW YORK

- OMB – Responsible Entity (RE) for the disbursement of CDBG-DR funds for Hurricane Sandy from HUD to City agencies and NEPA Lead Agency for the environmental review.
- NYC Parks – Review and issuance of permits and approvals for project design and construction in City parkland, and SEQRA/CEQR Lead Agency for the EIS.
- Mayor's Office of Recovery and Resiliency (ORR) – Advisory agency for activities and projects proposed to increase resiliency, including strengthening neighborhoods, upgrading buildings, adapting infrastructure and critical services, and strengthening coastal defenses.
- Department of Design and Construction (DDC) – Coordination of plans, designs, and environmental review of the proposed project for client agencies.
- Department of Environmental Protection (DEP) – Review of design and advisory agency for activities and projects related to stormwater management, water and sewer infrastructure, and natural resources.
- Department of Transportation (NYCDOT) – Review of flood protection design and permits related to activities along, adjacent to and within the FDR Drive and Williamsburg Bridge footings, and the local street network.
- Department of City Planning (DCP) – Planning and waterfront area zoning text compliance and decision-making, Coastal Zone Consistency decision-making, and approval of actions subject to Uniform Land Use Review Procedure (ULURP).
- New York City Economic Development Corporation (NYCEDC) – Coordination and approval for activities on EDC-leased property, including Stuyvesant Cove Park and Solar One Environmental Education Center.

- Small Business Services (SBS) – Coordination and approval for activities on SBS-owned property, including Stuyvesant Cove Park and adjacent parking lot; issuance of permits for construction related to improvement or maintenance on Waterfront Properties under SBS jurisdiction.
- New York City Emergency Management (NYCEM) – Coordination for emergency preparedness, response, and operations under storm conditions.
- Public Design Commission (PDC) – Review and approval of art, architecture, and landscape features proposed for City-owned property and capital projects.
- Landmarks Preservation Commission (LPC) – Advisory agency for activities on or near sites of historic or archaeological value.
- Department of Buildings (DOB) – Review of design and permits related to buildings including compliance with the City's Building, Electrical, and Zoning Codes and construction activities in the FEMA-designated flood hazard area.
- Department of Housing Preservation and Development (HPD) – Review and approval for the disposition of the New York City Housing Authority (NYCHA) property (easement).
- Office of the Deputy Mayor for Operations – Advisory agency in CEQR review and for activities and projects proposed to advance long-term plans for sustainable growth.
- New York City Fire Department (FDNY) – Design approval for emergency access.

AUTHORITIES

- NYCHA – Approval for acquisitions and activities on NYCHA property.
- New York Power Authority (NYPA) – Approval for design elements related to NYPA easements.

COMMISSION

- Public Service Commission—Approval of dispositions involving public utility properties (Con Edison).

D. PUBLIC PARTICIPATION

COMMUNITY ENGAGEMENT PLAN (CEP)

Concurrent with agency coordination and consultation, extensive public involvement activities for the proposed project were implemented. The public involvement activities for the proposed project have been guided by the Community Engagement Plan (CEP), which was originally developed during the conceptual design process as a living document that has been amended as the project has moved forward. The CEP will continue to be amended to reflect the ongoing outreach activities as the proposed project moves through the EIS process. The key goal of the plan is to inform interested parties about the proposed project and to seek input on a wide range of issues. Specific objectives of the CEP included:

- Establishing a Project Task Force to guide and provide community input on the project;
- Developing a Project Stakeholder list for use in disseminating project information and meeting invitations;
- Developing a Project Schedule to provide a broad roadmap to the public for the public engagement and EIS processes;

- Executing large public engagement meetings (during the design phase, as described in Chapter 2.0, "Project Alternatives"), and continuing to hold public meetings during the EIS process at appropriate project junctures (e.g., Public Scoping, Draft EIS Hearing)
- Providing local elected officials, agencies, community boards, special interest groups, residents, businesses, and property owners with necessary project information, the opportunity to provide input and feedback on the project's design as it evolves, and an opportunity to become actively involved in the development of the EIS; and
- Developing a project website for the dissemination of project information and updates.

In preparing this DEIS, outreach has continued, focusing on informing interested parties about the proposed project, seeking input on a wide range of issues, and addressing specific NEPA and SEQRA/CEQR public involvement requirements, including:

- Identifying potential environmental issues as part of the EIS process;
- Soliciting community feedback on the scope of alternatives, environmental and community issues to be covered, and the methods for their evaluation;
- Soliciting formal comments on the DEIS, including those from resource agencies; and
- Complying with relevant laws and regulations.

The public involvement methodology was tailored specifically to targeted groups to provide the most useful information to each group and to collect the most valuable feedback from these groups. This methodology involved the following key components:

- A well-advertised public scoping meeting (involving newspaper notices and providing professional interpretation services) to solicit formal public comments on EIS methodology and findings; and
- Ongoing targeted outreach to affected groups and communities—such as local and regional elected officials, community boards, community groups, and special interest groups, such as park users—to discuss specific topics of concern, project elements under consideration, and solicit input and opinions on these matters.

Forums and venues for meetings were selected so that constituents could easily participate in the process, including meetings in the evenings after working hours and at locations within the affected community districts.

PUBLIC PARTICIPATION PROGRAM

As outlined above, a comprehensive public participation program was developed and implemented for the proposed project. This program consisted of several discrete public participation components, all working in tandem to elicit feedback from interested stakeholders, public officials, and the broader community that lives, works, and recreates using the facilities along the proposed project areas. Three primary avenues to engage the public were used in this process: regularly scheduled Joint Waterfront Task Force Meetings (convened by Manhattan Community Boards [CB] 3 and 6); Community Engagement Meetings/Workshops; and a series of targeted thematic stakeholder meetings. Each of these public participation methods is described in more detail below, along with the key results from those activities.

JOINT WATERFRONT TASK FORCE MEETINGS

At the outset of the proposed project, CB3 and CB6, which cover Project Areas One and Two (as described in Chapter 2.0, "Project Alternatives"), respectively, convened a Joint Waterfront Task

Force (Task Force) to interface with the project team and ensure that the Community Boards remained updated on the proposed project's progress. The Task Force membership included the chairs of each CB, as well as other CB members, community residents, and representatives of local community-based organizations. Beginning in January 2015, a series of regularly scheduled meetings and coordination conference calls were held between the proposed project's design team and the Task Force members. Members of the public were also invited to attend these Task Force meetings.

Each of the Task Force meetings involved a presentation that included project updates and progress, as well as a preview of any upcoming Community Engagement Meetings/Workshops, followed by comments and questions from the Task Force members and a question and comment period from members of the public in attendance. These meetings were used to give project information to the Task Force members, as well as to solicit opinions about the topics of discussion to be presented and workshop activities to be conducted at the larger Community Engagement Meetings/Workshops. These meetings also provided for the review and discussion of draft presentation materials for content, clarity, and format, and to share results from previous Community Engagement sessions with the Task Force membership in advance of subsequent Community Engagement Meetings/Workshops. The Task Force was also instrumental in helping to determine the best dates and times for the Community Engagement Meetings/Workshops and to coordinate schedules of the CBs and other entities, to ensure maximum participation. The Task Force also assisted with advertising the Community Engagement Meetings/Workshops by making meeting flyers available at their offices, sending email blasts and/or website posting, and announcing upcoming Community Engagement Meetings/Workshops at general CB meetings.

The Joint Waterfront Task Force continued to meet as the proposed project progressed through mid-2018. CB3 and CB6 disbanded the Joint Waterfront Task Force in late 2018, and reassigned the coordination with the Community Boards as the proposed project continues to move forward to the CB3 Parks, Recreation, Waterfront, and Resiliency Committee, and the CB6 Land Use and Waterfront Committee. Both of these Community Board committee meetings are held monthly, with representatives from the project team able to request time as an agenda item for providing project updates. These meetings are open to the general public, and have agendas that are made available in advance of the meetings. As the proposed project has advanced after the disbanding of the Task Force, the Community Boards have continued to assist with advertising upcoming Community Engagement Meetings, and this is anticipated to continue throughout the duration of the proposed project.

COMMUNITY ENGAGEMENT MEETINGS/WORKSHOPS

Building on the public outreach process established during the Rebuild by Design (RBD) competition, the East Side community was engaged in a series of meetings/workshops (organized by topic and/or location) designed to explain the flood protection options under consideration and provide information about the open space and access improvements associated with the proposed project. Due to its size, Project Area One was subdivided into two areas for the purposes of Community Engagement—Project Area One South (Montgomery Street to East Houston Street) and Project Area One North (East Houston Street to East 13th Street).

The Community Engagement Meetings/Workshops were large, well-advertised (via meeting/workshop flyers, newspaper notices, on-line notices, project website postings, and email blasts) public meetings. Designed to inform and elicit feedback, the meetings and workshops had the following objectives: (1) describe the process being undertaken; (2) report on the progress achieved to date; and (3) elicit community feedback to shape concept design development, in

terms of likes, dislikes, and the community's understanding of the relative importance of coastal flood protection strategies in relation to urban design, usability, public safety, and project cost considerations.

In addition, two partner community based non-profit organizations Good Old Lower East Side (GOLES) in Project Area One North, and University Settlement in Project Area One South) assisted with the outreach for these meetings. They employed flyers, email blasts, telephone trees, as well as word of mouth and other outreach strategies, to advertise the large area-wide Community Engagement Meetings to the public. In consideration of the non-English speaking populations, meeting flyers, newspaper ads, and engagement activity materials were developed in English, Chinese, and Spanish, and foreign language interpreters (Spanish, Mandarin, and Cantonese) were provided at all of the large area-wide Community Engagement Meetings/Workshops (in addition, Fujianese interpreters were provided for meetings covering topics in Project Area One South). Four rounds each of the Community Engagement Meetings/Workshops had a distinct topic focus, as shown in **Tables 3.0-1 and 3.0-2**.

Beginning in October 2018, a new alternative was developed that involves integrating flood protection with the raising and reconstruction of East River Park. To get design input and comments on this alternative, the City has initiated additional outreach beginning in October 2018. The project team provided project status updates to CB3's Parks, Recreation, Waterfront, and Resiliency Committee and the CB6's Land Use and Waterfront Committee, to explain the modifications to the proposed project. In addition, Interactive Community Engagement Meetings were held in December 2018 to provide the public with detailed explanations for the modifications made to the proposed project, and opportunities to provide input on certain new design elements; one meeting was held in Project Area One, and the other was held in Project Area Two. Advertising for these meetings included meeting announcements, email blasts, direct mailings, on-line notices, project website postings, and advertising in local newspapers (in consideration of the non-English speaking populations, meeting announcements, newspaper ads, and engagement activity materials were developed in English, Chinese, Fujianese, and Spanish. Additionally, foreign language interpreters (Spanish, Mandarin, Cantonese, and Fujianese) were provided at both of the December 2018 Interactive Community Engagement Meetings. For these meetings, the Community Boards and local elected officials also assisted with advertising the meetings to their constituents.

Table 3.0-1
Community Engagement and Joint Waterfront Task Force Meetings (in 2015)

2015 Date	Meeting Type*	Primary Meeting Subject	Project Area(s) Covered		
			PA1 North	PA1 South	PA2
January 5	CB3/CB6 Joint Waterfront Task Force	Project Update and Community Engagement Preview	X	X	X
March 19	Community Engagement	How do you use the waterfront?	X	X	X
March 23	Community Engagement	How do you use the waterfront?	X	X	X
April 7	CB3/CB6 Joint Waterfront Task Force	Project Update and Community Engagement Meeting Results and Preview of Next Community Engagement Meetings	X	X	X
May 19	Community Engagement	What are the flood protection, urban design, and upland connection options for Project Area Two?			X
May 20	Community Engagement	What are the flood protection, urban design, and upland connection options for Project Area One?		X	
May 28	Community Engagement	What are the flood protection, urban design, and upland connection options for Project Area One?	X		
July 9	CB3/CB6 Joint Waterfront Task Force	Project Update and Community Engagement Meeting Results and Preview of Next Community Engagement Meetings	X	X	X
July 28	Community Engagement	How do we combine the options to make alternatives for Project Area Two?			X
July 29	Community Engagement	How do we combine the options to make alternatives for Project Area One?		X	
July 30	Community Engagement	How do we combine the options to make alternatives for Project Area One?	X		
September 10	Community Engagement	How do we combine the options to make alternatives for Project Area One?		X	
September 30	CB3/CB6 Joint Waterfront Task Force	Project Update and Community Engagement Meeting Results and Preview of Next Community Engagement Meetings	X	X	X
October 6	Community Engagement	Overall Initial Design Direction: Input and Feedback	X		
October 8	Community Engagement	Overall Initial Design Direction: Input and Feedback			X

Notes:
PA1 = Project Area One; PA2 = Project Area Two. All meetings lasted approximately 2.5 hours.
Project Area One South (Montgomery Street to East Houston Street) and Project Area One North (East Houston Street to East 14th Street).
* All Task Force and Community Engagement Meetings were scheduled to avoid regular Community Board meeting dates, school, and legal holidays.

Table 3.0-2

Community Engagement and Joint Waterfront Task Force Meetings (in 2016 through 2019)

2016 through 2018 Dates	Meeting Type*	Primary Meeting Subject	Project Area(s) Covered		
			PA1 North	PA1 South	PA2
May 23, 2016	CB3/CB6 Joint Waterfront Task Force	Review project goals and Preliminary Preferred Alternative	X	X	X
September 20, 2016	CB3/CB6 Joint Waterfront Task Force	Update on project status	X	X	X
November 14, 2016	Asser Levy and Murphy Brothers Playgrounds Community Meeting	Project overview and review site considerations and design options for Murphy Brothers Playground and Asser Levy Recreation Center + Playground			X
November 28, 2016	Project Area Two Community Outreach	Design considerations and approach for Project Area Two			X
December 1, 2016	Project Area One South Community Engagement	Design considerations and approach for Project Area One – South		X	
December 7, 2016	Project Area One North Community Outreach	Design considerations and approach for Project Area One – North	X		
January 31, 2017	CB3/CB6 Joint Waterfront Task Force	Update on project status	X	X	X
February 16, 2017	Asser Levy and Murphy Brothers Playgrounds Community Meeting	Review site considerations and design options for Murphy Brothers Playground and Asser Levy Recreation Center + Playground			X
June 20, 2017	CB3/CB6 Joint Waterfront Task Force	Project updates including Stakeholder Meetings, Substantial Action Plan Amendment, interior drainage analysis, 24th/25th Street alignment, and field work	X	X	X
November 9, 2017	CB3/CB6 Joint Waterfront Task Force	Update on project status	X	X	X
March 15, 2018	CB3 Parks, Recreation, Waterfront, and Resiliency Committee	Overall Project Design update	X	X	X
March 26, 2018	CB6 Land Use and Waterfront Committee	Overall Project Design update	X	X	X
March 27, 2018	CB3/CB6 Joint Waterfront Task Force	Overall Project Design update	X	X	X
April 11, 2018	CB6 Full Board Meeting	Overall Project Design update	X	X	X
October 11, 2018	CB3 Parks, Recreation, Waterfront, and Resiliency Committee	Project Design Update (Raised East River Park)	X	X	X
November 8, 2018	CB6 Land Use and Waterfront Committee	Project Design Update (Raised East River Park)	X	X	X
December 10, 2018	Interactive Community Engagement Meeting	Project Status and Design Update (Raised East River Park)	X	X	X
December 11, 2018	Interactive Community Engagement Meeting	Project Status and Design Update (Raised East River Park)	X	X	X
January 10, 2019	CB3 Parks, Recreation, Waterfront and Resiliency Committee	Project Design Update (Raised East River Park and related design changes)	X	X	X
January 17, 2019	LESReady!	Project Design Update (Raised East River Park and related design changes)	X	X	X
January 23, 2019	New York City Council, Jointly held Public Hearing of the Parks and Recreation Committee and the Committee on Environmental Protection	Project Design Update (Raised East River Park and related design changes)	X	X	X

Table 3.0-2 (cont'd)
Community Engagement and Joint Waterfront Task Force Meetings (in 2016 through 2019)

2016 through 2018 Dates	Meeting Type*	Primary Meeting Subject	Project Area(s) Covered		
			PA1 North	PA1 South	PA2
January 28, 2019	CB6 Land Use and Waterfront Committee	Project Design Update (Raised East River Park and related design changes; gate houses)	X	X	X
February 4, 2019	NYCHA Tenant Associations Leadership	Project Design Update (Raised East River Park and related design changes)	X	X	
February 14, 2019	CB3 Parks, Recreation, Waterfront, and Resiliency Committee	Project Design Update (Raised East River Park and related design changes; gate houses, drainage improvements)	X	X	
February 19, 2019	Lower East Side Power Partnership	Project Design Update (Raised East River Park and related design changes, drainage improvements)	X	X	
February 28, 2019	NYCHA, Jacob Riis Houses Residents	Project Design Update (Raised East River Park and related design changes)	X	X	
March 6, 2019	Amphitheater Working Group	Project design update and discussion related to reconstruction of amphitheater	X		
March 12, 2019	NYHCA, LES II/Bracetti Plaza and LES V Residents	Project Design Update (Raised East River Park and related design changes)	X	X	
March 13, 2019	East River Alliance	Project Design Update (Raised East River Park and related design changes), and responding to specific design and construction questions raised	X	X	X
March 14, 2019	CB3 Parks, Recreation, Waterfront, and Resiliency Committee	Project Design Update (Raised East River Park and related design changes; gate houses, drainage improvements)	X	X	
March 25, 2019	CB6 Land Use and Waterfront Committee	Project Design Update (Project Schedule, Pinch Point Bridge, Project Area 2 [14th to 25th Street] Park designs; location of 20th Street flood gate and gate houses, drainage issues)		X	X
March 26, 2019	Stuyvesant Town-Peter Cooper Village Tenants Association/Tenants	Project Design Update (Project Schedule, Pinch Point Bridge, Project Area 2 [14th to 25th Street] Park designs; location of 20th Street flood gate and gate houses, drainage issues)		X	X
March 28, 2019	NYCHA, Bernard M. Baruch Houses Residents	Project Design Update (Raised East River Park and related design changes)	X	X	

Notes:
PA1 = Project Area One; PA2 = Project Area Two. All meetings lasted approximately 2.5 hours.
Project Area One South (Montgomery Street to East Houston Street) and Project Area One North (East Houston Street to East 14th Street).
* All Task Force and Community Engagement Meetings were scheduled to avoid regular Community Board meeting dates, school and legal holidays.

TARGETED STAKEHOLDER MEETINGS

In addition to the Community Engagement Meetings/Workshops and the Joint Waterfront Task Force meetings, the project team worked with local community-based organizations, the leadership and committee members (Land Use and Parks committees) of CB3 and CB6, and various stakeholders to glean detailed information about the East Side community's concerns with respect to flood protection and open space and access improvements. Over the course of 2015 to 2019, a series of stakeholder meetings were held, which were targeted to specific groups or topics, including:

- Area Residents/Resident Groups;
- Community Groups and Community Based Organizations;

- CB3 Parks, Recreation, Waterfront, and Resiliency Committee (Parks Committee), Full Board and leadership/CB6 Land Use and Waterfront Committee (Land Use Committee), Full Board and leadership—concerning various parks, alignment, accessibility and design issues;
- Open Space and Recreation;
- Transportation;
- Ecology;
- Neighbors of the Montgomery Street Tie-Back (Gouverneur Gardens Housing Corporation Co-operative);
- NYCHA Issues and Coordination;
- Boating and Waterside Issues;
- Property Owners and Developers;
- Hazardous Material Concerns; and
- Utilities Coordination.

COMMUNICATION MEDIA

The proposed project's CEP encompasses a variety of communication vehicles such as the following:

- **Flyers** – Project flyers announcing large public meetings (such as the Public Scoping Meeting and forthcoming DEIS public hearing) were developed in English, Spanish, and Chinese, and served as an informational tool about key meetings. Newsletters were generally single-sided color printed pieces, and were bilingual (English/Spanish and English/Chinese) for distribution at local community based organization meetings, at Community Board meetings, and for posting in the affected neighborhoods, to advertise upcoming events. These materials were also available in electronic format as part of email blasts, and on the project website.
- **E-Communications** – E-communications consisted of various electronic means of communication including email blasts sent to Project Stakeholders (members of the Task Force, Community Boards, elected officials, interested local groups and organizations, and stakeholders identified during the design process). The email blasts were sent in advance of all Community Engagement meetings, including the Public Scoping Meeting.
- **Website** – The project's websites, http://www.nyc.gov/escr (developed during the design process) and http://www.nyc.gov/cdbg (which focuses on the City's approved CDBG-DR Action Plan and associated approved amendments, which provide information about the EIS process for the ESCR Project), contain project information, published documents, public meeting notes, and contact information. NYC Parks, as Lead Agency, also houses environmental review documentation on its website. These websites also serve to keep the public notified about upcoming public meetings and function as the main resources for public information about the project, as well as the primary means for the public to contact the City's project team.
- **Meetings** – Informational meetings were held during the design process (as described in detail in Chapter 2.0, "Project Alternatives"), to facilitate a better understanding of the proposed project and to encourage feedback. Meetings were advertised with local media outlets and/or publicized via flyers, email blasts, and mailings.

PUBLIC SCOPING

Following the release of the Draft Public Scoping Document on October 30, 2015 (see **Appendix A2**), a public scoping meeting was announced and held at 7 PM on December 3, 2015 at the Bard High School Early College, 525 East Houston Street, New York, NY.

Advertisements for the public scoping meeting were placed in local publications on November 6, 2015 (as listed in **Table 3.0-3**), in conformance with the OMB/HUD CDBG-DR requirements.

In addition, the following activities were undertaken to advertise the public scoping meeting:

- Nearly 1,700 flyers were posted or distributed during the week of November 16 through November 20, 2015. These flyers were distributed and posted by the ESCR consultant team, with assistance from interested local resident volunteers and Task Force members (including residents of East River Houses, Stuyvesant Town-Peter Cooper Village, and Gouverneur Gardens). In addition, Community Board 3 and Community Board 6 received flyers that were then distributed at their meetings.
- On November 18, 2015, a mailing, including the scoping meeting announcement flyers, was sent to more than 150 individuals and organizations on the project stakeholder list that did not provide email addresses as part of their contact information.
- ORR sent email blasts to all stakeholders and meeting attendees on November 10, 2015, and November 30, 2015. In addition, community boards and other stakeholders forwarded email notifications to their listservs to inform a wider audience about the meetings.

The purpose of the scoping meeting was to discuss the Draft Scoping Document and DEIS methodology and to accept comments from the public. Attendees viewed a short presentation by representatives from NYC Parks, the project design team, and the EIS consultants, on the project's purpose and need, potential project alternatives, the EIS process, and the project schedule. Attendees were then given an opportunity to view presentation materials and boards, ask questions of the project team, and to provide formal oral or written comments to be entered into the project record.

Table 3.0-3
Public Scoping Meetings Ads

Target Area	Publication Name / Type
New York, general	New York Daily News / Newspaper
	New York Post / Newspaper
	Newsday / Newspaper
Staten Island, NY	Staten Island Advance / Newspaper
Queens, NY	Rockaway Wave / Newspaper
New York, general (Chinese community)	Sing Tao / Newspaper
New York, general (Spanish-speaking community)	El Diario / Newspaper
New York, general (Russian-speaking community)	Russkaya Reklama / Newspaper

The CDBG-DR funding process requires publication of notices related to the Action Plan, environmental reviews, and notification of program application periods. The public participation activities undertaken for this project have been coordinated to ensure consistency with the CDBG-DR Citizen Participation Plan and public notification requirements and guidelines.

Following a 52-day public comment period (October 30, 2015 through December 21, 2015), all oral and written comments received were compiled into a Response to Scoping Comments Summary (see **Appendix A2**), included as part of the Final Public Scoping Document, and was made available on the project website. Approximately 100 comments were received throughout the scoping process.

ACTION PLAN AMENDMENT

Upon receiving CDBG-DR funding from HUD in the wake of Hurricane Sandy, the City prepared an Action Plan, which detailed the City's plans to allocate these grant funds. Any change greater than $1 million in funding committed to a certain program, the addition or deletion of any program, or change in eligibility criteria or designated beneficiaries of a program constitutes a substantial amendment to an Action Plan, and such amendment will be available for review by the public and approval by HUD.

On March 24, 2017, the City published Draft Substantial Action Plan Amendment 13, which described changes and updates to the proposed project since the initial HUD award in 2014. The Substantial Action Plan Amendment was published in English, Spanish, Chinese, and Russian. The public comment period on the Draft Substantial Action Plan Amendment was open until April 24, 2017. As part of the public comment period, a public hearing was held on April 4, 2017 at the Manny Cantor Center to receive oral and written comments. At the end of the comment period, responses to comments were incorporated into the City's Responses to Public Comments document. Action Plan Amendment 13 was approved by HUD on July 14, 2017.

Based on recent changes to the proposed project reflected in the Preferred Alternative, and pursuant to "*Additional Clarifying Guidance, Waivers, and Alternative Requirements for Grantees in Receipt of Community Development Block Grant (CDBG) Disaster Recovery Grant Funds Under the Disaster Relief Appropriations Act, 2013 (publication date – August 15, 2016),*" New York City will prepare and submit a subsequent Substantial Action Plan Amendment to the previously approved Action Plan Amendment 13. A separate public hearing would be held to receive further comments on the updated subsequent action plan, which would then be submitted to HUD for final approval.

E. PUBLIC REVIEW AND COMMENT ON THE DEIS

In accordance with the requirements of NEPA, SEQRA, and CEQR, this DEIS was made available for public review and comment on April 5, 2019.

To solicit public comments on the proposed project, a public meeting has been scheduled for July 31, 2019 at 10:00 AM, at the following location:

120 Broadway, Concourse Level
New York, NY 10271

A copy of the DEIS is available online at: http://www.nyc.gov/cdbgdr, https://www.nycgovparks.org/planning-and-building/planning/neighborhood-development/east-side-coastal-resiliency, and nyc.gov/escr or by contacting:

Calvin Johnson, Assistant Director CDBG-DR
New York City Office of Management and Budget
255 Greenwich Street, 8th Floor
New York, New York 10007

Telephone: 212-788-6282
Fax: 212-788-6222
Email: CDBGDR-Enviro@omb.nyc.gov

or

Colleen Alderson, Chief of Parklands and Real Estate
New York City Department of Parks and Recreation
The Arsenal, Central Park
830 Fifth Avenue, Room 401
New York, New York 10065
Telephone: 212-360-3403
Fax: 212-360-3453
Email: escr@parks.nyc.gov

Written comments on this DEIS can also be sent to either of the above mailing addresses, fax numbers, or email addresses through August 15, 2019. OMB and NYC Parks will review and consider these submitted comments before issuing an FEIS. The FEIS will include responses to the comments received during the public review and comment period and will include any revisions necessary to address those comments. ✷

Chapter 4.0: Analysis Framework

A. INTRODUCTION

The impact of Hurricane Sandy highlighted the need for the City of New York (the City) to increase its efforts to protect vulnerable populations and critical infrastructure in light of increased storm frequency and intensity and sea level rise. To address this vulnerability and reduce risks associated with flooding and sea level rise, the City has proposed the East Side Coastal Resiliency (ESCR) Project (the proposed project) which would install a flood protection system along a portion of the east side of Manhattan. To implement the proposed project, the City has entered into a grant agreement with the U.S. Department of Housing and Urban Development (HUD) to disburse Community Development Block Grant-Disaster Recovery (CDBG-DR) Funds for the design and construction of the proposed project. The City is the grantee of the CDBG-DR funds for Hurricane Sandy, which would be provided to the City through its New York City Office of Management and Budget (OMB) acting under HUD's authority. The City also allocated additional funding towards the proposed project.

This Environmental Impact Statement (EIS) has been prepared pursuant to the National Environmental Policy Act (NEPA). Consistent with the regulations implementing NEPA, its purpose is to evaluate the short- and long-term adverse effects, both beneficial and adverse, to the built and natural environment that would result both from the construction and operation of the proposed project. Because the proposed project requires both state and local approvals, the EIS also complies with the State Environmental Quality Review Act (SEQRA) and City Environmental Quality Review (CEQR) set forth in Executive Order 91 of 1977 and subsequent amendments. As the lead agency managing the disbursement of federal funds, OMB is also the City's lead agency with respect to NEPA and pursuant to 24 CFR Part 58 (Environmental Review Procedures for Entities assuming HUD Environmental Responsibilities). Because the proposed project would require considerable construction in City parkland, the New York City Department of Parks and Recreation (NYC Parks) is the City's lead agency for addressing the SEQRA and CEQR review requirements. OMB and NYC Parks, with the cooperation of involved and interested agencies at City, State, and federal levels, have therefore prepared this EIS in accordance with the statutory obligations of NEPA, SEQRA, and CEQR.

The EIS examines the City's proposal to install a flood protection system that would be primarily constructed on City property. The proposed system is a combination of floodwalls, levees, and closure structures coupled with infrastructure improvements and park enhancements that, together, would reduce the adverse effects of a design storm event on the community it would protect. The principal objectives of the Proposed Project are as follows: (1) provide a reliable coastal flood protection system against the design storm event for the protected area; (2) improve access to, and enhance open space resources along the waterfront, including John V. Lindsay East River Park (East River Park) and Stuyvesant Cove Park; (3) respond quickly to the urgent need for flood protection and resiliency, particularly for communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and (4) achieve implementation milestones and comply with the conditions attached to funding allocations as

established by HUD, including scheduling milestones. Additionally, design considerations for the proposed project include: (1) reliability of the proposed coastal flood protection system; (2) urban design compatibility and enhancements; (3) improving the ecology of East River Park; (4) minimizing environmental effects, including construction-related effects, and disruptions to public right of way; (5) constructability; (6) operational needs; (7) minimizing use of pre-storm event deployable structures; (8) the Federal Emergency Management Agency (FEMA) accreditation; (9) scheduling that meets HUD milestones; and (10) cost effectiveness.

This chapter outlines the specific analysis framework used to complete this EIS. It describes the reasoning behind the chosen analysis year(s) and study area(s), and outlines the methodology used to establish baseline conditions from which the environmental effects are analyzed.

B. ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This EIS considers both the short-term (construction) and long-term (operational and, where relevant, maintenance) effects of each alternative under consideration for implementation of the proposed project. These alternatives have been evaluated for potential adverse effects to the project site and applicable study areas during storm and non-storm operational conditions for all relevant potential environmental effect categories in accordance with the *CEQR Technical Manual* as well as the applicable state and federal guidelines. The proposed project is subject to categories of environmental effects pursuant to 24 CFR Part 58.5 – Related Federal laws and authorities and 24 CFR Part 58.6 – Other Requirements; however, the Farmland Protection Act, Sole Source Aquifers, Coastal Barriers Resources Act, and Runway Protection/Clear Zone are not considered to be areas of concern for the proposed project.

STORM AND NON-STORM CONDITIONS

Components of the proposed project have the potential to result in different effects under the two future operational conditions for certain technical areas: storm and non-storm, and so the proposed project is evaluated in this EIS under both operational conditions where appropriate. Storm conditions are defined as flood events that meet the criteria of the design storm event (the 100-year flood events with sea level rise to 2050s) for when the protection system would be fully deployed and engaged. This design storm event reflects FEMA 100-year storm tide, which is 10.9 feet NAVD88, and is associated with the coastal analysis used to develop the Preliminary Flood Insurance Rate Maps (PFIRMs) for New York City that were released on January 30, 2015.[1] Although the PFIRMs are still preliminary, the storm tide elevations are higher than the storm tides associated with FEMA's 2007 Effective Flood Insurance Rate Maps (FIRMs). The City's Local Law 96 currently requires the use of the higher of the two storm tides (City of New York Law Department 2013) in the design of coastal protection features. This design storm event also includes an additional 30 inches of increased surface water elevation to address sea level rise projections through the 2050s.

For the purposes of this flood protection system design, non-storm conditions are defined as typical day-to-day conditions without the occurrence of a design storm event. These non-storm

[1] In FEMA terminology the storm tide is referred to as the stillwater elevation and the 100-year event is referred to as the 1 percent-annual-chance event.

conditions include typical dry weather days as well as typical rainfall and high tide event days without storm surges coupled with a high tide above the 100-year storm.

CATEGORIES OF ENVIRONMENTAL EFFECTS

As appropriate, in accordance with the *CEQR Technical Manual*, the following categories have been determined to warrant analysis for adverse effects during non-storm and/or storm operational conditions: land use, zoning, and public policy; socioeconomic conditions; open space; historic and cultural resources; urban design and visual character; natural resources; hazardous materials; water and sewer infrastructure; transportation; neighborhood character; and environmental justice.

Based on the guidance of the 2014 *CEQR Technical Manual*, the following impact categories do not warrant further analysis for effects during typical operational conditions: community facilities and services; shadows; noise; air quality; energy; greenhouse gases; and solid waste and sanitation services; and public health. Screening analyses were undertaken to determine that these impact categories would not result in long-term operational effects (see **Appendix B**). Specifically, based on current information, during non-storm operational conditions the alternatives would not alter, displace, or overcrowd community facilities and services such as schools, libraries, child care facilities, healthcare facilities, or fire and police protection; result in new structures or additions to existing structures greater than 50 feet, or be located adjacent to, or across from, a sunlight-sensitive resource; generate any mobile or stationary sources of noise; increase or redistribute traffic, create any other mobile sources of pollutants, add new users near mobile sources, create new stationary sources of pollutants; significantly affect the transmission or generation of energy; involve power generation (not including emergency backup power) or result in development of 350,000 square feet or greater; or result in the generation of 50 tons per week or more of solid waste. .

Furthermore, this EIS evaluates the potential for construction effects under the proposed project in the following technical areas: socioeconomic conditions; open space; historic and cultural resources; urban design and visual character; natural resources; hazardous materials; water and sewer infrastructure; energy; transportation; air quality; greenhouse gas; noise; and public health.

Each category discusses the existing conditions (affected environment) and conditions in the future for each evaluated alternative. The technical analysis identification of potential significant adverse effects is focused on the incremental changes to the affected environment that would occur under the alternatives that are being considered as compared with the No Action Alternative. The No Action Alternative includes a discussion of projects expected to be completed independent of the proposed project in addition to the baseline growth within the affected environment for each applicable category.

C. PROPOSED PROJECT AREA (PROTECTED AREA)

The proposed project area begins to the south at Montgomery Street and extends north along the waterfront to East 25th Street and is composed of two sub-areas: Project Area One and Project Area Two. Project Area One extends from Montgomery Street on the south to the north end of East River Park at about East 13th Street. Project Area One consists primarily of the Franklin Delano Roosevelt East River Drive (the FDR Drive) right-of-way, a portion of Pier 42 and Corlears Hook Park as well as East River Park. The majority of Project Area One is within East River Park. Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Consolidated Edison Company of New York (Con Edison) East 13th Street Substation and the

East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreational Center and Playground, and in-street segments along East 20th Street, East 25th Street, the Veteran Affairs (VA) Medical Center, and along and under the FDR Drive.

The area that would be protected under the proposed project (the protected area) includes lands within the FEMA 100-year special flood hazard area (SFHA). In addition, the protected area also takes into consideration the 90th percentile projection of sea level rise to the 2050s. The protected area is a broader geographic area that is intended to cover the area of consideration for studies of project elements with a broader geographic effect and is generally bounded by East 25th Street to the north, Pitt Street, Ridge Street, Avenue A, First Avenue, and Second Avenue to the west, Montgomery Street to the south, and the U.S. Piershead line in the East River to the east and includes portions of the Lower East Side and East Village neighborhoods, Stuyvesant Town, and Peter Cooper Village, as well as East River Park and Stuyvesant Cove Park inland of the flood alignment (see Figure 1.0-2).

D. ANALYSIS YEAR

The environmental setting for the technical analyses for the proposed project is not the current conditions, but is the conditions as they would exist at the completion of its construction. Therefore, future conditions in the absence of the proposed project are projected to compare potential project effects. This projection is made for a particular year, generally referred to under NEPA/SEQRA/CEQR as the "analysis year," which is the year when the proposed project would be substantially operational. For this analysis, it is expected that construction of the proposed project would take approximately 5 years (see Chapter 2.0, "Project Alternatives," for further details) with construction commencing in spring of 2020 and completed in 2025. However, for the Preferred Alternative (Alternative 4), it is anticipated that construction would also commence in the spring of 2020 but with a construction duration of approximately 3.5 years, resulting in a 2023 build year. This shorter construction duration of the Preferred Alternative is primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive. This substantially reduces the construction and logistical complexities associated with working in or in close proximity to the FDR Drive and the sensitive Con Edison transmission lines. Chapter 2.0, "Project Alternatives," provides further details regarding the alternatives analyzed in the EIS.

E. STUDY AREAS

Study areas relevant to each analysis category are defined by the geographic areas with the potential to be affected by the proposed project for each impact category and as informed by *CEQR Technical Manual* guidance. Study areas therefore differ depending on the category.

F. METHODOLOGIES FOR TECHNICAL ANALYSES

The analyses contained in this EIS have been developed in conformance with NEPA, SEQRA, and CEQR regulations and guidelines. The methodologies utilized for each analysis are presented in each technical area's respective chapter.

AFFECTED ENVIRONMENT

For each technical area to be assessed in the EIS, the existing conditions in the project area will be described. The analysis framework begins with an assessment of existing conditions, which

serves as a starting point for the projection of future conditions both with and without the proposed project and the analysis of adverse effects.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area by the 2025 analysis year presented in this EIS. The No Action Alternative establishes the context to assess and compare the effects among the project alternatives where relevant. In the absence of this system, the existing neighborhoods within the protected area would remain at risk to coastal flooding during design storm events.

WITH ACTION ALTERNATIVES (ALTERNATIVES 2 THROUGH 5)

The EIS will evaluate the potential adverse effects of the proposed project for the 2025 analysis year based on the proposed designs for each of the With Action Alternatives. In addition, for analysis purposes, a reasonable worst-case conceptual construction phasing and schedule was developed to illustrate how the construction of the proposed project could occur over a 3.5-year to 5-year period, depending on the project alternative. ✷

Chapter 5.1: Land Use, Zoning, and Public Policy

A. INTRODUCTION

This chapter describes existing land use, zoning, and public policies applicable to the proposed project and evaluates potential significant adverse effects that may result from implementation of the proposed flood protection system. Potential significant adverse effects to land use as a result of implementing the flood protection system are also evaluated. Potential land use issues include known or likely changes in current land uses within the study area, as well as the proposed project's potential effect on existing and future land use patterns. Potential zoning and public policy issues include the compatibility of the proposed project with existing zoning and consistency with existing applicable public policies.

PROJECT AREA ONE

Project Area One extends from Montgomery Street on the south to the north end of John V. Lindsay East River Park (East River Park) at about East 13th Street. Project Area One consists primarily of the Franklin Delano Roosevelt East River Drive (the FDR Drive) right-of-way, a portion of Pier 42 and Corlears Hook Park as well as East River Park. The majority of Project Area One is within East River Park and includes four existing pedestrian bridges across the FDR Drive to East River Park (Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges) and the East Houston Street overpass. Project Area One is located within Manhattan Community District 3, and borders portions of the Lower East Side and East Village neighborhoods.

PROJECT AREA TWO

Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Consolidated Edison Company of New York (Con Edison) East 13th Street Substation and the East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreational Center and Playground, the VA Medical Center, and in-street segments along East 20th Street, East 25th Street, and along and under the FDR Drive. Project Area Two is in Manhattan Community Districts 3 and 6, and borders portions of the East Village, Stuyvesant Town, Peter Cooper Village, and Kips Bay neighborhoods.

LAND USE, ZONING, AND PUBLIC POLICY STUDY AREA

The land use, zoning, and public policy study area (the "study area") encompasses the area of direct effect in Project Areas One and Two as well as the census tracts within the larger area associated with the inland extent of the Special Flood Hazard Area (i.e., the "protected area"). These census tracts include 2.02, 10.01, 10.02, 12, 20, 22.01, 22.02, 24, 26.01, 26.02, 28, 32, 34, 44, 60, 62, and 64.

In total, the study area covers approximately 739 acres and is located along approximately 3.06 miles of the southeastern Manhattan waterfront between Montgomery Street and East 34th Street

with areas extending inland (see **Figure 5.1-1**). South of East Houston Street, the study area extends inland along East Broadway Street, Ridge Street, and Clinton Street; north of East Houston Street, the study area extends further inland to Avenue B, First Avenue, and Third Avenue. The study area includes portions of Manhattan Community Districts 3 and 6, and the neighborhoods of the Lower East Side, East Village, Alphabet City, Stuyvesant Town, Peter Cooper Village, Stuyvesant Square, Gramercy Park, and Kips Bay. Neighborhoods in Manhattan are in a continuous state of growth and change, and boundaries of these neighborhoods are not clearly defined. However, a general discussion of the land uses within the neighborhoods is provided below based on historic and common delineations, reviews of community plans, spatial data, and the major traffic thoroughfares that help to define the edges of the neighborhoods.

B. PRINCIPAL CONCLUSIONS

Principal conclusions for each of the alternatives evaluated are summarized below. Additional details on these alternatives are provided in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is not anticipated to result in significant adverse effects to any existing or planned land use, zoning, or public policies within the study area. Projects proposed within the study area would continue as planned (see **Appendix A1**). However, the No Action Alternative would not meet the proposed project goal of providing comprehensive coastal flood protection for the protected area. During a coastal storm event similar to the design storm, the protected area could experience effects similar to Hurricane Sandy. Targeted resiliency measures may reduce the effects of storms in certain locations but would not provide protection for the larger protected area.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

This alternative would not result in significant adverse effects to any existing or planned land use, zoning, or public policies within the study area. Land use actions resulting from the Preferred Alternative include acquisition of real property, amendments to the City Map for changes related to existing and proposed pedestrian bridges, and a zoning text amendment; however, these actions would not result in any adverse effects on land uses and would be consistent with zoning and public policies, including the City's Waterfront Revitalization Program (WRP). Since the Preferred Alternative provides resiliency and protection for East River Park against design storm events and periodic inundation from projected sea level rise coupled with the enhanced public access, this alternative would ensure that East River Park provides improved public access, operations, and functionality, during pre- and post-storm periods compared to the No Action Alternative.

3/15/2019

Source: Source: U.S. Census Bureau TIGER/Line Shapefiles (2017)

Project Area One

Project Area Two

100-year Flood Hazard Area with 90th Percentile 2050s Sea Level Rise

Census Tracts

Land Use, Zoning & Public Policy Study Area

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Land Use, Zoning, and Public Policy Study Area
Figure 5.1-1

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would similarly be consistent with existing and planned land use and zoning, although Alternative 2 would require fewer land use actions than the Preferred Alternative (i.e., City Map change would not be required for Alternative 2). The alternatives would vary in the degree to which they advanced public policies pertaining to improving open spaces and access to open spaces as well as the incorporation of resiliency features, with the Preferred Alternative being the superior alternative for creating a resilient park.

C. REGULATORY CONTEXT

The proposed project is in the Borough of Manhattan in New York City. Land use and zoning within the study area is governed by the City of New York through the New York City Zoning Resolution. Land use refers to the activity that occurs on land and within the structures that occupy it. Uses may include residential, community facility, retail and service, office, industrial, heavy automotive, vacant land, parks, public facilities, institutions, and utilities. New York City's Zoning Resolution controls the use, density, and bulk of development within the City. The Zoning Resolution is divided in two parts: zoning text and zoning maps. The zoning text establishes zoning districts and sets forth the regulations governing land use and development and zoning maps show the locations of the zoning districts.

The proposed project is subject to Federal, State, City, and other local plans and policies. Per the 2014 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, public policies are officially adopted and promulgated and prescribe intended uses or activities applicable to an area or particular site(s) in the City. The consistency of the proposed project with such plans and policies is examined below in Section F, "Environmental Effects."

FEDERAL

Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands

The proposed flood protection system is located within the 100-year Federal Emergency Management Agency (FEMA) Special Flood Hazard Area (SFHA) (see **Figure 5.1-2**) and would involve both temporary and permanent adverse effects to tidal wetlands. As such, the proposed project is subject to regulations under Code of Federal Regulations Title 24, §55, Floodplain Management and Protection of Wetlands, which implements Executive Orders 11988 and 11990. This analysis would discuss why the proposed project must be situated within the floodplain and wetlands and provide the full range of effects associated with the proposed project. Further, the analysis requires a discussion of any reasonable alternative to locating the proposed project in a floodplain and wetlands. Compliance with these Executive Orders is demonstrated through the application of the Eight Step Decision Making Process (see **Appendix L**).

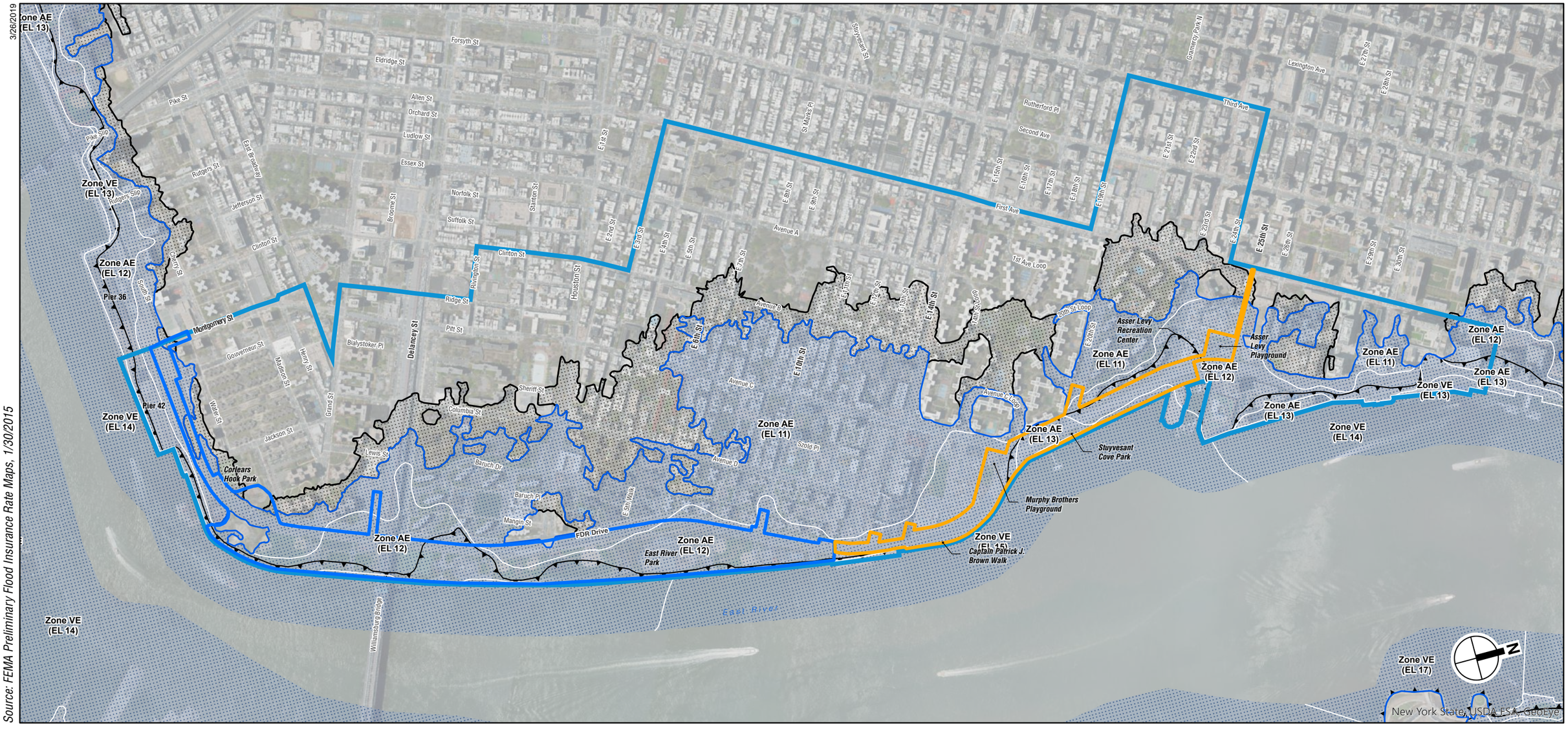
NEW YORK STATE

Coastal Zone Management Act

After enactment of the federal Coastal Zone Management Act (CZMA), the New York State Department of State (NYSDOS) developed a Coastal Management Plan (CMP) and enacted implementing legislation (Waterfront Revitalization and Coastal Resources Act) in 1981, with the

3/26/2019

Source: FEMA Preliminary Flood Insurance Rate Maps, 1/30/2015



Project Area One

Project Area Two

Land Use, Zoning & Public Policy Study Area

100-Year Flood Hazard Area (1% Annual Chance)

500-Year Flood Hazard Area (0.2% Annual Chance)

Boundary dividing Flood Hazard Area Zones and areas of different Base Flood Elevations

Limit of Moderate Wave Action (Coastal A Zone)

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Land Use, Zoning and Public Policy Study Area
and FEMA Preliminary Flood Hazard Areas (2015)

Figure 5.1-2

purpose of achieving a balance between economic development and preservation, thus promoting waterfront revitalization and water-dependent uses and protecting open space, scenic areas, and public access to the shoreline, fish, wildlife, and farmland. The program also aims to minimize significant adverse effects to ecological systems, erosion, and flood hazards. The proposed project would be located within the Coastal Zone as designated by New York State and New York City, and would therefore be subject to City and State coastal management policies.

NEW YORK CITY

Manhattan Waterfront Greenway

The Manhattan Waterfront Greenway is a plan prepared by the New York City Economic Development Corporation (NYCEDC), NYCDOT, and NYC Parks. The objective of the plan is to provide a connected greenway along the waterfront perimeter of the entirety of Manhattan. Benefits of the project include providing improved access to the shore line, integrating larger parks within a connected network, and providing a bike path for recreation and commuting. Five gaps and two areas needing upgrades have been identified and are required to complete the intended 32.5-mile loop. One of these improvements falls within the project area between East 13th and East 15th Streets, where the shared-use path narrows substantially and impedes access.

East River Blueway Plan

The East River Blueway Plan is a community-based waterfront study funded by the NYSDOS Division of Coastal Resources, commissioned by Manhattan Borough President's Office, in collaboration with Manhattan Community Board 3, Manhattan Community Board 6, and the Lower East Side Ecology Center. The East River Blueway Plan established an extensive public outreach program for coastal protection and resiliency approach that incorporated a number of sustainable principles for the East River waterfront, from the Brooklyn Bridge to East 38th Street. The East River Blueway Plan was released in March 2013. The proposed project advances the two primary goals of the plan by creating a more resilient, sustainable waterfront and providing more recreational access to the waterfront.

The Blueway Plan divides the East River waterfront into three sections for the purposes of plan analysis: South Street Waterfront Area, East River Park Waterfront Area, and Stuyvesant Cove/Waterside Plaza Waterfront Area. The study seeks to provide a vision for the East River Waterfront and includes recommendations for new and enhanced public access along the East River including a new public beach and kayak launch beneath the Brooklyn Bridge; the creation of boat launches at Stuyvesant Cove at the ends of East 20th and 23rd Streets; the installation of marshlands and sea walls in especially vulnerable flood zones, and the planting of trees and greenery along the FDR Drive to provide shade and absorb storm water runoff. Plan recommendations also include improved pedestrian connections to the waterfront, creating green corridors along streets that lead to the river, traffic calming at the East Houston Street overpass to increase pedestrian safety, capturing storm water at the ballfields in East River Park, elevating the East River Greenway to create a flood barrier, and creating a Blueway Crossing at 14th Street that would improve bike and pedestrian traffic flow while adding flood protection.

The East River Blueway Plan includes the following concepts and recommendations for the East River Park Waterfront Area:

- Connecting Two Parks—Corlears Hook Park and East River Park;
- Connect the East River to the growing neighborhood at Delancey Street;
- Reduce pedestrian-car conflicts with traffic calming on the East Houston Street Overpass;

- Provide new vantage points and functionality for the East 6th Street Bridge;
- Enhance and extend East 10th Street Bridge to the water;
- Capture stormwater in recreation field detention basins;
- Develop "Green Fingers" as guides to waterfront access points;
- Elevate East River Park Greenway for infrastructure and mode separation; and
- Create the Blueway Crossing to eliminate esplanade bottlenecks and protect critical infrastructure.

The Plan's concepts and recommendations for the Stuyvesant Cove Park and Waterside Plaza Waterfront Area include the following:

- Create areas for both human-powered and historic vessels in Stuyvesant Cove;
- Enlarge marina to create space for public access to boating facilities;
- Support safe swimming and boating;
- Restoring intertidal salt marsh and creating complete streets to help manage stormwater;
- Create a continuous waterfront esplanade at the marina connecting to Waterside Plaza's esplanade; and
- New and improved at-grade pedestrian crossings beneath the FDR Drive viaduct.

East River Esplanade Plan

In 2007, the East River Esplanade Plan was adopted by the Lower Manhattan Development Corporation and approved under ULURP for the site selection and disposition of the pavilion component of the Plan. The pavilion component of the plan would allow commercial activities to occur along the waterfront under the FDR Drive. The plan involves the revitalization of the waterfront from Maiden Lane for two blocks to Wall Street, and then north along City-owned land along the water's edge to East River Park north of the Manhattan Bridge. The plan would transform the Lower Manhattan and Lower East Side waterfronts into a pedestrian-friendly public open space destination. The Maiden Lane-Wall Street phases were completed in 2014 and the esplanade component has yet to be funded. The southern portion of Project Area One overlaps with a northern portion of the East River Park Esplanade Plan. The East River Esplanade Plan identifies Pier 42 as a crucial link between the esplanade and East River Park. Specifically, the plan calls for the creation of a wider and safer connection to East River Park. A new habitat-friendly pier structure and a new public waterfront amenity would be created in this location. Additionally, the creation of a cove at Montgomery Street would provide an additional waterfront destination where boats could be moored.

PlaNYC/OneNYC

One New York: The Plan for a Strong and Just City (OneNYC) is the City's comprehensive strategy and policy directive to address long-term challenges related to climate change, an evolving economy, and aging infrastructure. This plan built on the *PlaNYC: A Greener, Greater New York* and *PlaNYC: A Stronger, More Resilient New York*, released in 2007 and 2013, respectively. Specific visions outlined in OneNYC (Vision 3: Our Sustainable City and Vision 4: Our Resilient City) are overseen and implemented by the Mayor's Office of Sustainability and the Mayor's Office of Recovery and Resiliency. As a project of City-wide significance, the proposed project will be assessed for consistency with City policies related to growth, equity, sustainability

and resiliency measures as outlined in OneNYC. In particular, the goal outlined as "Vision 4: Our Resilient City with Coastal Defense" is directly correlated to the proposed project.

"Vision 4: Our Resilient City with Coastal Defense," within OneNYC, describes an integrated flood protection system for the east side of Manhattan and in Lower Manhattan south of Montgomery Street to the northern end of Battery Park City. Within the "Vision 4: Our Resilient City with Coastal Defense" goal, there are three initiatives:

- Initiative 1, Strengthen the city's coastal defenses: Complete the City's $3.7 billion coastal protection plan, a program of infrastructure investments, natural areas restoration, and design and governance upgrades of which nearly half is funded.
- Initiative 2, Attract new funds for vital coastal protection projects: Continue to identify and secure new sources of funds for infrastructure to reduce coastal flooding risk.
- Initiative 3, Adopt policies to support coastal protection: Align and adopt policies to support the right investments in coastal protection, and ensure those investments are operated and maintained effectively.

The proposed project specifically addresses a portion of this policy, since Project Areas One and Two create flood protection for the east side of Manhattan from Montgomery Street to East 25th Street.

Uniform Land Use Review Procedure (ULURP)

The New York City Charter identifies actions that are subject to review by the City Planning Commission through ULURP, such as changes to the City Map or site selection for capital projects. ULURP is a standardized procedure whereby certain applications affecting the land use of the city are publicly reviewed. The Charter establishes a public review period for these applications. The proposed project triggers three land use actions, including acquisition of real property by the City in the form of easements, amendments to the City Map, and a zoning text amendment to acknowledge compliance of the proposed design with the City's waterfront zoning regulations. The amendments to the City Map would be needed for changes related to existing and proposed pedestrian bridges.

Vision 2020: New York City Comprehensive Waterfront Plan

The Comprehensive Waterfront Plan, originally issued by the New York City Department of City Planning (DCP) in 1992, presented a long-range vision for the City's waterfront. In 2011, the Comprehensive Waterfront Plan was updated and issued under the title Vision 2020. Vision 2020 was prepared in partnership with State and federal agencies, including NYSDEC, the Port Authority of New York and New Jersey and the U.S. Army Corps of Engineers. Specific strategies included improvements for each of the City's 22 stretches of waterfront, inlets and bays, as well as active port areas, residential neighborhoods, wetlands and public open space. As a project that is located directly on City waterfront, the proposed project is analyzed for consistency with the goals of this plan.

New York City Local Waterfront Revitalization Program

The proposed project would be located within the Coastal Zone as designated by New York State and New York City, and would therefore be subject to City and State coastal management policies. Pursuant to federal legislation, New York State and the City have adopted policies aimed at protecting resources in the coastal zone. New York City's WRP is the City's primary tool for guiding the development of the coastal zone and waterfront. The WRP contains 10 major policies,

each with several objectives focused on improving public access to the waterfront; reducing damage from flooding and other water-related disasters; protecting water quality, sensitive habitats, such as wetlands, and the aquatic ecosystem; reusing abandoned waterfront structures; and promoting development with appropriate land uses. When a proposed project is located within the coastal zone and requires federal, state or local discretionary action, a determination of the project's consistency with the policies of the WRP must be made before the project can proceed. Since the waterfront portions of the area affected by the proposed project are within the City's coastal zone, a detailed assessment of the project's consistency with New York City's WRP policy is covered in Section F, "Environmental Effects," below as well as in **Appendix D**.

East Village–Lower East Side–Two Bridges Resilient Neighborhoods Initiatives

As part of the Resilient Neighborhoods initiative, the Department of City Planning is working with the communities of the East Village, Lower East Side, and Two Bridges to collaboratively identify changes to zoning and land use to address specific local conditions not addressed by the Flood Resilience Zoning Text Amendment, and other citywide resiliency efforts. These neighborhoods were selected in part because they were among the City's hardest-hit neighborhoods during Hurricane Sandy, but also because of the unique concentration of multi-family affordable housing developments. DCP is currently working with Community Board 3 to identify local strategies to facilitate resiliency in the neighborhood. As discussed in Chapter 2.0, "Project Alternatives," the proposed project is a result of a competition to protect Lower Manhattan from coastal surge and would therefore further the goals of the East Village–Lower East Side–Two Bridges Resilient Neighborhoods Initiatives.

LOCAL

The proposed project is located within areas of Community Boards 3 and 6. Section 197-a of the City Charter authorizes Community Boards, Borough Boards or Borough President, the Mayor, or the City Planning Commission to sponsor a plan for the development, growth, and improvement of the city, its boroughs and communities. There are several community 197-a plans providing policy guidance in Project Areas One and Two. These plans are summarized below.

Stuyvesant Cove 197-a Plan

The Stuyvesant Cove 197-a Plan was sponsored by Manhattan Community Board 6 in 1995, modified by the City Planning Commission in 1997, and adopted by the City Council on March 13, 1997. The plan provided an original vision for Stuyvesant Cove based on seven planning principles to guide the planning, design, and creation of public open space and compatible revenue-generating uses along the East River waterfront between East 18th and East 23rd Streets. These planning principles were intended to support development of easily accessible public parks and open space at the waterfront; encourage water dependent uses that are compatible with the open space goals of Community Board 6; and align DCP, Borough President, and Community Board goals and vision for the waterfront. The plan also identified 19 points that outlined the community's vision for waterfront open space, specifically the 1.9-acre area identified for Stuyvesant Cove Park, including operation of a park with no large-scale active uses; creation of a waterfront promenade with direct links to existing promenades at the north and south ends of the site; and development of focal points at critical entry points to the waterfront park.

Community Board 6 197-a Plan for Eastern Section of Community District 6

The 2007 Community Board 6 197-a Plan for Eastern Section of Community District 6 was prepared to address the ongoing changes and growth in the eastern portion of Community District

6. The 197-a Plan was officially approved by the New York City Council in March 2008. This area includes an extensively developed and diverse area that includes Stuyvesant Town, East River Park, Peter Cooper Village, the FDR Drive, Consolidated Edison, and the East River, which are all located within the land use, zoning, and public policy study area. Overall goals of the plan include (but are not limited to) increasing the amount of useful open space, improving access to waterfront, completing the East River Esplanade, and implementing land use policies consistent with historic trends in the area. Waterfront related recommendations identified in this plan that are relevant to this project include the following: accommodate pedestrians, joggers, cyclists, and skaters on new esplanades and greenways; encourage new pedestrian bridges and other means to provide improved public access to the waterfront, particularly at East 16th, 27th, 29th, 30th, 40th, 41st, 42nd, 48th, and 54th Streets; preserve and create waterfront views and facilitate public access to the waterfront using appropriate zoning, land use and mapping controls; and improve urban design and streetscapes.

Pier 42 Master Plan: A People's Plan for the East River Waterfront

The Pier 42 Master Plan was approved by a Community Board 3 sub-committee and the New York City Public Design Commission (PDC) in January 2014. The Master Plan was developed between 2008–2009 when the Lower East Side Waterfront Alliance engaged Lower East Side and Chinatown community members to develop a community vision for the East River waterfront and Pier 42. The Pier 42 project will transform a former industrial maritime site on the East River into waterfront parkland. The project will be implemented in phases. Phase 1A consists of the demolition of a pier shed and other associated demolition work activities. Phase 1B consists of site remediation and construction of an upland park, including lawns, trees, landscaping, a picnic knoll, a playground, and a comfort station. Phases 1A and 1B are anticipated to be complete by 2021 and will provide a new open space amenity to the community while the City seeks funding to implement the full master plan.

D. METHODOLOGY

As discussed above, the study area for this analysis is defined by the area of direct effect in Project Areas One and Two as well as the boundary of the census tracts associated with the inland extent of the protected area.

The primary source of land use information is Geographic Information System (GIS) parcel data obtained from the DCP. Field surveys and aerial photography were used to verify land uses within the study area. Zoning and public policy information was obtained from New York City and New York State. New York City's Zoning Resolution, for example, controls the use, density, and bulk of development. Alternatives were discussed in terms of the non-storm and storm operational and maintenance phases of the flood protection system and their compatibility with land use, zoning, and public policies in effect for the area were assessed.

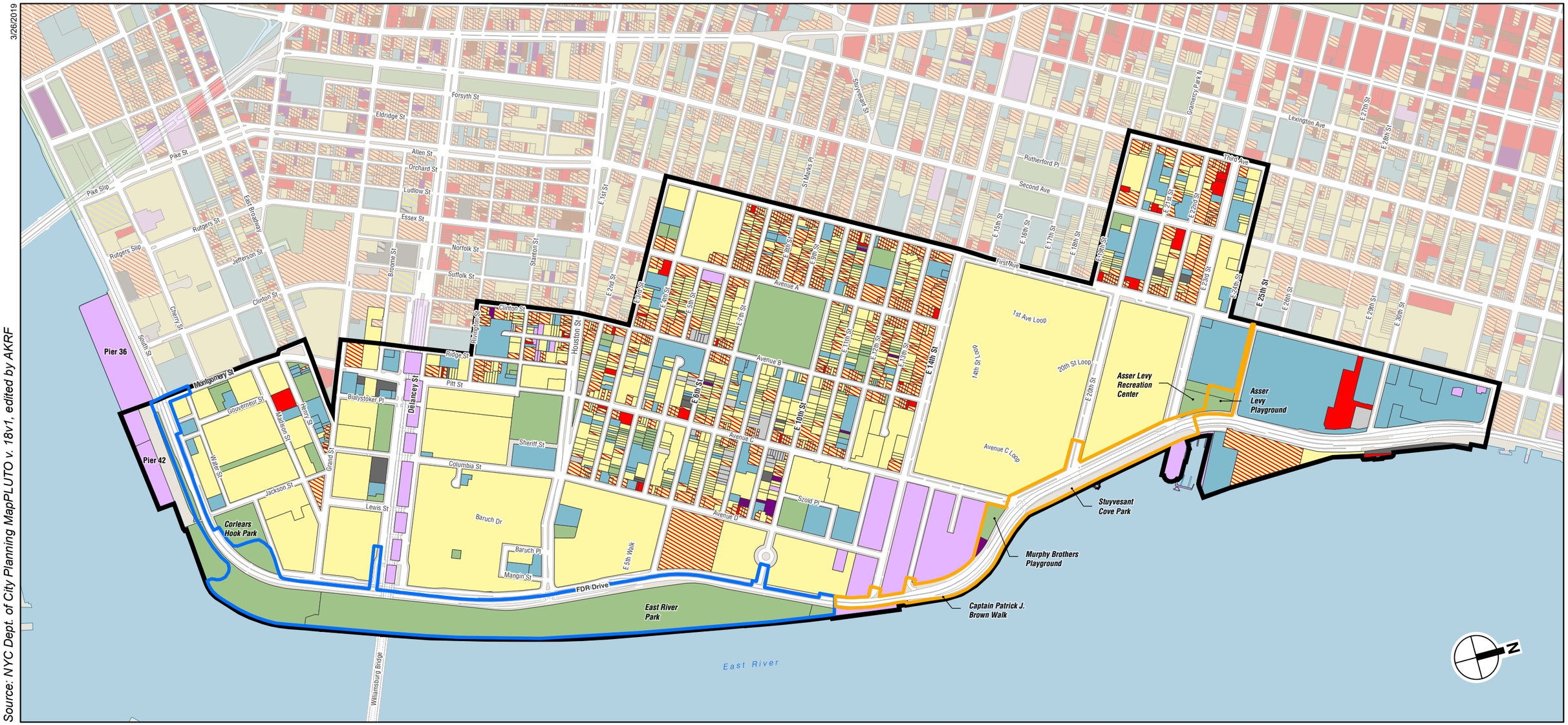
E. AFFECTED ENVIRONMENT

LAND USE

Existing land uses were identified and characterized based on field visits, New York City land use data, aerial photographs, and applicable planning documents. Existing land uses are described below for study area. **Figure 5.1-3** shows existing land uses in the study area.

3/26/2019

Source: NYC Dept. of City Planning MapPLUTO v. 18v1, edited by AKRF



- *Project Area One*
- *Project Area Two*
- *Land Use, Zoning & Public Policy Study Area*
- *Commercial and Office Buildings*
- *Hotels*
- *Industrial and Manufacturing*
- *Open Space and Outdoor Recreation*
- *Parking Facilities*
- *Public Facilities and Institutions*
- *Residential*
- *Residential with Commercial Below*
- *Transportation and Utility*
- *Under Construction*
- *Vacant Building*
- *Vacant Land*

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Existing Land Use in Study Area
Figure 5.1-3

PROJECT AREA ONE

Project Area One is approximately 61 acres and consists primarily of the FDR Drive right-of-way (Montgomery Street to East 13th Street) and East River Park. Additionally, the Montgomery Street (South Street to Water Street) right-of-way is located within Project Area One. Project Area One is bordered to the west by large residential developments including New York City Housing Authority (NYCHA) and private housing. East River Park, which is operated by NYC Parks, is approximately 45.88 acres and bounded by FDR Drive to the west and the East River to the east, Jackson Street to the south and East 13th Street to the north. East River Park contains a variety of passive and active recreation spaces, including a waterfront esplanade and athletic fields. East River Park is accessible via Pier 42 to the south, several bridges that span the FDR Drive along the western side of the park, and Captain Patrick J. Brown Walk to the north. In addition, the Lower East Side Ecology Center utilizes a former fireboat house near the Williamsburg Bridge for programmed activities (e.g., planned arts activities accessible by the public) and has a composting center at the southern end of the park. East River Park also contains an amphitheater used for various events (e.g., City Parks Foundation SummerStage) near the bridge leading to Corlears Hook Park. Refer to Chapter 5.3, "Open Space," for additional information on East River Park. EDC has implemented a Citywide Ferry Service initiative that includes 21 landings, with 10 new ferry landings, upgrades to five existing landings, and the use of six existing landings. Two of the new ferry landing sites are located within the project area, including one at Corlears Hook in Project Area One. The new landings feature barges (35 feet by 90 feet) that are connected to the shore by a gangway. The barges accommodate passenger queuing and shelter, a ticket machine and information kiosk, lighting, and static and/or digital signage.

PROJECT AREA TWO

Project Area Two is approximately 21 acres and extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two also includes a portion of East 25th Street from the FDR Drive to First Avenue. At the southernmost point of Project Area Two, the Captain Patrick J. Brown Walk extends for 0.5 miles, serving as a shared-use path for both pedestrians and bicyclists. At this southernmost point, the walkway is adjacent to the Con Edison Head House, which is located east of the walkway on the river's edge. The Con Edison Head House is used for fuel and oil deliveries for the Con Edison East River Generating Facility located on the west side of the FDR Drive between East 13th Street and approximately East 17th Street. At the northern end of the Captain Patrick J. Brown Walk, the shared-use path continues into Stuyvesant Cove Park, which is under the jurisdiction of the New York City Department of Small Business Services (SBS). Located along 0.3 miles of waterfront with approximately 1.9 acres, Stuyvesant Cove Park provides passive recreation, gardens, and programming event space. A new ferry landing is currently operational within Stuyvesant Cove Park as part of EDC's Citywide Ferry Service. At the northernmost portion of the park, programming event space is located adjacent to a building maintained by Solar One Initiatives, a non-profit organization that promotes community solar initiatives, innovative programs in public and private schools, and other efforts. Directly north of the Solar One Environmental Education Center is a BP Gas and Service Station. The BP Gas and Service Station is accessible via East 23rd Street or the FDR Drive service ramp. North of East 23rd Street between East 23rd and East 25th Streets is the Asser Levy Recreation Center and Playground. Between the FDR Drive and First Avenue, East 25th Street is lined on the north by City University of New York (CUNY) buildings and on the south by the Veterans Affairs New York Harbor Health Care Center (VA Medical Center).

STUDY AREA

Following is a description of the land use in the neighborhoods located within the study area. Many residential buildings, community facilities, and public utilities in the study area were affected by Hurricane Sandy, which had significant economic, fiscal, and social effects on the study area neighborhoods. Additional information regarding these effects can be found in Chapter 2.0, "Project Alternatives," and within the technical analysis chapters of this DEIS.

Lower East Side

A portion of the Lower East Side neighborhood is in the southern section of the study area between Montgomery Street and East Houston Street. As shown in **Figure 5.1-3**, land uses within the study area are primarily higher-density residential, consisting of multi-family (elevator and walk-up) and mixed-use residential buildings (i.e., with commercial uses on the ground floor). Additionally, throughout the Lower East Side there are public facilities and institutions, religious facilities, open spaces, parking, and commercial space. Multi-family elevator buildings include NYCHA's Vladeck Houses and the Baruch Charney Vladeck II complex located along Madison and Water Streets, and Jackson and Gouverneur Streets. The Vladeck Houses are a 13-acre housing complex consisting of 20 six-story buildings with approximately 1,500 apartment units. The Baruch Charney Vladeck II Houses are a two-acre complex with four six-story buildings containing approximately 250 apartment units. The Bernard Baruch Houses are bound by the FDR Drive, Columbia Street, East Houston Street, and Delancey Street. The Baruch Houses are located on 27 acres and contain 17 buildings (ranging between seven and 14 stories) with approximately 2,150 apartment units. The privately owned East River Cooperative Housing campus is located north of the Vladeck Houses between Cherry and Delancey Streets along the FDR Drive. The East River Cooperative Housing campus includes four 20-story apartment buildings located on two lots totaling approximately 11 acres. There are approximately 1,650 apartment units located on the East River Cooperative Housing campus. The East River Cooperative Housing complex includes a one-story commercial development along Grand Street and houses some commercial and institutional facilities within the residential buildings.

Public facilities and institutions in the area include P.S. 137 and the City College Child Development Center located between Henry and Grand Streets; P.S. 110 at Lewis and Delancey Streets; Henry Street Settlement on the northeast corner of Henry and Pitt Streets; P.S. 97 on East Houston Street; New Explorations into Science, Technology, and Math located on Columbia Street; and P.S. 188 and Girls Prep Charter School along East Houston Street on Lillian Wald Drive.

Open space in the Lower East Side includes Sol Lain Playground, Luther Gulick Playground, Corlears Hook Park, and Baruch Playground. Refer to Chapter 5.3, "Open Space," for additional information on these parks.

Transportation and utility land uses include the Williamsburg Bridge and the Con Edison East River Generating Facility complex. Commercial and office building land uses are on the south corners of Grand and Henry Streets, and the southeast corner of Abraham Kazan and Delancey Streets, south of Williamsburg Bridge.

East Village and Alphabet City

In the center of the study area north of East Houston Street is the East Village neighborhood. The East Village is bordered to the north by Stuyvesant Square and Stuyvesant Town, to the south by the Lower East Side, to the east by the East River Park, and to the west by Greenwich Village.

Within East Village is the Alphabet City neighborhood. Alphabet City is defined by Avenues A, B, C, and D, which run in a north-south direction from East 14th Street to East Houston Street. Residential land uses within the East Village and Alphabet City largely consist of mixed residential and commercial buildings, and multi-family walk-up and elevator buildings. Commercial uses on the ground floor vary greatly and range from bars and restaurants to boutique stores and supermarkets. Except for a few large developments (e.g., NYCHA Lillian Wald Houses and Jacob Riis Houses), residential buildings (mixed-use and multifamily) in these two neighborhoods are typically four- to six-story buildings on small lots. Lillian Wald Houses are located between the FDR Drive and Avenue D, and East 6th and East Houston Streets, and include 18 buildings varying between 11 and 14 stories tall with approximately 1,860 apartment units on 16 acres. The Jacob Riis Complex (comprised of Jacob Riis Houses and Jacob Riis II) is located between East 6th and East 13th Streets, and Avenue D and the FDR Drive. The complex includes a total of 19 buildings, varying between 6 and 14 stories high. Totaling approximately 17 acres, the Jacob Riis Complex has approximately 1,770 apartment units. Other land uses in this neighborhood include industrial and manufacturing, public facilities and institutions, and transportation and utility. Industrial and manufacturing land uses include the Con Edison East River Generating Facility and a New York City Department of Environmental Protection (DEP) building.

The Con Edison East River Complex is located between Avenue C, the FDR Drive, East 13th Street, and the East 20th Street FDR Drive entrance. The complex consists of the East River Generating Facility, which generates steam and electricity, and two substations that send power to area substations and distribution networks in Midtown and Lower Manhattan, south of 39th Street and north of the World Trade Center.

Several community facilities, institutions, and religious facilities are in the East Village and Alphabet City neighborhoods. Schools include P.S. 34 at the corner of East 12th Street and Szold Place; P.S. 15 between Avenues C and D, between East 4th and 5th Streets; and Children's Workshop School and East Village Community School, both located between Avenue B and Avenue C and East 8th and 12th Streets. Additional community facilities and institutions include a Social Security Administration Building, Police Service Area #4, Housing Work Healthcare, and Tompkins Square Library.

Open spaces within the East Village and Alphabet City neighborhoods consist of three NYC Parks-managed parks and many lots that are part of the NYC Parks GreenThumb Program. GreenThumb was initiated in the 1970s to create opportunities for volunteer gardens and community spaces on vacant lots. The GreenThumb program supports over 600 community gardens across the City that are managed by neighborhood residents. NYC Parks-managed parks in the East Village and Alphabet City include Dry Dock Playground, Tompkins Square Park, and Murphy Brothers Playground. Refer to Chapter 5.3, “Open Space,” for additional information on NYC Parks-managed parks. Community gardens in the GreenThumb program include El Jardin Del Paradiso, Secret Garden, Orchard Alley, Peach Tree Garden, Parque de Tranquilidad, All People's Park, 9th Street Community Garden Park, Firemen's Memorial Garden, Green Oasis, Gilbert's Garden, Campos Garden, Suen Dragon Garden, The Creative Little Garden, 6th Street and Avenue B Community Garden, El Sol Brillante Sr. Garden, El Sol Brilliante, Jr., Joseph C. Sauer Park, Children's Garden and Dias Y Flores Garden.

Stuyvesant Town and Peter Cooper Village

Stuyvesant Town and Peter Cooper Village are large private residential developments located from First Avenue to Avenue C, and East 14th to East 23rd Streets. These developments are

bordered by the East River and Avenue C to the east, the Stuyvesant Square and Gramercy Park neighborhoods to the west, East Village and Alphabet City to the south, and Kips Bay to the north. Uses in Stuyvesant Town and Peter Cooper Village are limited to residential housing with a few street-level commercial uses. Stuyvesant Town consists of approximately thirty-six 13-floor apartment buildings with 8,800 apartment units. Peter Cooper Village consists of 21 15-floor apartment buildings with several commercial storefronts on East 20th Street. There are approximately 2,450 apartment units located within Peter Cooper Village.

Gramercy Park

A small portion of the Gramercy Park neighborhood, between First and Third Avenues and East 19th and East 23rd Streets, is located within the study area. Gramercy Park is defined as the neighborhood surrounding Gramercy Park, a small, private park bordered by East 21st Street, East 20th Street, and Gramercy Park East and West (and between Third Avenue and Park Avenue). The Gramercy Park neighborhood is generally defined as bordering Stuyvesant Town-Peter Cooper Village to the east, the Flatiron District to the west, Union Square to the southwest, Stuyvesant Square to the south, Rose Hill to the northwest, and Kips Bay to the northeast. The neighborhood was designated as a historic district by LPC in 1996. Land uses within the Gramercy Park neighborhood are primarily residential (mixed residential and commercial buildings, one- and two-family buildings, and multifamily elevator/walk-ups), along with commercial uses, open space and recreation, parking facilities, and public facilities and institutions. Mixed residential and commercial buildings are concentrated along First Avenue. One- and two-family buildings, and multifamily elevator and walk-up buildings, are generally located on streets between East 14th and East 23rd Streets.

Open spaces within this neighborhood include Augustus St. Gaudens Playground and Peter's Field. Refer to Chapter 5.3, “Open Space,” for additional information on these parks. Public facilities, institutions, and religious facilities include several schools and medical facilities. Schools in the Gramercy Park neighborhood include Manhattan Comprehensive Night and Day High School, P.S. 40: The Salk School of Science, and Simon Baruch Junior High School. Medical facilities include Gramercy Surgery Center Beth Israel Medical Center. The Mt. Sinai Beth Israel Medical Center, High School for Health Professions and Human Services serves the role of both a medical facility and a school.

Kips Bay

A portion of the Kips Bay neighborhood is located within the study area. Part of Manhattan Community Board 6, Kips Bay is bordered on the north by Murray Hill; on the west by Madison Square; on the south by the Stuyvesant Square neighborhood and the Peter Cooper Village apartment complex; and on the east by the East River. Land uses within the Kips Bay neighborhood are primarily residential (mixed residential and commercial buildings, one- and two-family buildings, and multi-family elevator/walk-ups), along with commercial and office uses, open space, and public facilities and institutions. Medical and institutional land uses within Kips Bay in the study area include the VA Medical Center located at 423 East 23rd Street, NYU Rory Meyers College of Nursing at 431 First Avenue, Bellevue Hospital Center located at 462 First Avenue, the 30th Street Men’s Shelter at 400 East 30th Street, and NYU Langone Medical Center located at 550 First Avenue. Open spaces within the study area include Asser Levy Playground bordered by the FDR Drive, East 23rd Street, the VA Medical Center, and East 25th Street. Commercial uses dependent on the waterfront within the study area include the Marine and Aviation Building, located along the East River adjacent to Project Area Two, and the New York

City Ferry landing at East 34th Street. The Marine and Aviation Building contains a parking garage, a landing base for seaplanes, and berthing spots for pleasure boats.

ZONING

Land other than parks and streets, wharfs, or places are mapped with zoning districts that define the allowable uses and development regulations. Special Districts are often mapped to regulate distinct development policies for any given area. Description of the zoning districts mapped within the study area are summarized below, and **Figure 5.1-4** presents the zoning districts mapped in the study area.

PROJECT AREA ONE

The majority of Project Area One is located within public parkland under the jurisdiction of NYC Parks (i.e., East River Park); zoning regulations are not applicable to park areas. A portion of Project Area One near Pier 42 is located within a light manufacturing district (M1-4). Another portion of Project Area One in the vicinity of Montgomery Street is located within residential (R7-2) and commercial (C6-4) districts. These and other districts in the study area are described below.

PROJECT AREA TWO

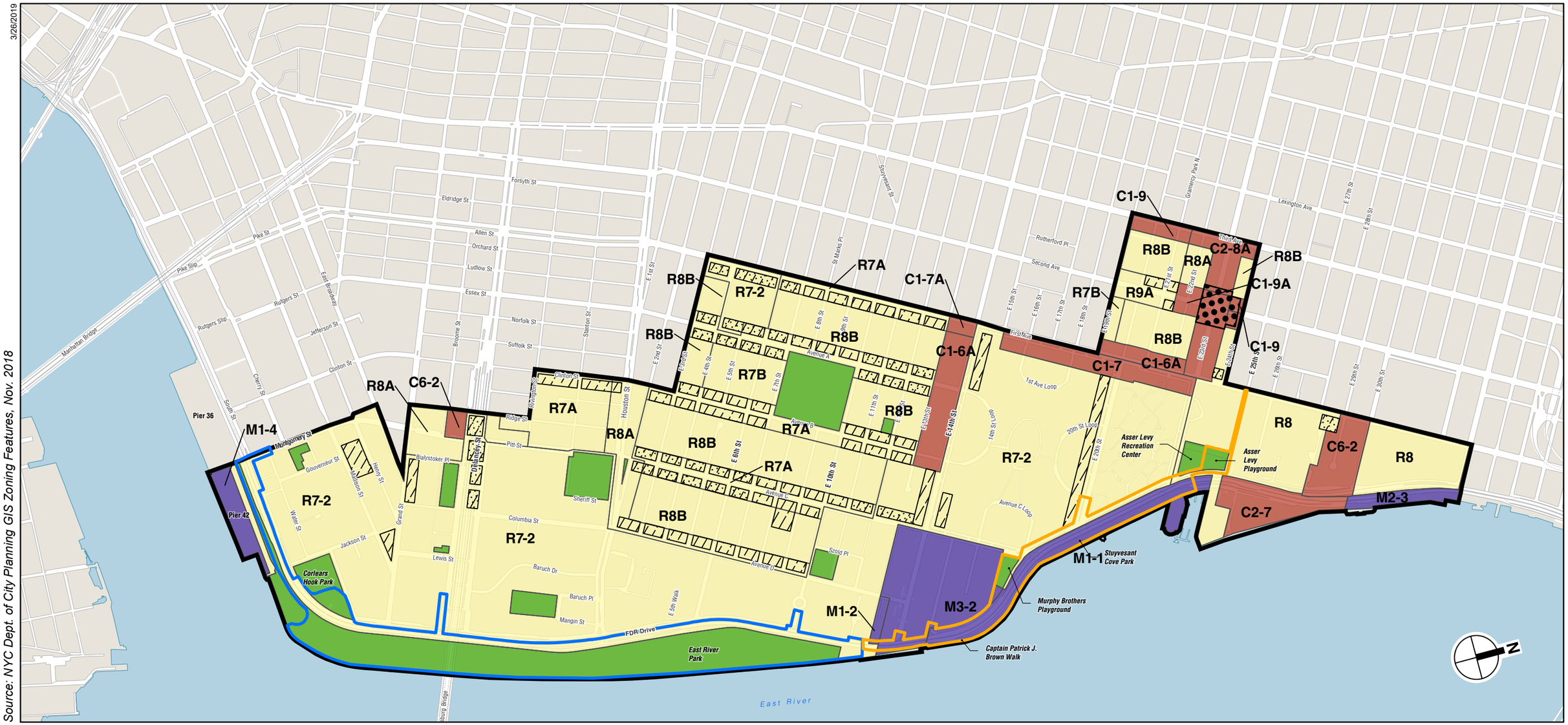
Similar to Project Area One, Project Area Two is largely comprised of areas (parks and mapped roadway rights-of-way) with no applicable zoning districts. Stuyvesant Cove Park is zoned M1-1, the VA Medical Center is zoned R8, the NYCHA Jacob Riis Houses are zoned R7-2, and the Con Edison facility is zoned M3-2 (see **Figure 5.1-4**). These zoning designations are described below.

STUDY AREA

The larger study area is mapped with a range of residential, commercial, park, and manufacturing zoning designations (see **Figure 5.1-4**). **Table 5.1-1** summarizes the various zoning districts controlling land use and development in the study area.

3/26/2019

Source: NYC Dept. of City Planning GIS Zoning Features, Nov. 2018



Project Area One

Project Area Two

Land Use, Zoning & Public Policy Study Area

C 1-5 Commercial Overlay District

C 2-5 Commercial Overlay District

Special Transit Land Use District

Zoning Designation

Commercial

Manufacturing

Park

Residential

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Existing Zoning in Study Area

Figure 5.1-4

Table 5.1-1
Zoning Designations within the Land Use, Zoning, and Public Policy Study Area

Zoning District	Maximum Floor Area Ratio (FAR)[1]	Use/Zone Type
Residential Districts		
R7-2	0.87–3.44 R; and 4.60 R (with Inclusionary Housing [IH] bonus); 6.5 CF	General medium-density residential district
R7A	4.00 R and 4.60 R (with IH bonus); 4.00 CF	Contextual medium-density residential district
R7B	3.00 R; 3.00 CF	Contextual medium-density residential district
R8	0.94-6.02 R and 7.20 R (with IH bonus); 6.50 CF	General medium-density residential district
R8A	6.02 R and 7.20 R (with IH bonus); 6.50 CF	Contextual medium-density residential district
R8B	4.00 R; 4.00 CF	Contextual medium-density residential district
R9A	7.52 R and 8.50 (with IH bonus); 7.5 CF	Contextual high-density residential district
Commercial Districts		
C1-5 overlay	2.00 C	Local commercial uses serving a residential area
C1-6A	2.00 C; 4.00 CF; 4.00 R; and 4.60 R (with IH bonus)	Contextual local retail and local service district
C1-7	2.00 C; 6.50 CF; 0.94-6.02 R; and 6.02 R (with IH bonus)	Local retail and local service district
C1-7A	2.00 C; 6.50 CF, 6.02 R; and 7.20 R (with IH bonus)	Contextual local retail and local service district
C1-8A	2.00 C; 7.50 CF; 7.52 R; and 8.50 R (with IH bonus)	Contextual local retail and local service district
C1-9	2.00 C; 10.00 CF; 10.00 R and 12.00 R (with IH bonus)	Local retail and local service district
C1-9A	2.00 C; 10.00 CF, 12.00 R (with IH bonus)	Contextual local retail and local service district
C2-5 overlay	2.00 C	Local commercial uses serving a residential area
C2-7	2.00 C; 10.00 CF; 0.99–7.52 R; and 8.00 R (with IH bonus);	Contextual local retail and local service district
C2-8	2.00 C; 10.00 CF; 10.00 R; and 12.00 R (with IH bonus)	Contextual local retail and local service district
C2-8A	2.00 C; 10.00 CF; 10.00 R; and12.00 R (with IH bonus)	Contextual local retail and local service district
C6-2	6.00 C; 6.50 CF; 0.94–6.02 R; and 7.20 R (with IH bonus)	General central commercial district
C6-4	10.00 C; 10.00 CF; 10.00 R; and 12.00 R (with IH bonus)	General central commercial district
Manufacturing Districts		
M1-1	1.00 M; 1.00 C; 2.40 CF	Light manufacturing district (high performance)
M1-2	2.00 M; 2.00 C; 4.80 CF	Light manufacturing district (high performance)
M1-4	2.00 M; 2.00 C; 6.50 CF	Light manufacturing district (high performance)
M2-3	2.00 M; 2.00 C	Medium manufacturing district (medium performance)
M3-2	2.00 M; 2.00 C	Heavy manufacturing district (low performance)

Notes:
[1] FAR is a measure of density establishing the amount of development allowed in proportion to the base lot area. For example, a lot of 10,000 square feet with a FAR of 1 has an allowable building area of 10,000 square feet. The same lot with an FAR of 10 has an allowable building area of 100,000 square feet.
[2] Under the Quality Housing option, the maximum FAR is 4.0 on wide streets and 3.44 on narrow streets.
Source: New York City Zoning Resolution 2018

Residential Districts

The majority of the inland portion of the study area is located within medium- and high-density residential zoning districts, particularly non-contextual residential districts (R7-2 and R8), while a portion of the study area north of Delancey Street is located within contextual residential districts (R7A, R7B, R8A, R8B, and R9A). In all residential districts, uses are limited to residential and community facility uses, and commercial or manufacturing uses are not permitted. In general, buildings in residential districts may be developed under height factor regulations, which include open space requirements and determine bulk on a sliding scale based on the amount of open space provided, or Quality Housing regulations. Quality Housing regulations apply height limits to produce high-lot coverage buildings set at or near the street line. Contextual zoning districts apply the Quality Housing regulations as mandatory requirements and are generally mapped in established residential neighborhoods to produce buildings that match the traditional streetscape.

The contextual zoning districts within the study area were mapped by the East Village/Lower East Side Rezoning Plan, adopted in 2008, which was intended to preserve the existing neighborhood scale and character of the area while providing opportunities for residential growth and incentives for affordable housing. These districts contain a mix of residential buildings, ranging from row houses (typically located in R8B districts) to 10- to 12-story apartment buildings.

Commercial Districts

The study area also contains commercial zoning districts (C1-6A, C1-7, C1-7A, C1-8A, C1-9, C1-9A, C2-7, C2-8, C2-8A, C6-2, and C6-4) concentrated mostly along East 14th and East 13th Streets and First Avenue and Avenue A in the northern portion of the study area. These commercial districts are typically mapped along major thoroughfares in predominantly residential districts and are intended to provide for commercial districts that support the surrounding residential area. Commercial districts permit residential, commercial, and community uses; residential uses are governed by specified residential district equivalents. In contextual commercial districts (such as the C1-6 A, C1-7A, C1-8A, C1-9A, C2-7, C2-8, and C2-8A districts located within the study area), the contextual zoning regulations described above are applied through the contextual residential district equivalent.

In addition, commercial overlay districts (C1-5 and C2-5) are mapped along many of the main thoroughfares within the study area, particularly along First Avenue and Avenues A, B, C, and D in the Alphabet City portion of the study area. Commercial overlays are mapped along major streets in residential districts and provide for local retail and services, such as grocery stores, restaurants, beauty parlors, and other businesses that cater to nearby residents. Commercial uses are permitted to a maximum of 2.0 Floor Area Ratio (FAR) (in medium- and high-density residential districts) located in individual structures or on the lower floors of residential buildings.

Manufacturing Districts

As noted above, a portion of Project Area One is located within an M1-4 district, and a portion of Project Area Two is located with M1-1 and M3-2 districts. Other manufacturing districts within the study area include an M1-2 and an M2-3 district, which are mapped along the FDR Drive. Manufacturing zoning districts are widely mapped along the City's waterfront areas, a reflection of the City's history of working waterfronts with shipping and industrial uses. M3 districts are designated for areas with heavy industries that generate noise, traffic, or pollutants, and are usually located near the waterfront and buffered from residential areas. M2 districts occupy the middle ground between light and heavy industrial areas and are mainly mapped in the city's older industrial areas along the waterfront. M1 districts permit only light manufacturing uses such as

warehouses that conform to stringent performance standards and are generally used as buffers between heavy manufacturing districts and commercial or residential areas. Commercial uses are generally permitted in manufacturing districts, although some commercial uses (such as hotels and many retail facilities) are not permitted in M3 districts. Residential uses are generally not permitted in manufacturing districts.

Waterfront Zoning

The City Zoning Resolution includes special regulations applying to areas located along the waterfront, outlined in Article VI, Chapter 2 ("Waterfront Zoning"). These regulations, among other policy objectives, encourage active water dependent uses and ensure access to the City's waterfront. Waterfront zoning regulations mandate that most developments on waterfront zoning lots provide public open space along the water's edge with pedestrian links to upland communities. Waterfront zoning also applies rules governing the location, minimum size, proportion, and design elements for waterfront public access areas. In addition, waterfront zoning regulations provide for visual corridors (unobstructed views of the shoreline from upland public areas) through special urban design rules. A majority of the waterfront area within the study area consists of park space under the jurisdiction of NYC Parks. However, Stuyvesant Cove Park is within a mapped "Marginal Street, Wharf, or Place," which is City-owned property (under jurisdiction of SBS) where zoning applies. This property would remain as public open space with the proposed project. However, since the waterfront zoning regulations would technically apply to this property, a zoning text amendment is necessary to acknowledge compliance with the City's waterfront zoning restrictions.

Flood Resilience Zoning Text Amendment

In 2013, DCP proposed a zoning text amendment to encourage flood-resilient building construction throughout designated flood zones. Following Hurricane Sandy, this text amendment was adopted by the City Council in 2013 on an emergency, temporary basis. Efforts are currently underway to update the text and make it permanent based on lessons learned in the recovery process. The amendment enables new and existing buildings to comply with new, higher flood elevations issued by FEMA, and to new requirements in Building Code, with the intentions of promoting and protecting public health, safety, and general welfare. General goals of the amendment include, among others, to mitigate the effects of elevated and flood-proofed buildings on the streetscape and pedestrian activity; and to promote the most desirable use of land and thus conserve and enhance the value of land and buildings, and thereby protect the City's tax revenues. Further, the Flood Resilience Zoning Text Amendment permits temporary flood control devices and associated emergency egress systems that are assembled prior to a storm and removed thereafter on the waterfront, and within open spaces.

PUBLIC POLICY AND PLANS

Applicable federal, state, city and local policies are listed below and described above in Section C, "Regulatory Context."

- **Federal:** Executive Orders 11988, 11990
- **New York State:** Coastal Zone Management Act.
- **New York City:** Manhattan Waterfront Greenway; East River Blueway Plan; East River Esplanade Plan; PlaNYC: A Greener, Greater New York; One New York: The Plan for a Strong and Just City (OneNYC); ULURP; WRP; and Vision 2020: New York City Comprehensive Waterfront Plan.

- **Local:** Stuyvesant Cove 197-a Plan; Community Board 6 197-a Plan for Eastern Section of Community District 6; Pier 42 Master Plan: A People's Plan for the East River Waterfront; and Business Improvement Districts.

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. Under the No Action Alternative, the existing neighborhoods would remain at risk to coastal flooding during extreme coastal storm events (the 100-year flood events with sea level rise projections to the 2050s), referred to herein as the design storm event. Therefore, the No Action Alternative would not meet the project goals and be inconsistent with City policy, specifically OneNYC's Vision 4: Our Resilient City. As described in **Appendix A1**, there are a number of projects planned or currently under construction in the project area, including the Pier 42 project and the Solar One Environmental Education Center project (No Action projects).

As discussed in Chapter 2.0, "Project Alternatives," and identified in **Appendix A1**, there are projects independent of the proposed project within the study area. Projects that would result in changes to land use within the project area include developments resulting from the 2008 East Village and Lower East Side Rezoning. Additional projects independent of the proposed project are not anticipated to result in changes to land use and zoning. Additionally, no changes to existing public policies are planned at this time, with the exception of the acceptance of the Flood Resilience Zoning Update, and no known new public policies are proposed by the 2025 analysis year. Major land use projects that have recently been completed within the project area include the Citywide Ferry Service. Minor projects that would not result in changes to land use include deck replacement of the East Houston Street overpass, Solar One Environmental Educational Center, and LES Ecology Center Compost Facility. Additionally, a variety of planned resiliency projects would occur under the No Action Alternative, including resiliency measures at NYCHA properties near the study area. While these resiliency measures are intended to protect critical infrastructure at these facilities, they would not provide the type of comprehensive neighborhood protection from future storm-related coastal flooding events that would be provided by the coastal flood protection systems presented in the other alternatives.

EDC has implemented a Citywide Ferry Service initiative that includes 21 landings, with 10 new ferry landings, upgrades to five existing landings, and the use of six existing landings. Two of the new ferry landing sites are located within the project area: at Corlears Hook in Project Area One and Stuyvesant Cove in Project Area Two. The new landings feature barges (35 feet by 90 feet) that are connected to the shore by a gangway. The barges accommodate passenger queuing and shelter, a ticket machine and information kiosk, lighting, and static and/or digital signage.

In 2008, the City Council adopted the East Village and Lower East Side Rezoning. The zoning changes approved under that measure are now in effect for over 110 blocks in Manhattan Community District 3. As shown in **Appendix A1**, there are a number of projected development sites located in the study area. Sites identified in this table would be developed into residential buildings with affordable and luxury apartments and ground-floor retail. Increasing development in the study area would also increase residential population densities along with the worker

population. Overall, projects resulting from the East Village and Lower East Side rezonings would result in little to no change in the overall land use pattern in the study area since proposed projects would only increase residential and worker population densities within these two neighborhoods. It is not anticipated that the proposed project would have a significant effect on the areas approved for rezoning. Land uses where proposed projects are located would remain largely the same (i.e., residential). The underlying zoning regulations of the 2008 East Village and Lower East Side rezoning plan would remain in effect under this alternative.

As indicated above, NYC Parks is proposing to construct Pier 42 as a public waterfront open space that would increase accessible open space within the study area. For many years, the Pier 42 property consisted of warehouse space and parking, located just south of East River Park between the East River and the FDR Drive. A masterplan for the overall redevelopment of Pier 42 as an open space was approved by a Community Board 3 sub-committee and the New York City Public Design Commission (PDC). Phase 1A of the Pier 42 redevelopment included the demolition of the pier shed. Phase 1B will include the redevelopment of the upland park (north and east of Phase 1A) with amenities such as an entry garden in the western section, a playground, a comfort station, a grassy knoll rising approximately seven feet above grade, solar powered safety lighting throughout the park, and access from the shared-use path along the FDR Drive service road or Montgomery Street. The Pier 42 project will introduce approximately 2.93 acres of new passive open space to the study area by 2021.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

LAND USE AND ZONING

In the event of a storm under the Preferred Alternative, the flood protection system would be activated as described in chapter 2.0, "Project Alternatives," to provide protection from both surge and inland flooding. The Preferred Alternative is expected to be completed before Alternatives 2, 3 and 5, which would protect upland land uses by 2023 as compared to 2025. The Preferred Alternative would additionally protect East River Park from design storm events, requiring less post-storm maintenance in East River Park to return to pre-storm conditions compared to the No Action Alternative and Alternatives 2 and 3, and therefore, more effectively protects this land use and would allow park use to resume more quickly following a design storm event, benefitting the neighborhoods of the Lower East Side, East Village, Alphabet City, Stuyvesant Town, Peter Cooper Village, Gramercy Park, and Kips Bay.

During non-storm conditions, the closure structures would remain open. Under the Preferred Alternative, landscape and urban design features would be incorporated into existing open spaces in the project area. Land uses within the study area would not be affected by the proposed project and would remain largely park or City right-of-way. During non-storm operations, the closure structures would remain open and East River Park and Stuyvesant Cove Park would remain accessible. The bridge improvements would not alter the use of land at landing sites. All landings west of the FDR Drive would be within City rights-of-way or would remain unchanged. Bridge landings within East River Park would be integrated into the park's design. The proposed shared-use flyover bridge would be compatible with the land uses in the project area: the proposed bridge landings would be within the limits of the shared-use path and can generally be considered an extension of that path.

In addition, as discussed in Chapter 5.5, "Urban Design and Visual Resources," the proposed flood protection features associated with the Preferred Alternative would have no adverse urban design

effects. Urban design enhancements under this alternative include a reconstructed shared-use path and portions of the waterfront esplanade, relocation of two embayments in East River Park, full reconstruction of three bridges that span the FDR Drive, relocation and reconstruction of the amphitheater, and enhanced passive recreation and resiliently landscaped spaces. In addition, the Preferred Alternative would install the floodwall below-grade for a majority of East River Park to soften the visual effect of the flood protection system. These enhancements would ensure that the flood protection system would remain compatible with existing and anticipated land uses in the study area.

Although a zoning text amendment is necessary to acknowledge compliance of the proposed design with the City's Waterfront Zoning regulations, the Preferred Alternative does not propose changes to zoning regulations and would be compatible with existing and planned zoning within the project area and study area.

PUBLIC POLICY

The following is a discussion of the Preferred Alternative's compliance with federal, State, City, and local regulations.

Federal

Compliance with Executive Orders 11988 and 11990 is demonstrated via the Eight Step Decision Making Process for the proposed project, which may be found in **Appendix L**. This analysis concludes that the proposed project must be situated within the floodplain since the purpose of the proposed project is to provide flood protection and there is no reasonable alternative to locating the proposed project in a floodplain.

New York State

The Preferred Alternative would be in compliance with the NYSDOS CMP policy via the New York City WRP. A consistency assessment analysis has been prepared for the proposed project, which examines the compliance with State and City coastal management policies (see **Appendix D**). The analysis concludes that the proposed project would be consistent with applicable City coastal management policies and standards. The development of the proposed project is consistent with goals established for the Borough of Manhattan and the City for revitalizing and creating public access to the waterfront and would represent an increase in public access to the waterfront for recreational use, while implementing flood protection measures to protect Lower Manhattan.

New York City

Implementation of the Preferred Alternative would trigger land use actions including acquisition of real property, amendments to the City Map for changes related to existing and proposed pedestrian bridges, and a zoning text amendment. Specifically, the Preferred Alternative requires the acquisition of easements at Gouverneur Gardens, East River Housing Corporation, NYCHA, Con Edison, and the VA Medical Center to allow for construction of floodwalls or drainage elements on or near those properties. An easement would also be required for the flyover bridge footings that will be located within Captain Patrick J. Brown Walk, which is NYSDOT property. In addition, a zoning text amendment is necessary to acknowledge compliance of the proposed design with the City's Waterfront Zoning regulations for a portion of the project area. Approval of these actions is specific to the implementation of the proposed project and would not conflict with land use and zoning conditions in the study area.

In addition, while no changes to zoning in the study area are proposed, the Preferred Alternative complements City zoning policies and recent zoning changes, including those in Lower East Side,

which have been approved to stimulate commercial and residential development and ongoing resiliency initiatives in the East Village and Lower East Side. The proposed flood protection system would provide protection to the study area while enhancing the shared-use path within East River Park. It would allow for the continued use of valuable open spaces. The Preferred Alternative, by reconstructing the shared-use path and enhancing passive recreation and landscaped spaces, would support public recreational facilities in the area.

The Preferred Alternative would be consistent with the initiatives to protect Lower Manhattan from surge events outlined in *PlaNYC* and *OneNYC*, while continuing to provide and enhance access to the waterfront as discussed in the Vision 2020 plan, the East River Esplanade Plan, and the East River Blueway Plan. The Preferred Alternative also includes the foundations for a shared-use flyover bridge connecting East River Park and Captain Patrick J. Brown Walk, which would provide the opportunity for a new north-south connecting link in the East River Greenway and achieve a goal of the Manhattan Waterfront Greenway. Additionally, as mentioned above, the Preferred Alternative is consistent with applicable City coastal management policies would be in compliance with the New York City WRP. Therefore, the proposed project would be consistent with public policies pertaining to the study area, and no adverse effects to public policies would occur with this alternative. A coastal zone consistency determination using policies included in the WRP for the proposed project is included in **Appendix D**.

Local

The Preferred Alternative would be consistent with initiatives to support development of accessible public parks and open space at the waterfront outlined in the Stuyvesant Cove 197-a Plan. Additionally, the Preferred Alternative would maintain the operation of Stuyvesant Cove Park as a public open space with no large-scale active uses and would sustain links to existing promenades at the north and south ends of the park. The Preferred Alternative would also be consistent with the goals of the Community Board 6 197-a Plan via the improvement of access to the waterfront. Finally, it is anticipated that implementation of the Preferred Alternative would complement the Pier 42 Master Plan that has been approved for the East River Waterfront and Pier 42.

Therefore, it is concluded that the Preferred Alternative would be compatible with land use, zoning, and public policies within the study area.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Similar to the Preferred Alternative, in the event of a design storm under Alternative 2, the flood protection system would be activated as described in Chapter 2.0, "Project Alternatives," to provide protection from both surge and inland flooding. However, the effects of a storm and the restoration that would follow would not result in changes to land use or zoning. Alternative 2 would provide the same benefits to upland communities as the Preferred Alternative but includes minimal park resiliency features or open space enhancements for East River Park. Following a design storm event, restoration to the Park would be anticipated to be more time and labor intensive, and the Park likely would be closed for a longer duration than under the Preferred Alternative.

During non-storm operations, the closure structures would remain open, and landscape and urban design features would be incorporated into existing open spaces in the project area. These proposed project elements would be compatible with existing land uses. No changes to land use within the study area are proposed, although certain land use actions would be required.

Alternative 2 would require the same land use actions as the Preferred Alternative with the exception of the City Map change, which would not be necessary under this alternative. Approval of these actions is specific to the implementation of the proposed project and would not conflict with land use and zoning conditions in the study area. As with the Preferred Alternative, Alternative 2 would have no adverse urban design effects in the study area as described in Chapter 5.5, "Urban Design and Visual Resources." Therefore, it is concluded that Alternative 2 is consistent with land use, zoning and public policies pertaining to the study area.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

In the event of a design storm under Alternative 3, the flood protection system would be activated but the effects of a storm and the restoration that would follow would not result in changes to land use or zoning. As described above under the Preferred Alternative, the proposed features of Alternative 3 would be consistent with applicable Federal, State, and local public policies and would not alter surrounding land uses or zoning. The land use actions required under this Alternative would be similar to Alternative 2. However, implementation of Alternative 3 would also require amendments to the City Map for changes related to existing and proposed pedestrian bridges as described in Chapter 2.0, "Project Alternatives." Approval of these actions is specific to the implementation of the proposed project and would not conflict with land use and zoning conditions in the study area.

In addition, Alternative 3 does not conflict with City zoning policies or recent zoning changes for the nearby neighborhoods. Alternative 3 would also be consistent with relevant public policies and would provide flood protection while enhancing and providing the continued use of waterfront access and open space. Alternative 3, by reconstructing the shared-use path and enhancing passive and active waterfront recreation spaces, would contribute to the study area's public amenities and vitality. Further, the proposed enhancement and realignment of the existing bridges at Delancey and East 10th Streets and the park-side plaza area at the East Houston Street overpass would allow for increased access to well used open spaces. However, this alternative would not provide the level of protection for East River Park proposed under the Preferred Alternative and thus, which it would be consistent with public policies to improve access to open spaces and resiliency within the study area, it would not further those policies to the same degree as the Preferred Alternative. Alternative 3 would be consistent with land use, zoning, and public policies applicable to the study area.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

The consistency of Alternative 5 with land use, zoning, and public policies would be the similar to the Preferred Alternative. Raising the FDR Drive would not alter or affect the use or function of the roadway. This alternative provides flood protection for the FDR Drive, facilitates access to East River Park following a storm event, and eliminates the need for closure structures across the FDR Drive as proposed under the above alternatives. As a result, Alternative 5 is consistent with public policies that apply to the project area and study area described above. The land use actions required under this Alternative would be the same as the Preferred Alternative; however, this alternative would require fewer acquisitions along the Con Edison segment. Alternative 5 would support the uplands communities through enhanced protection of the FDR Drive and would also allow for emergency access to the flood protection system in East River Park during storm events when access to East River Park is otherwise limited. Therefore, it is concluded that Alternative 5 is consistent with land use, zoning, and public policies pertaining to the study area. ✷

A. INTRODUCTION

This chapter assesses the potential impacts of the proposed project on the socioeconomic character of the area surrounding the project areas in accordance with the National Environmental Policy Act (NEPA), the New York State Environmental Quality Review Act (SEQRA), and New York City Environmental Quality Review (CEQR). As described in the 2014 *City Environmental Quality Review Technical Manual*, the socioeconomic character of an area includes its population, housing, and economic activities. Socioeconomic changes may occur when a project directly or indirectly affects any of these elements.

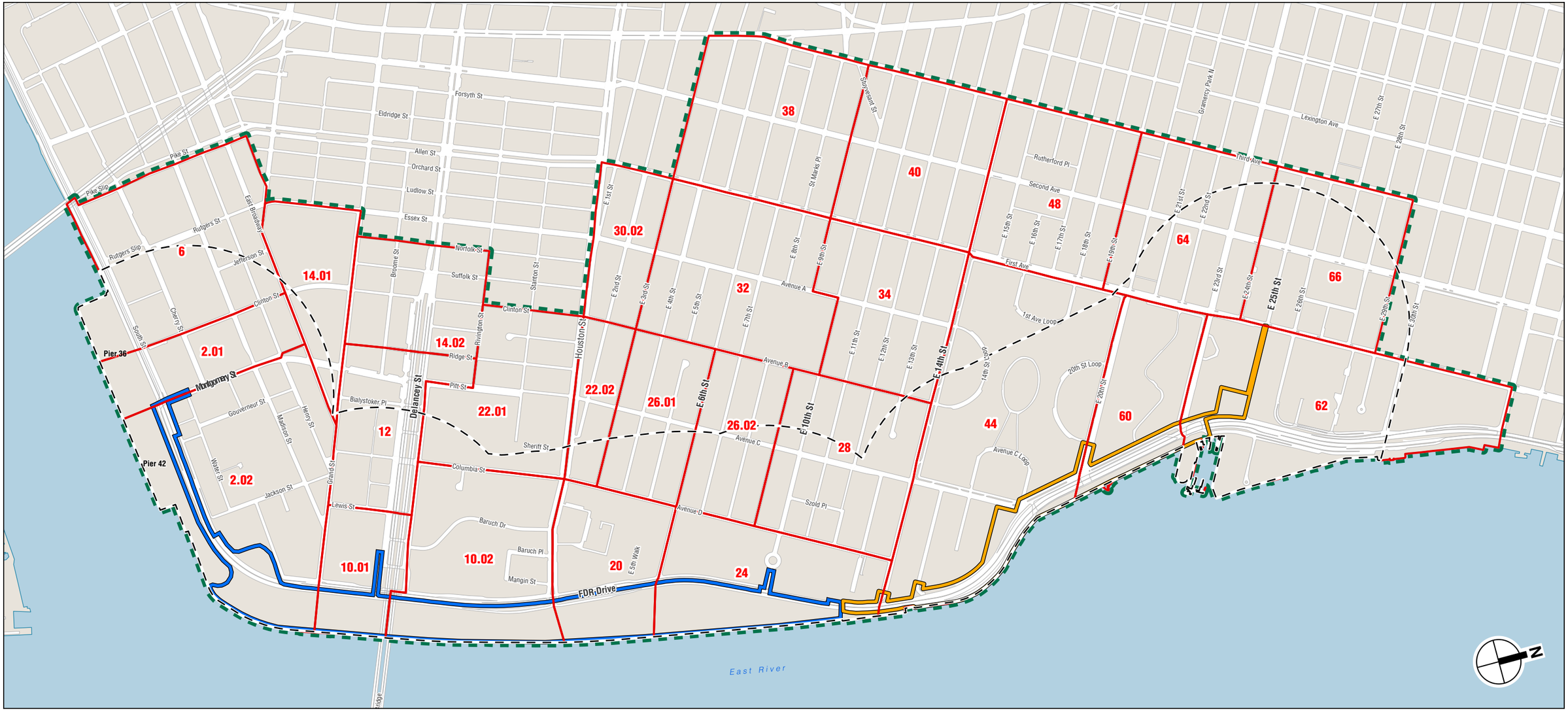
In accordance with *CEQR Technical Manual* guidelines, this analysis considers whether the proposed project could result in significant adverse socioeconomic impacts due to: (1) direct displacement of residential population; (2) indirect displacement of residential population; (3) direct displacement of existing businesses; (4) indirect displacement of businesses; and (5) adverse effects on a specific industry. This analysis also assesses the proposed project's potential impacts in accordance with the methodologies outlined in *The SEQR Handbook, Fourth Edition 2019* and applicable federal guidelines for assessing socioeconomic impacts.

STUDY AREA

According to the *CEQR Technical Manual*, the socioeconomic study area typically mirrors the land use study area, and should reflect the scale of the project relative to the area's population. The socioeconomic study area, shown on **Figure 5.2-1**, is based largely on the furthest extent of either the ¼-mile radius from the project areas**—**the dashed line in **Figure 5.2-1**—or as shown by the dotted line, the ¼-mile radius from the protected area.[1] As per CEQR methodology, the above-described outer boundary is adjusted to align with census tracts to form the socioeconomic study area. The northern boundary of the socioeconomic study area is East 34th Street between First Avenue and the East River, and East 29th Street between First and Third Avenues. The western boundary of the socioeconomic study area is First Avenue between East 29th and East 34th Streets; Third Avenue between East 3rd and East 29th Streets; and Allen, Clinton, Norfolk, Essex, and Pike Streets between East 3rd Street and South Street (see **Figure 5.2-1**). The East River is the eastern and southern boundary of the socioeconomic study area.

The analysis of indirect business displacement includes data on the socioeconomic study area, and provides more detail on a ¼-mile local study area—the area where the proposed project would have the greatest potential effect on local business conditions (see **Figure 5.2-1**).

[1] The protected area is the area that would be protected under the proposed project (the protected area) and includes lands within the Federal Emergency Management Agency (FEMA) 100-year special flood hazard area (SFHA). In addition, the protected area takes into consideration the 90th percentile projection of sea level rise to the 2050s.



Project Area One

Project Area Two

Socioeconomic Study Area

10 *Census Tracts*

1/4-Mile Radius of Project Area (1/4-Mile Local Study Area)

1/4-Mile Radius of Flood Protection Area

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Socioeconomic Conditions Study Area

Figure 5.2-1

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, in the absence of the flood protection system, the existing neighborhoods would remain at risk to coastal flooding during design storm events. Thus, for the No Action Alternative, there is the potential for adverse socioeconomic effects within the study area due to potential flood damage created by design storm events. Socioeconomic effects would include the direct physical damages associated with a design storm event, displacement, human impacts, and loss of services. In addition, the open space amenities associated with other alternatives would not be added to the project area.

Under the No Action Alternative, area business conditions would not be affected by substantial increases in pedestrian traffic and associated consumer spending. Rent levels also would not be affected by the proposed project under the No Action Alternative. In the future without the proposed project, market housing costs would continue to be well above rents affordable to low- and moderate-income households (based on 2012–2016 ACS data, the median household income in the study area was $59,272; median monthly rents were around $3,850). However, unlike with the other alternatives outlined below, none of the economic benefits associated with the construction of comprehensive flood protection systems would be realized under the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Although the Preferred Alternative would result in additional park and neighborhood connection improvements, as with the other alternatives, it does not present new uses or activities to the project area that could markedly influence the study area's residential or commercial market.

The Preferred Alternative does not introduce a new use to the project area that would have the potential to fundamentally alter real estate values. The project area currently includes large public open spaces—including East River Park—that offer active and passive recreation options to study area residents and visitors, and are highly utilized. The proposed project would not create new public parkland that could affect property values, but would elevate, protect, and reconstruct the existing parks (e.g., East River Park, Murphy Brothers Playground, and Asser Levy Playground) in the study area that already influence property values.

Recent trends already show study area market housing costs to be well above rents affordable to low- and moderate-income households (based on 2012–2016 ACS data, the median household income in the study area was $59,272; median monthly rents were around $3,850). These trends are expected to continue with or without this alternative's park and neighborhood connection improvements in place. There is also little existing, and limited opportunity to develop additional, market housing abutting the project area, where values and rents would have the greatest potential to increase as a result of proximity to the park improvements. Moreover, the majority of existing housing abutting the project area and much of the study area's housing overall is in rent-regulated housing developments. Thus, even with the Preferred Alternative's flood protection, open space, and connectivity improvements in place, rents in these developments are protected from local market forces.

The Preferred Alternative is also not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. First, to the extent that commercial rents are influenced by consumer spending, should there be some increase

in visitation attributable to the proposed project, there are few businesses directly abutting the project area that would be affected by any increases in expenditure potential. Second, most of the businesses in the study area are located several blocks away from the project area, and not located on streets leading to the improved park connections across the FDR Drive, where businesses could be affected by any increased pedestrian traffic. Moreover, while the reduced business risk would enhance the value of properties, potentially leading to increased rents, such an influence is not expected to result in significant indirect commercial displacement, as many commercial uses within the study area are located outside of or on the outskirts of the protected area. Therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the protected area and would not have the potential for significant effects throughout the overall study area. Third, with multiple residential projects expected to be completed by 2025 and the associated increases in population and spending potential, any effects on commercial rent increases would be expected in the future without the proposed project. Finally, although this alternative would provide park and neighborhood connection improvements, it does not present new uses or activities to the project area that could markedly influence the study area's commercial market.

Under the Preferred Alternative, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under the Preferred Alternative, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

As with the Preferred Alternative, Alternative 2 would not result in the direct displacement of any residents or businesses. Alternative 2 would not result in significant indirect residential or business displacement pressures within the study area for the same reasons as the Preferred Alternative as described above. However, since Alternative 2 would not provide for the extensive park improvements and integrated access identified for the Preferred Alternative, the potential indirect displacement due to increases in residential and commercial property values over time from park improvements would be less.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

As with the Preferred Alternative, Alternative 3 would not result in direct displacement of any residents or businesses. In addition, Alternative 3 would not result in significant indirect residential or business displacement pressures within the study area for the same reasons as the Preferred Alternative (see above).

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 includes the same flood protection objectives and the same general open space improvements as described in the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the

FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property, and Murphy Brothers Playground. The change in flood protection system approach in this area would not result in increased residential property values and rent increases that could lead to significant indirect residential or business displacement within the study area. This alternative would not add a new use to the project area.

Under Alternative 5, residents and businesses within the 100-year floodplain area would be less vulnerable to flooding during storm events Therefore, as with the other alternatives described above, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise occur during storm events.

C. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following federal, state, and local laws, programs, rules, legal requirements, and policies for which each of the alternatives have been analyzed to result in a determination of environmental effects with project implementation.

FEDERAL

In 1978, the Council on Environmental Quality (CEQ) issued regulations (40 CFR Parts 1500-1508) to implement NEPA. These regulations are binding on all federal agencies. CEQ includes economic and social impacts in its definition of effects. Many federal agencies have also developed their own NEPA procedures that supplement the CEQ NEPA regulations, as the U.S. Department of Housing and Urban Development (HUD) has done. According to HUD's regulations for implementing NEPA (24 CFR Part 50), environmental impact statements (EIS) will be prepared and considered in program determinations pursuant to the general environmental policy stated in § 50.3 and 40 CFR 1505.2 (b) and (c). According to 40 CFR 1505.2 (b) and (c), in making a decision in cases requiring an EIS, an agency may discuss preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions.

NEW YORK STATE

SEQRA considerations include social and economic factors as they relate to community character, such as changes in demographics or access to businesses. Moreover, according to the *SEQR Handbook*, social and economic benefits of, and need for, an action must be included in an EIS.

NEW YORK CITY

The assessment of potential significant adverse socioeconomic effects follows the methodology in the *CEQR Technical Manual*. As described above, under CEQR, the socioeconomic character of an area includes its population, housing, and economic activity. Although socioeconomic changes may not result in significant adverse effects under CEQR, they are disclosed if they would affect land use patterns, low-income populations, the availability of goods and services, or economic investment in a way that changes the socioeconomic character of the area. In some cases, these changes may be substantial but not adverse. In other cases, these changes may be good for some groups but bad for others. The objective of the CEQR analysis is to disclose whether any changes created by the project would have a significant adverse effect compared with what would happen in the future without the proposed project.

An assessment of socioeconomic conditions distinguishes between effects on the residents and businesses in an area and separates these effects into direct and indirect displacement for both of those segments. Direct displacement occurs when residents or businesses are involuntarily

displaced from the actual site of the proposed project or sites directly affected by it. For example, direct displacement would occur if a currently occupied site were redeveloped for new uses or structures or if a proposed easement or right-of-way encroached on a portion of a parcel and rendered it unfit for its current use. In these cases, the occupants of a particular structure to be displaced can usually be identified and, therefore, the disclosure of direct displacement focuses on specific businesses and a known number of residents and workers.

Indirect or secondary displacement occurs when residents, businesses, or employees are involuntarily displaced due to a change in socioeconomic conditions in the area caused by the proposed project. Examples include the displacement of lower-income residents who are forced to move due to rising rents caused by higher-income housing introduced by a proposed project. Examples of indirect business displacement include higher-paying commercial tenants replacing industrial uses when new uses introduced by a proposed project lead to an increase in commercial rents. Unlike direct displacement, the specific occupants to be indirectly displaced are not known. Therefore, an assessment of indirect displacement usually identifies the size and type of groups of residents, businesses, or employees potentially affected.

Some projects may affect the operation and viability of a specific industry not necessarily tied to a specific location. An example would be new regulations that prohibit or restrict the use of certain processes that are critical to certain industries. In these cases, the CEQR review process may involve an assessment of the economic effects of the project on that specific industry.

D. METHODOLOGY

According to the *CEQR Technical Manual*, a socioeconomic assessment should be conducted if a project may be reasonably expected to create socioeconomic changes in the area affected by the project that would not be expected to occur in the absence of the project. The following screening assessment considers threshold circumstances identified in the *CEQR Technical Manual* and enumerated below that can lead to socioeconomic changes warranting further assessment.

1. ***Direct Residential Displacement: Would the project directly displace residential population to the extent that the socioeconomic character of the neighborhood would be substantially altered? Displacement of fewer than 500 residents would not typically be expected to alter the socioeconomic character of a neighborhood.***

   The project areas do not contain any residential uses. Therefore, the proposed project would not directly displace any residents, and an assessment of direct residential displacement is not warranted.

2. ***Direct Business Displacement: Would the project directly displace more than 100 employees, or would the project directly displace a business whose products or services are uniquely dependent on its location, are the subject of policies or plans aimed at its preservation, or serve a population uniquely dependent on its services in its present location? If any of these conditions is considered likely, assessments of direct business displacement and indirect business displacement are appropriate.***

   There are a limited number of businesses within and immediately adjacent to the project areas. The businesses include: a BP Gas Station (along the waterfront at East 23rd Street and FDR Drive); a 395,800-sf Skyport Marina Parking Garage (just north of the project area along the waterfront north of East 23rd Street); and a Propark America outdoor parking lot (along the waterfront at East 20th Street and FDR Drive). None of these businesses would be directly displaced by the proposed project. New York City Department of Parks and Recreation (NYC

Parks) is currently developing Pier 42 into a public waterfront open space, which is expected to be open to the public in 2020. The uses that are currently on Pier 42 will be displaced irrespective of the proposed project. Since no businesses would be directly displaced by the proposed project, an assessment of direct business displacement is not warranted.

3. ***Indirect Displacement due to Increased Rents: Would the project result in substantial new development that is markedly different from existing uses, development, and activities within the neighborhood? Residential development of 200 units or less or commercial development of 200,000 square feet or less would typically not result in significant socioeconomic impacts. For projects exceeding these thresholds, assessments of indirect residential displacement and indirect business displacement are appropriate.***

   Although the proposed project would not introduce any residential or commercial space, the proposed project would introduce a substantial new use (a vertical flood protection system) that does not currently exist in the neighborhood; therefore, assessments of indirect residential displacement and indirect business displacement are warranted in order to determine whether and under what conditions the proposed project could stimulate changes that would raise rents, and if so, whether this would make existing categories of tenants vulnerable to displacement. Factors that could potentially influence rents include the following: the addition of new open space amenities as part of the flood protection system that would make the area a more attractive place to live and work; the reduction of risk of property damage from flooding; and the reduction of costs associated with investing in resiliency measures for individual properties.

4. ***Indirect Business Displacement due to Retail Market Saturation: Would the project result in a total of 200,000 square feet or more of retail on a single development site or 200,000 square feet or more of region-serving retail across multiple sites? This type of development may have the potential to draw a substantial amount of sales from existing businesses within the study area, resulting in indirect business displacement due to market saturation.***

   The proposed project would not introduce retail uses in excess of 200,000 square feet; therefore, an assessment of potential indirect business displacement due to retail market saturation is not warranted.

5. ***Adverse Effects on Specific Industries: Is the project expected to affect conditions within a specific industry? This could affect socioeconomic conditions if a substantial number of workers or residents depend on the goods or services provided by the affected businesses, or if the project would result in the loss or substantial diminishment of a particularly important product or service within the City.***

   The proposed project would not result in direct business displacement, and the analysis finds that there is no potential for significant indirect displacement within any specific industry sector. Therefore, an assessment of adverse effects on specific industries is not necessary.

Based on the screening assessment presented above, the proposed project warrants preliminary assessments of indirect residential displacement and indirect business displacement due to increased rents.

ANALYSIS FORMAT

Based on *CEQR Technical Manual* guidelines, indirect residential displacement and indirect business displacement analyses begin with a preliminary assessment. The objective of the preliminary assessment is to learn enough about the potential effects of the proposed action to

either rule out the possibility of significant adverse effects or determine that a more detailed analysis is warranted to fully determine the extent of the effects. A detailed analysis, when warranted, is framed in the context of existing conditions and evaluations of the future without the proposed action and the future with the proposed action by the project's analysis year. In conjunction with the land use analysis that was undertaken for this EIS (see Chapter 5.1, "Land Use, Zoning, and Public Policy"), specific development projects expected to occur in the area in the future without the proposed project were identified, along with the possible changes in socioeconomic conditions that would result (e.g., potential increases in population, changes in the income characteristics of the study area, possible changes in rents or sales prices of residential units, or changes in employment or retail sales). Those conditions were then compared with the condition in the future with the proposed project to determine the potential for significant adverse effects.

DATA SOURCES

Demographic data was obtained primarily from the New York City Department of City Planning (DCP)'s NYC Population FactFinder, which compiles data from the U.S. Census Bureau. Data collected from FactFinder includes: American Community Survey (ACS) 2006–2010 and 2012–2016 estimates. Except where specifically noted, values (i.e., median household income, median housing value, and median contract rent) presented in this chapter are in 2016 inflation-adjusted dollars, as shown on FactFinder. Another source of demographic data included in this chapter is Social Explorer, a private data provider (particularly where 2006–2010 ACS data for Manhattan and New York City as a whole was not obtainable from FactFinder). ACS data, which are estimates from a sample of the population, are used for population characteristics including age and household income, as well as housing unit characteristics such as age of structure and unit tenure.[2]

Residential rental rates and sale values were obtained through online property databases such as Cityrealty.com and Streeteasy.com, as well as through current market reports published by Douglas Elliman, CitiHabitats, and Corcoran. Data on New York City Housing Authority (NYCHA) developments was collected from NYCHA's online directory.[3] Data on privately owned subsidized affordable rental properties was obtained from New York University Furman Center's Subsidized Housing Information Project (SHIP), which includes data on 235,000 units in New York City that were developed with financing and insurance from the U.S. Department of Housing and Urban Development (HUD), HUD project-based rental assistance, New York City or State Mitchell-Lama financing, or the Low-Income Housing Tax Credit (LIHTC).[4]

For the indirect business displacement analyses, employment data was obtained from the U.S. Census Bureau's OnTheMap tool. Land use and parcel data were collected from the New York City Department of City Planning's MapPLUTO database. In addition, AKRF conducted field surveys of existing businesses within the ¼-mile local study area in March 2018.

[2] https://www.census.gov/programs-surveys/acs/guidance/comparing-acs-data.html

[3] http://gis.nyc.gov/nycha/im/wmp.do, accessed September 2015.

[4] http://datasearch.furmancenter.org/, accessed September 2015.

E. AFFECTED ENVIRONMENT

This section describes the population and housing characteristics of the socioeconomic study area. It outlines trend data since 2006–2010, and compares the characteristics of the socioeconomic study area with Manhattan and New York City.

POPULATION

According to the U.S. Census Bureau, the socioeconomic study area had a population of 163,962 residents in 2006–2010 and 160,138 residents in 2012–2016 (see **Table 5.2-1**).Over the same time period, the population grew in Manhattan (3.3 percent) and New York City (4.7 percent).

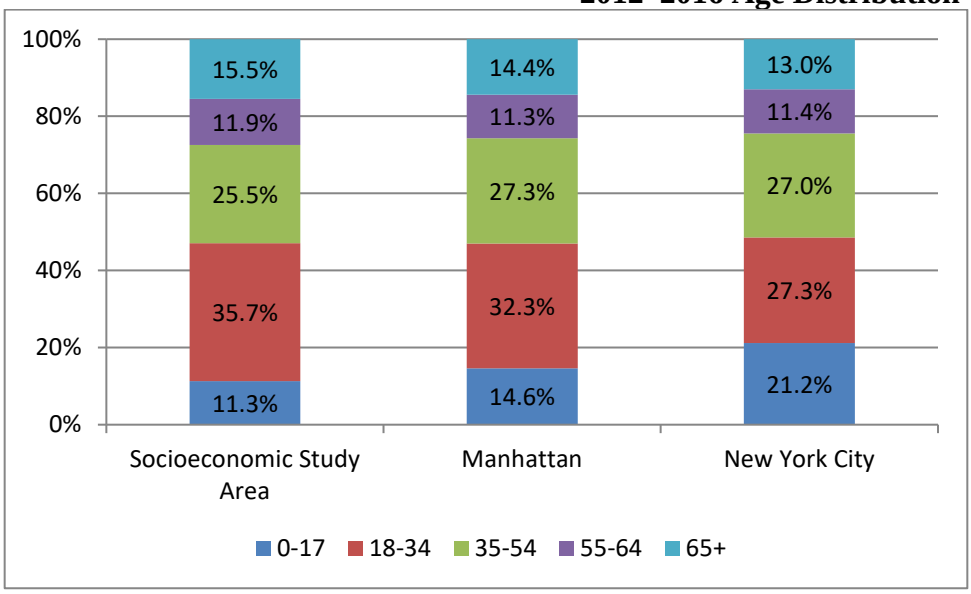
Table 5.2-1
Population: 2006–2010 and 2012–2016

Area	Population		Percent Change
	2006–2010	2012–2016	
Socioeconomic Study Area	163,962	160,138	
Manhattan	1,583,345	1,634,989	3.3%
New York City	8,078,471	8,461,961	4.7%

Note: The statistical reliability of the data included in this table has been vetted using DCP's NYC Population FactFinder and by following guidance provided by DCP. For the study area, neither the rate of change nor the directionality of change over time was statistically reliable. For Manhattan and New York City, the rate of change and the directionality of change were statistically reliable and therefore reported.
Sources: U.S. Census Bureau 2006–2010 ACS and 2012–2016 ACS. Accessed through DCP's NYC Population FactFinder in November 2018. 2006–2010 ACS data for Manhattan and New York City were obtained from Social Explorer (accessed November 2018).

Figure 5.2-2 shows 2012–2016 age distribution in the socioeconomic study area, Manhattan, and New York City. Approximately 35.7 percent of the residents in the socioeconomic study area were between 18 and 34—this is higher than Manhattan (32.3 percent) and New York City (27.3 percent). The socioeconomic study area also had a slightly higher share of adults over 65—15.5 percent, as compared with 14.4 percent in Manhattan and 13.0 percent in New York City. The higher share of residents above 65 years of age suggests that more residents are aging in place in the socioeconomic study area.

Figure 5.2-2
2012–2016 Age Distribution



Source: U.S. Census Bureau. 2012–2016 ACS. Accessed through DCP's NYC Population FactFinder (accessed November 2018).

HOUSEHOLDS AND INCOME

The socioeconomic study area contained a total of 77,596 households in 2012–2016, with an average household size of 1.97 persons per household (see **Table 5.2-2**). This average household size is similar to the average household size in Manhattan (1.99 persons per household), but lower than the average household size in New York City (2.57 persons per household). Between 2006–2010 and 2012–2016, the number of households in the socioeconomic study area increased. The number of households also increased in Manhattan (2.9 percent increase) and New York City (2.7 percent increase) over the same time period.

Table 5.2-2
Household Characteristics: 2006–2010 and 2012–2016

	Total Households			Average Household Size		
	2006–2010	2012–2016	Percent Change	2006–2010	2012–2016	Percent Change
Socioeconomic Study Area	75,420	77,596	↑ Increased	2.09	1.97	↓Decreased
Manhattan	732,204	753,385	2.9%	2.10	2.10	N/A
New York City	3,047,249	3,128,246	2.7%	2.60	2.70	3.8%

Note: The statistical reliability of the data included in this table has been vetted using DCP's NYC Population FactFinder and by following guidance provided by DCP. For the study area, the rate of change was not statistically reliable but the directionality of change was and therefore reported. For Manhattan and New York City, the rate of change and the directionality of change were statistically reliable and therefore reported.
Sources: U.S. Census Bureau ACS 2006–2010 and ACS 2012–2016. Accessed through DCP's NYC Population FactFinder in November 2018. 2006–2010 ACS data for Manhattan and New York City were obtained from Social Explorer (accessed November 2018).

Table 5.2-3 presents average household income, median household income, and poverty status for the socioeconomic study area, Manhattan, and New York City over the 2006–2010 and 2012–

2016 periods. According to 2012–2016 ACS data, the average household income for the socioeconomic study area was $92,242 (see **Table 5.2-3**). This was lower than the average household income in New York City ($88,437) and in Manhattan ($138,748).

Table 5.2-3
Income Characteristics and Trends

Area	Average Household Income[1,2,3]			Median Household Income[1,2,3]			Poverty Status (Percent)[2]	
	2006–2010	2012–2016	Percent Change	2006–2010	2012–2016	Percent Change	2006–2010	2012–2016
Socioeconomic Study Area	$93,007	$92,242		$59,613	$59,272		19.8%	21.4%
Manhattan	$135,027	$138,748	2.8%	$71,545	$75,513	5.5%	17.8%	17.6%
New York City	$85,779	$88,437	3.1%	$55,373	$55,191	-0.3%	19.1%	20.3%

Notes:
[1] The ACS collects data throughout the period on an on-going, monthly basis and asks for respondents' income over the "past 12 months." The 2012–2016 ACS data therefore reflects incomes between 2012 and 2016, while 2006–2010 ACS data reflects incomes between 2006 and 2010.
[2] The average household income and median household income for both time periods is presented in 2016 inflation-adjusted dollars, as shown on DCP's NYC Population FactFInder (accessed in November 2018).
[3] The statistical reliability of the data included in this table has been vetted using DCP's NYC Population FactFinder and by following guidance provided by DCP. For the study area, neither the rate of change nor the directionality of change over time was statistically reliable. For Manhattan and New York City, the rate of change and the directionality of change were statistically reliable and therefore reported.
Sources: U.S. Census Bureau 2006–2010 ACS and 2012–2016 ACS. Accessed through DCP's NYC Population FactFinder in November 2018. 2006–2010 ACS data for Manhattan and New York City were obtained from Social Explorer (accessed November 2018).

Based on 2012–2016 ACS data, the median household income in the study area was $59,272 (see **Table 5.2-3**). The median household income in Manhattan increased by 5.5 percent over this time period, while New York City as whole experienced a slight decline in median household income.

The socioeconomic study area and New York City had similar percentages of their population living below the poverty level in 2012–2016 (21.4 percent and 20.3 percent, respectively) (see **Table 5.2-3**). This was higher than in Manhattan where 17.6 percent of the population was living below the poverty level in 2012–2016.

HOUSING PROFILE

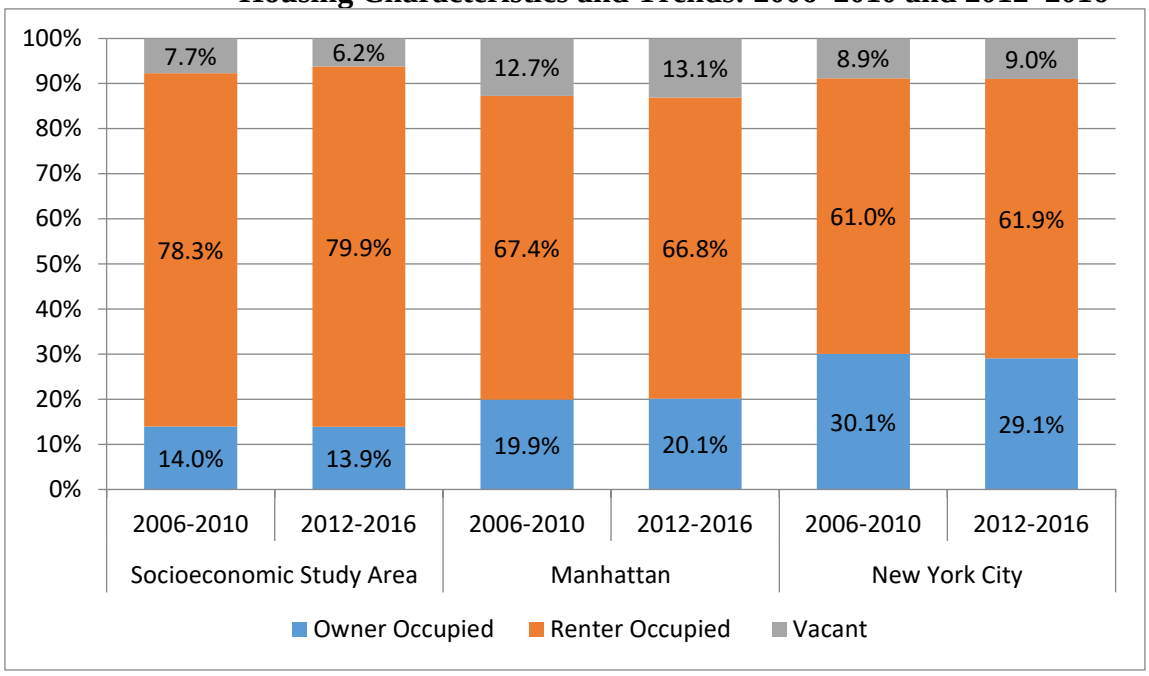
The socioeconomic study area includes predominantly multi-family mid-rise buildings (tenements) and tower-in-the-park-style developments. In 2012–2016, there were approximately 82,724 housing units in the socioeconomic study area. The number of housing units in the socioeconomic study area increased between 2006–2010and 2012–2016. Census Tract 22.02, which is bounded by East Houston Street, Avenue B, East 3rd Street, and Avenue D, experienced an increase in housing units from 2006–2010 to 2012–2016. Also, housing units in Census Tracts 26.01 and 26.02, which are bounded by East 3rd Street, Avenue D, East 9th Street, and Avenue B, increased during the same time period. In Census Tract 26.02, which is bounded by Avenue B to the west, East 9th Street to the north, Avenue D to the east, and East 6th Street to the south, housing built between 2006 and 2010 includes 74 affordable senior units at Grand Street Settlement's Senior Supportive Housing Building at 711 East 6th Street (completed in 2006).

As shown in **Figure 5.2-3**, as reported in the 2012–2016 ACS, 6.2 percent of housing units in the socioeconomic study area were vacant. Higher shares of housing were vacant in Manhattan and New York City, at 13.1 percent and 9.0 percent, respectively. The socioeconomic study area's 7.7 percent vacancy rate in 2006–2010 was also lower than Manhattan (12.7 percent) and New York City (8.9 percent). Based on data from Corcoran's *Manhattan Residential Rental Market Report, First Quarter 2015*, the rental market conditions within the study area are tighter, with reported

vacancy rates of 2.13 percent for rental units in the East Village and 1.52 percent in Manhattan. Citi Habitats also shows lower vacancy rates in its *Manhattan Residential Rental Market Report for the Second Quarter 2015* at 1.40 percent in the East Village and 1.39 percent in Manhattan.[5]

Of the 82,724 housing units in the study area, approximately 12,707 units (or 15.5 percent) are in NYCHA developments.[6] In addition, the study area includes 8,198 affordable residential units in privately owned subsidized rental developments in the socioeconomic study area (or 10.0 percent of study area housing units); these include developments that were developed with financing and insurance from HUD, HUD project-based assistance, Mitchell-Lama financing, or the LIHTC.[7] See section "Investments in Affordable Housing" below for more details on NYCHA housing and other affordable housing in the socioeconomic study area.

Figure 5.2-3
Housing Characteristics and Trends: 2006–2010 and 2012–2016



Note: Vacant units include units "For rent," "For sale only," and "Other vacant." In each geography (Socioeconomic Study Area, Manhattan, New York City), the majority of vacant units were classified as "Other vacant," which includes the following ACS 2012–2016 Vacant Housing Unit categories: Rented, Not Occupied; Sold, Not Occupied; For Seasonal, Recreational, or Occasional Use; For Migrant Workers, and Other Vacant.
Sources: U.S. Census Bureau 2006–2010 ACS and 2012–2016 ACS. Accessed through DCP's NYC Population FactFinder in November 2018. 2006–2010 ACS data for Manhattan and New York City were obtained from Social Explorer (accessed November 2018).

The socioeconomic study area had a higher percentage of renters than in Manhattan and New York City; approximately 79.9 percent of the socioeconomic study area's residential units were renter-

[5] The reports do not provide vacancy rates for the Lower East Side/Alphabet City.

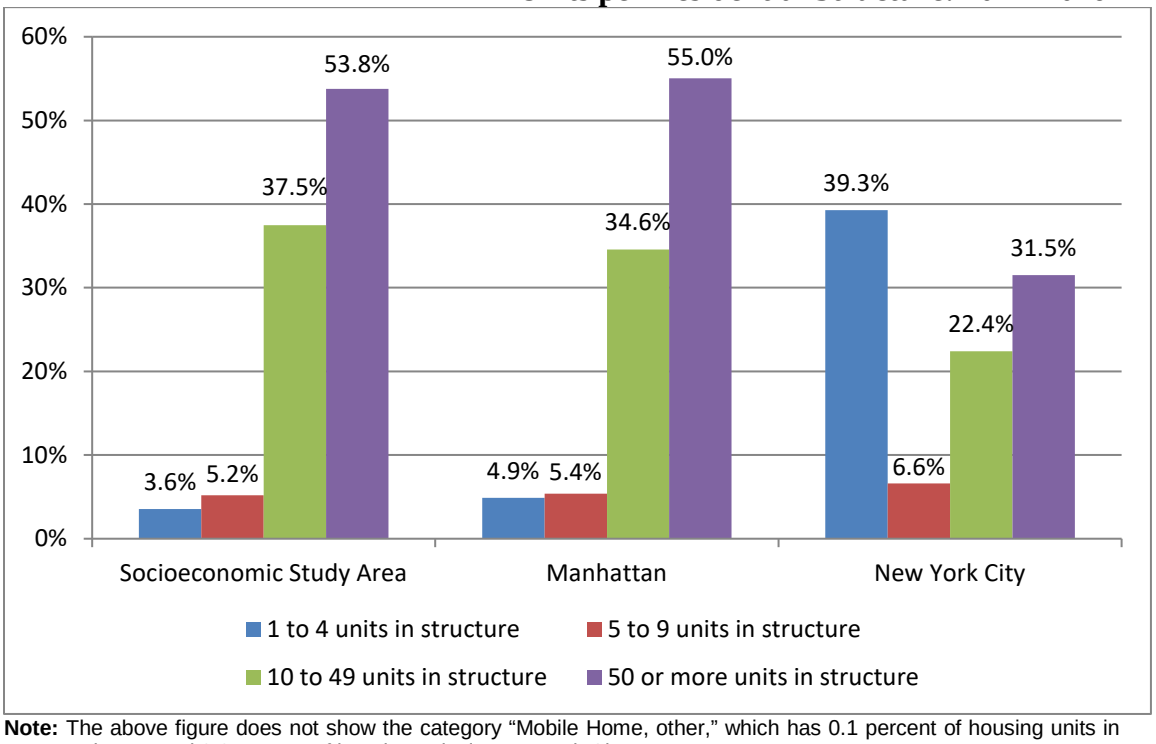
[6] NYCHA website (accessed September 2015).

[7] NYU Furman Center's SHIP database (accessed September 2015).

occupied in 2012–2016, compared with 66.8 percent and 61.9 percent in Manhattan and New York City, respectively (see **Figure 5.2-3**).

Figure 5.2-4 shows the distribution of residential units per structure. Similar to Manhattan, over half of housing units in the socioeconomic study area were in buildings with 50 or more units. This reflects the presence of the study area's tower-in-the-park-style developments. In addition, approximately 37.5 percent of housing units in the socioeconomic study area were in buildings with 10 to 49 units, reflecting the presence of the study area's tenements. Manhattan and New York City had a lower share of housing units with 10 to 49 units, at 34.6 percent and 22.4 percent, respectively.

Figure 5.2-4
Units per Residential Structure: 2012–2016



Note: The above figure does not show the category "Mobile Home, other," which has 0.1 percent of housing units in Manhattan and 0.2 percent of housing units in New York City.
Source: U.S. Census Bureau. 2012–2016 ACS. Accessed through DCP's NYC Population FactFinder in November 2018.

As shown in **Table 5.2-4**, according to 2012–2016 ACS data the median home value in the socioeconomic study area was $616,585, which is lower than the median home value in Manhattan ($871,500), but higher than in New York City as a whole ($508,900).

Table 5.2-4
Median Home Value and Gross Rent: 2006–2010 and 2012–2016

	Median Home Value[1,2]			Median Gross Rent[1,2]		
	2006–2010	2012–2016	Percent Change	2006–2010	2012–2016	Percent Change
Socioeconomic Study Area	$672,553	$616,585	↓ Decreased	$1,264	$1,405	↑ Increased
Manhattan	$908,699	$871,500	-4.1%	$1,359	$1,575	15.9%
New York City	$565,900	$508,900	-10.1%	$1,179	$1,294	9.8%

Notes:
[1] Median home value and median contract rent for both time periods are presented in 2016 inflation-adjusted dollars as shown on DCP's NYC Population Fact Finder (accessed November 2018).
[2] The statistical reliability of the data included in this table has been vetted using DCP's NYC Population FactFinder and by following guidance provided by DCP. For the study area, the rate of change was not statistically reliable but the directionality of change was and therefore reported.
Sources: U.S. Census Bureau 2006–2010 ACS and 2012–2016 ACS. Accessed through DCP's NYC Planning Population FactFinder in November 2018. 2006–2010 ACS data for Manhattan and New York City were obtained from Social Explorer (accessed November 2018).

Based on 2012–2016 ACS data, the median gross rent[8] in the socioeconomic study area was an estimated $1,405 per month, which is an increase since 2006–2010. The median contract rent also increased in Manhattan (15.9 percent) and New York City as a whole (9.8 percent).

RECENT RESIDENTIAL TRENDS

Based on a survey of current market rate rental listings collected from StreetEasy.com in August and September 2015, rental rates for studios generally ranged from $1,850 to $4,469, one-bedroom units ranged from $2,095 to $6,950 per month, rental rates for two-bedroom units ranged from $2,500 to $8,950 per month, and rental rates for three-bedroom units ranged from $3,995 to $18,500 per month (see **Table 5.2-5**). Based on this data, the overall median rental rate for new listings in the socioeconomic study area was $3,850, which is significantly higher than the median contract rent based on the most recent ACS ($1,335). The overall median rental rate for the socioeconomic study area was 13.4 percent higher than the median monthly rent in Manhattan of $3,395 reported in the *Elliman Report* for March 2015.

Table 5.2-5
Current Rental Rates
in the Socioeconomic Study Area and Manhattan

	Median Monthly Rent	Average Annual Price per Square Foot (PSF)	Count
Socioeconomic Study Area			
Studio	$3,350	$53	26
1BR	$3,488	$61	38
2BR	$3,900	$57	32
3BR	$5,395	$68	17
Total	**$3,850**	**$59**	**113**
Manhattan	**$3,395**	**$55**	**5,117**

Source: Data for the socioeconomic study area is based on data from StreetEasy.com, accessed August and September 2015. Data source for Manhattan is the Elliman Report for Manhattan, Brooklyn, and Queens Rentals, March 2015.

[8] According to the U.S. Census Bureau, median contract rent is the middle value of the monthly rent agreed to or contracted for, regardless of any furnishings, utilities, fees, meals, or services that may be included.

Overall, the median sales price of owner-occupied housing in the socioeconomic study area, including condos and co-ops, was $852,500 (see **Table 5.2-6**). This was 9.3 percent lower than the median value for condos and co-ops in Manhattan ($940,000). However, the recent sales data suggest that home values are increasing in the study area since the recent sales values are 28.7 percent higher than the median home value reported in the 2012–2016 ACS ($619,429).

Table 5.2-6
Recent Condo and Co-op Sales
in the Socioeconomic Study Area and Manhattan

	Socioeconomic Study Area[1]	Manhattan
Condos		
Median Sale Price	$1,560,000	$1,350,000
Average Price/SF	$1,527	$1,529
No of Transactions	171	5,050
Co-ops		
Median Sale Price	$625,000	$740,000
Average Price/SF	$904	$1,143
No of Transactions	209	7,645
Condos and Co-ops		
Median Sale Price	$852,500	$940,000
Average Price/SF	$1,184	$1,297
No of Transactions	380	12,695

Sources: Data for the socioeconomic study area is based on properties sold from August 2014 through August 2015 with sales prices listed on CityRealty.com, accessed August 2015. While the ACS provides data on median home value, it does not distinguish between condos and co-ops. Also, ACS provides an average over a 5-year period, whereas the sales provided in this table occurred in a single year. Data source for Manhattan is from *The Elliman Report: 2005–2014 Manhattan Decade*, Douglas Elliman and Miller Samuel Inc.

The median sales price for condos in the socioeconomic study area was higher than the median sales price for condos in Manhattan as a whole. As shown in **Table 5.2-6**, the median sales price for condos in the study area was $1.56 million, which was 15.6 percent higher than the median sale price for Manhattan as a whole. The median sales price of co-ops in the socioeconomic study area, however, was 15.5 percent lower than the median sales price of co-ops in Manhattan.

INVESTMENTS IN AFFORDABLE HOUSING

The socioeconomic study area includes 26 NYCHA developments that have over 12,700 residential units (see **Table 5.2-7** and **Figure 5.2-5**). NYCHA housing units account for 15.5 percent of the 81,929 housing units in the socioeconomic study area. It is estimated that over 28,200 residents live in the NYCHA housing units in the socioeconomic study area (or 17.5 percent of the population in the study area).

Project Area One

Project Area Two

Socioeconomic Study Area

NYCHA Developments

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

New York City Housing Authority Developments

Figure 5.2-5

Table 5.2-7
New York City Housing Authority Developments in the Study Area

Development Name	Address	Senior Only	Number of Apartments	Completion Year
344 East 28th Street	344 East 28th Street	No	225	1971
Straus Houses	224 East 28th Street	No	267	1965
Riis House	152 Avenue D	No	1,191	1949
Jacob Riis II	765 FDR Drive	No	578	1949
Lower East Side III	722 East 9th Street	No	56	1996
Pedro Albizu Campos Plaza I	635 East 12th Street,	No	269	1979
Pedro Albizu Campos Plaza II	643 East 13th Street	No	224	1982
Lower East Side Rehab (Group 5)	89 Avenue C	No	55	1986
Lower East Side II	637 East 5th Street	No	188	1988
East 4th Street Rehab	227 East 4th Street	No	25	1988
Mariana Bracetti Plaza	251 East 3rd Street	No	108	1974
First Houses	138 East 3rd Street	No	126	1936
Judge Max Meltzer Tower	94 East 1st Street	Yes	231	1971
Stanton Street	189 Stanton Street	No	13	2003
Lillian Wald	10 Avenue D	No	1,861	1949
Bernard M. Baruch	605 FDR Drive	No	2,194	1959
Bernard M. Baruch Houses Addition	72 Columbia Street	Yes	197	1977
Samuel Gompers	100 Pitt Street	No	474	1964
Seward Park Extension	154 Broome Street	No	360	1973
Baruch Charney Vladeck	70 Gouverneur Street	No	1,531	1940
Lavanburg Houses	126 Baruch Place	No	104	1984
Baruch Charney Vladeck II	28 Jackson Street,	No	240	1940
Mayor Fiorello H. LaGuardia	45 Rutgers Street	No	1,094	1957
Mayor Fiorello H. LaGuardia Addition	282 Cherry Street	Yes	150	1965
Two Bridges URA Site 7	286 South Street	No	250	1975
Henry Rutgers	45 Pike Street	No	721	1965

Note: Locations illustrated in **Figure 5.2-5**.
Source: MyNYCHA Developments database, https://my.nycha.info/DevPortal, December 2018.

These developments range in size from the 13-unit Stanton Street development at 189 Stanton Street to the 2,194-unit Baruch Houses (described below).

There is a concentration of NYCHA housing in the eastern portion of the socioeconomic study area between Avenue D, the FDR Drive, and Delancey and East 14th Streets. This area includes the Jacob Riis Houses, Lillian Wald Houses, Bernard Baruch Houses, Capmos Plaza II, and the Lavanburg Homes. These developments include over 6,100 apartments in 54 buildings built between 1949 and 1984. The Jacob Riis Houses are an 11.7-acre development between East 8th and East 13th Streets, Avenue D, and the FDR Drive. It was built in 1949 and has 13 buildings, 6, 13, and 14 stories tall with 1,191 apartments. Just south of the Jacob Riis Houses is the Jacob Riis II development, which has six buildings, 6, 13, and 14 stories tall with 578 apartments on 5.9 acres between East 6th and East 8th Streets, Avenue D, and the FDR Drive. The Lillian Wald Houses are south of the Jacob Riis Houses and are located on 16.5-acres between East 6th Street and East Houston Streets, between Avenue D and the FDR Drive. The Lillian Wald Houses have 16 buildings, 11 and 14 stories tall with 1,861 apartments. Between the FDR Drive and East Houston, Delancey, and Columbia Streets are three developments: Bernard Baruch Houses, Baruch Houses Addition, and Lavanburg Houses. The Bernard Baruch Houses encompass 27.5 acres and have 17 buildings, 7, 13, and 14 stories tall with 2,194 apartments. Baruch Houses Addition encompasses 1.08 acres and has 197 senior-only apartments. Lavanburg Homes, which is a 0.53-acre development, south of East Houston Street and adjacent to the Baruch Houses, is a 6-story building with 104 apartments.

There is also a concentration of NYCHA housing in the southern portion of the socioeconomic study area between the FDR Drive and Henry and Pike Streets. This area includes approximately 3,960 NYCHA apartments in 40 buildings built between 1940 and 1975. Rutgers Houses, which is a 5.2-acre development between Cherry, Pike, Madison, and Rutgers Streets, has 721 apartments in five, 20-story buildings. East of Rutgers Houses is the LaGuardia Houses and the LaGuardia Addition developments. LaGuardia Houses is a 10.7-acre development bordered by Rutgers, Madison, Montgomery, and Cherry Streets, and includes 9 16-story buildings with 1,094 apartments. The LaGuardia Addition development is 0.6 acres and includes a 16-story senior-only building (150 units). Vladeck Houses I and II are located between Gouverneur, Water, and east of Jackson Street. Vladeck Houses I is a 13-acre complex with 20 6-story buildings with 1,531 apartments and Vladeck Houses II is a 2.23-acre complex with 4 6-story buildings with 240 apartments. This area also includes the Two Bridges Urban Renewal Area Site 7 development, which has a 26-story building with 250 apartments on a site bordered by Clinton, South, Cherry, and Montgomery Streets.

In addition to the NYCHA units, the socioeconomic study area also includes affordable residential units in privately owned subsidized rental or co-op developments. Based on data from New York University's Subsidized Housing Information Project,[9] there are approximately 60 subsidized rental or co-op developments in the socioeconomic study area. These properties include 8,198 affordable residential units in 114 buildings throughout the socioeconomic study area. These 8,198 affordable units make up 10.0 percent of the housing units in the socioeconomic study area. These developments range in size between 7 and 1,105 residential units. The largest of these properties is the Masaryk Towers, which is located on Columbia Street, and has 4 buildings with 801 residential units (co-ops). This Mitchell-Lama development was built in 1966. Another large subsidized development in the socioeconomic study area is Gouverneur Gardens on Montgomery Street, which was built in 1962 and has six buildings with 869 residential units (co-ops). Gouverneur Gardens is also a Mitchell-Lama development.

Another effort to maintain affordability in the neighborhood is evident in the sale of Stuyvesant Town-Peter Cooper Village, which has approximately 11,240 apartments between East 14th Street to the south, First Avenue to the west, East 23rd Street to the north, and Avenue C to the east. The terms of the agreement include a regulation that will reserve 4,500 units for middle-income families and 500 units for moderate-income families for the next 20 years.[10]

ECONOMIC PROFILE

PROJECT AREAS

As discussed above, there are a few businesses within and immediately adjacent to the project areas. The businesses include: a BP Gas Station (along the waterfront at East 23rd Street and FDR

[9] SHIP, which is a project of New York University Furman Center and the Moelis Institute for Affordable Housing Policy, contains data on 235,000 units of privately owned subsidized affordable rental properties in New York City developed with financing and insurance from HUD, HUD-project based rental assistance, New York City or State Mitchell-Lama financing, or the LIHTC. Last accessed March 1, 2018 at http://coredata.nyc/.

[10] "Mayor, Local Elected Officials and Tenant Leaders Announce 20-Year Agreement with Blackstone and Ivanhoé Cambridge to Protect Middle Class Housing at Stuyvesant Town and Peter Cooper Village" (2015, October 20). Retrieved from http://www1.nyc.gov/office-of-the-mayor/news/736-15/mayor-local-elected-officials-tenant-leaders-20-year-agreement-blackstone-and/#/0.

Drive); a 395,800-sf Skyport Marina Parking Garage (just north of the project area along the waterfront north of 23rd Street); and Propark America outdoor parking lot (along the waterfront at East 20th Street and FDR Drive). In addition, Pier 42 currently has parking, as well as a temporary park that opened in 2013. NYC Parks is currently developing Pier 42 into a public waterfront open space, which is expected to be open to the public in 2020.

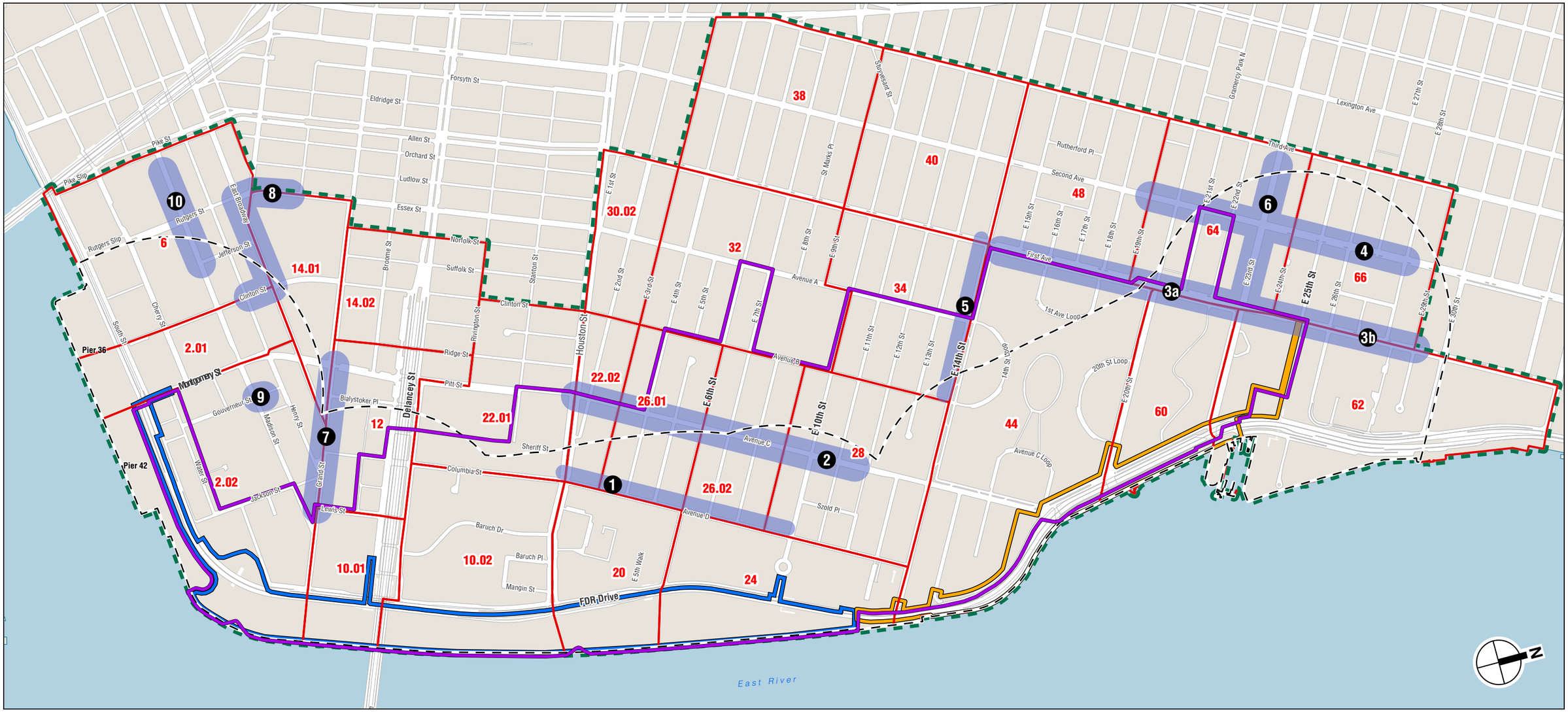
¼-MILE LOCAL STUDY AREA

The ¼-mile local study area—the area within which the proposed project would be expected to have the greatest potential to affect business conditions—is predominantly residential, but also includes ground-floor retail, open space, and institutional uses. Closest to the project area along FDR Drive, businesses include a limited number of parking facilities and industrial uses, including the Consolidated Edison facility located adjacent to the project area, east of Avenue C between East 13th and approximately East 17th Street. Throughout the ¼-mile local study area, ground-floor retail uses are common along major east-west and north-south corridors. The closest neighborhood-serving retail/restaurants to the project area are on Avenue D, which is west of the project area (see Corridor 1, **Figure 5.2-6**).

The retail corridor along First Avenue between East 14th Street and East 28th Street can be described as two somewhat distinct areas—the area north of East 23rd Street and the area south of East 23rd Street (see Corridors 3a and 3b, respectively, **Figure 5.2-6**). Retail along First Avenue between East 23rd Street and East 28th Street serves the local retail needs of the workers employed by surrounding institutional uses located on First Avenue, including Bellevue Hospital, The VA Hospital Center New York, New York University (College of Dentistry, College of Nursing, and School of Engineering), and Brookdale Health Science Center of Hunter College. Retail along this portion of First Avenue is significantly less concentrated, and includes small-sized stores, including an Au Bon Pain, Citibank, and Chase Bank. The low density of retail businesses on Corridor 3a is supplemented with food carts that are prevalent along the corridor. First Avenue below East 23rd Street is characterized by a high concentration of retail businesses and a high level of retail users (mainly catering to the relatively dense residential population, including residents of Stuyvesant Town). The dominant store types along this stretch of First Avenue are delis, restaurants, dry cleaners and laundromats, hair/nail salons, banks, clothing stores, and grocery stores. National retailers along this corridor include CVS, Dunkin' Donuts, Chipotle, TD Bank, and Walgreens. In comparison to other retail corridors included in this analysis and on **Figure 5.2-6**, there is a low level of retail vacancies on First Avenue south of East 23rd Street.

Second Avenue between East 19th Street and East 28th Street primarily serves the local retail needs of residents in the surrounding area and the southern end of the this stretch (see Corridor 4, **Figure 5.2-6**). Businesses include laundromats, dry cleaners, pharmacies, hair/nail salons, delis, and restaurants. Medical and educational uses such as a Beth Isreal Clinic and Explore and Discover Early learning Center are interspersed with the retailers on this corridor. Although the majority of the storefronts are smaller in size, there are also medium-to-large storefronts, including two Duane Reade locations and a Morton Williams's grocery store. Business activities in this area appeared healthy; however, there were approximately 14 vacant/closed storefronts, which gives the impression that business activities on Corridor 4 are not as healthy as that of Corridor 3a.

There is also a concentration of retail along the two large cross-town streets: East 23rd Street and the south side of East 14th Street (see Corridors 5 and 6, respectively, **Figure 5.2-6**). East 23rd Street includes national retailers including Mattress Firm, Amalgamated Bank, 7-Eleven, Chase Bank, McDonald's, and CVS, as well as pharmacies, second-hand clothing stores, and a spa. Stores along the south side of East 14th Street were predominantly small-format locally owned



- *Project Area One*
- *Project Area Two*
- *Socioeconomic Study Area*
- *Protected Area*
- 10 *Census Tracts*
- *1/4-Mile Radius of Project Area (1/4-Mile Local Study Area)*
- *Retail Corridors*

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Retail Corridors in 1/4-Mile Local Study Area
Figure 5.2-6

businesses, such as laundromats and delis. On the south side of East 14th Street, close to Avenue B, are recently developed mid- to large-sized retail spaces that have not yet been occupied. One of the recent tenants to locate at the southeast corner of Avenue A and East 14th Street is an urban Target (opened July 2018).

In the East Village (between East Houston Street and East 12th Street), ground-floor retail within the ¼-mile local study area is concentrated along Avenue C and the west side of Avenue D (see Corridors 2 and 1, respectively, **Figure 5.2-6**). Retail uses along Avenue C include a plethora of local eating and drinking establishments, hair/nail salons, laundromats, and delis. While most stores along Avenue C are smaller stores, there are also some mid-size grocery stores like C-Town Supermarket and Associated Grocery Store. Overall there is a mix of healthy business activity with scattered vacant storefronts (20 vacant stores were observed). Similarly, Avenue D includes delis, convenience stores, pharmacies, laundromats, and hair/nail salons. Most stores are smaller in scale; however, there are larger businesses on the southern end of this corridor including Duane Reade and Compare Food Supermarket. These retail establishments cater to the residential population; including the NYCHA developments east of Avenue D (see **Figure 5.2-5**). Approximately seven vacant retail stores were observed on Avenue D. While there are a greater number of vacancies on Avenue C than Avenue D, there are also a greater number of occupied retail spaces on Avenue C such that existing vacancies are not plaguing the retail corridor and causing disinvestment. In fact, the business activities on Avenue C appear to be healthier than those on Avenue D.

Retail south of East Houston Street in the Lower East Side neighborhood is concentrated along Grand Street and East Broadway (see Corridors 7 and 8, respectively, **Figure 5.2-6**). More specifically, retail is clustered along Grand Street from Pitt Street to Madison Street. There is also a cluster of retail along East Broadway between Clinton Street and Rutgers Street, turning north along Essex Street. There are two retail stores located on Gouveneur Street between Henry Street and Madison Street (see Corridor 9, **Figure 5.2-6**), relied upon by residents of NYCHA's Vladeck Houses and LaGuardia Houses. The last cluster of retail is along Madison Street between Pike Street and Jefferson Street (see Corridor 10, **Figure 5.2-6**). The retail stores in this area serve the nearby residents, including those who live in this area's NYCHA developments, including Vladeck Houses I and II, LaGuardia Houses, Two Bridges URA (Site 7), and Rutgers Houses. The businesses include eating and drinking establishments, grocery stores, hair/nail salons, delis, laundromats, bike shops, and banks. The larger retail stores in this area include a Fine Fare grocery store, CVS, McDonald's, and a Dunkin' Donuts. Approximately nine closed or vacant storefronts were observed on Grand Street, East Broadway, Madison Street, and Clinton Street, with the majority of vacant storefronts (4 vacancies) located on East Broadway.

ECONOMIC PROFILE OF THE SOCIOECONOMIC STUDY AREA

As of January 2017, there were an estimated 4,945 businesses in the socioeconomic study area. The 4,945 businesses in the study area represent approximately 3.6 percent of the businesses in Manhattan, and 1.6 percent of the businesses in all of New York City (see **Table 5.2-8**).

Table 5.2-8
Estimated Businesses in the Socioeconomic Study Area, Manhattan, and New York City

Industry (by NAICS Code)	Study Area		Manhattan		New York City	
	Businesses	Percent	Businesses	Percent	Businesses	Percent
Agriculture, Forestry, Fishing, and Hunting	2	0.0%	57	0.0%	187	0.1%
Mining	1	0.0%	55	0.0%	100	0.0%
Utilities	4	0.1%	72	0.1%	194	0.1%
Construction	145	2.9%	3,473	2.5%	14,211	4.7%
Manufacturing	63	1.3%	3,673	2.7%	8,416	2.8%
Wholesale Trade	88	1.8%	3,950	2.9%	9,879	3.3%
Retail Trade	623	12.6%	18,897	13.8%	46,541	15.5%
Transportation and Warehousing	71	1.4%	1,468	1.1%	5,492	1.8%
Information	145	2.9%	6,206	4.5%	9,810	3.3%
Finance and Insurance	86	1.7%	8,603	6.3%	14,045	4.7%
Real Estate, Rental, and Leasing	289	5.8%	9,158	6.7%	18,724	6.2%
Professional, Scientific, and Tech Services	371	7.5%	20,171	14.8%	32,750	10.9%
Management of Companies and Enterprises	6	0.1%	367	0.3%	559	0.2%
Administrative and Support and Waste Management and Remediation Services	165	3.3%	5,888	4.3%	11,646	3.9%
Educational Services	157	3.2%	3,221	2.4%	8,705	2.9%
Health Care and Social Assistance	394	8.0%	8,573	6.3%	23,811	7.9%
Arts, Entertainment, and Recreation	139	2.8%	3,436	2.5%	5,691	1.9%
Accommodation and Food Services	838	16.9%	10,899	8.0%	26,768	8.9%
Other Services (except Public Administration)	680	13.8%	12,367	9.1%	35,500	11.8%
Public Administration	46	0.9%	1,236	0.9%	2,730	0.9%
Unclassified Establishments	632	12.8%	14,673	10.8%	24,597	8.2%
Total	**4,945**	**100.0%**	**136,443**	**100.0%**	**300,356**	**100.0%**

Source: ESRI, Business Analyst Online, Inc. Business Summary Report, 2017 data.

Within the socioeconomic study area, the Accommodation and Food Services sector accounted for the highest share of businesses, with 16.9 percent of total businesses (or 838 businesses); this was approximately double the share of Accommodation and Food Services businesses in Manhattan (8.0 percent) and New York City (8.91 percent). The Other Services (except Public Administration) accounted for the second highest share of businesses, with 13.8 percent of total businesses (or 680 businesses); this was marginally higher than the share of sector busineses in Manhattan (9.1 percent) and New York City (11.8 percent). The Retail Trade sector accounted for 12.6 percent of total businesses (or 623 businesses). Within the Retail Trade sector, there were a significant number of food and beverage stores (145 businesses), clothing and clothing accessories stores (102 businesses), and miscellaneous store retailers (154 businesses). Office uses appeared to represent a smaller share of businesses in the socioeconomic study area compared with Manhattan. As shown in **Table 5.2-8**, the Finance and Insurance sector made up 1.7 percent of businesses in the socioeconomic study area compared with 6.3 percent in Manhattan and 4.68 percent in New York City; and the Professional, Scientific, and Technical Services sector made up 7.5 percent of businesses in the socioeconomic study area compared with 14.8 percent in Manhattan and 10.9 percent in New York City.

As shown in **Table 5.2-9**, there were an estimated 65,532 employees in the socioeconomic study area in 2015. Within the study area, the Health Care and Social Assistance sector accounted for a significant share of study area employment with 38.9 percent of all employment (or 25,503 employees). In comparison, the Health Care and Social Assistance sector accounts for 10.7 percent of employment in Manhattan and 17.5 percent of employment in New York City. The Education Services sector accounted for the second-highest share of study area employment, with 21.9

percent, followed by Accommodation and Food Services, with 12.1 percent. These businesses cater to the large residential population that lives in the study area and accounted for a higher share of employment in the study area compared with Manhattan and New York City as a whole. The remaining industry sectors each represent less than 10 percent of the study area's employment.

Table 5.2-9
Estimated Employment in the Study Area, Manhattan, and New York City

Industry (by NAICS Code)	Study Area		Manhattan		New York City	
	Employees	Percent	Employees	Percent	Employees	Percent
Agriculture, Forestry, Fishing, and Hunting	1	0.0	131	0.0	305	0.0
Mining, Quarrying, and Oil and Gas Extraction	0	0.0	30	0.0	60	0.0
Utilities	0	0.0	6,326	0.3	17,219	0.4
Construction	630	1.0	42,898	1.8	139,034	3.3
Manufacturing	343	0.5	26,070	1.1	77,003	1.8
Wholesale Trade	231	0.4	84,748	3.5	148,216	3.6
Retail Trade	2,700	4.1	163,656	6.8	348,783	8.4
Transportation and Warehousing	335	0.5	20,043	0.8	173,244	4.2
Information	810	1.2	178,091	7.4	204,217	4.9
Finance and Insurance	454	0.7	296,641	12.3	337,501	8.1
Real Estate, Rental, and Leasing	1,575	2.4	94,509	3.9	137,817	3.3
Professional, Scientific, and Technical Services	1,609	2.5	354,608	14.7	401,105	9.6
Management of Companies and Enterprises	731	1.1	64,169	2.7	72,039	1.7
Administrative and Support, Waste Management, and Remediation	2,129	3.2	163,737	6.8	239,381	5.7
Educational Services	14,380	21.9	142,469	5.9	354,614	8.5
Health Care and Social Assistance	25,503	38.9	257,083	10.7	730,860	17.5
Arts, Entertainment, and Recreation	653	1.0	76,126	3.2	95,055	2.3
Accommodation and Food Services	7,941	12.1	222,000	9.2	338,249	8.1
Other Services (excluding Public Administration)	1,974	3.0	102,693	4.3	168,905	4.0
Public Administration	3,533	5.4	112,132	4.7	189,152	4.5
Total	**65,532**	**100.0**	2,408,160	100.0	4,172,759	100.0

Source: U.S. Census Bureau, OnTheMap, November 2018

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

As described in **Appendix A1**, there are a number of projects planned or currently under construction in the project area, including Pier 42, the Solar One Environmental Education Center, Pier 35, the East River Waterfront Esplanade-Phase IV, and the new Rutgers Slip Open Space (No Action projects). Pier 42, Pier 35, the East River Waterfront Esplanade-Phase IV, and the new Rutgers Slip Open Space projects would increase the amount of accessible public open space in the project area. The existing Solar One Environmental Education Center at the northern end of Stuyvesant Cove Park is anticipated to be redeveloped and improved with a new green arts and energy education center and horticultural garden.[11]

[11] See Chapter 5.3, "Open Space," for detailed descriptions of these open space projects.

Other targeted resiliency projects, such as those proposed at the NYCHA properties and the recently completed measures along VA Medical Center, would protect critical infrastructure at these facilities, but would not provide the type of comprehensive neighborhood protection that would be provided by the coastal flood protection systems presented in the other alternatives.

As detailed in Chapter 2.0, "Project Alternatives," under the No Action Alternative, there are mulitiple new developments in the study area, which are planned for completion by 2025. Although still vulnerable to flooding during potential design storm events, these new developments would be less susceptible to flood-related damage due to assumed compliance with updated Building Code standards. As defined in the New York City Building Code, Appendix G, flood-resistant construction standards are required in flood zones including the use of flood-resistant materials for portions of structures susceptible to water damage, elevated placement of some critical systems, and in some instances, the ability to withstand wave pressure.

Overall, given the increase in total housing units within the study area since 2000, and the considerable residential and commercial development expected within the study area by 2025, a continuation of existing trends towards a mix of new uses with increasing rents and home values is expected under the No Action Alternative.

NON-STORM CONDITIONS

Under the No Action Alternative, no new public open space or recreational amenities would be introduced to the project area as part of a coastal flood protection system that could potentially affect residential rents in the study area by making the area more attractive as a residential neighborhood. However, under the No Action Alternative, there is the potential to affect residential rents through the provision of new open space as part of the Pier 42, Pier 35, the East River Waterfront Esplanade-Phase IV, and the new Rutgers Slip Open Space projects.

Under the No Action Alternative, area business conditions would not be affected by substantial increases in pedestrian traffic and associated consumer spending as a result of the proposed project. Rent levels also would not be affected by the proposed project under the No Action Alternative.

However, unlike with the other alternatives outlined below, none of the economic benefits associated with the construction of comprehensive flood protection systems would be realized under the No Action Alternative.

STORM CONDITIONS

Absent the proposed project's coastal flood protection measures, residents and businesses within the 100-year floodplain will remain vulnerable to flooding during design storm events. Thus, the key project objective to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm would not be met. Although some resiliency measures are expected to be completed at NYCHA's Baruch Houses, Wald Houses, Riis Houses, and other developments, they will continue to be vulnerable to flood damage during future design storm events, and responders' access to the dwellings would continue to be compromised during flood events. Additionally, residents in market rate and affordable dwellings in Stuyvesant Town and Peter Cooper Village, and many dwellings east of Avenue B, will remain vulnerable. Further, existing businesses, especially ground floor establishments along Avenues B, C, and D would remain vulnerable through potential loss of customers during flood events, and possibly by water damage to property. Thus, under the No Action Alternative, there is the potential for adverse economic effects within the study area due to potential flood damage created by future design

storm events. While the construction, operations, and maintenance costs associated with a flood protection system would be avoided, the benefit of avoided losses from a design storm event would not be realized.[12]

PREFERRED ALTERNATIVE (ALTERNATIVE 4) – FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative would not result in the direct displacement of any residents or businesses. The project area does not contain any residential uses; and while there are a limited number of businesses within and immediately adjacent to the project area, none of these businesses would be directly displaced by this alternative. The following assessment therefore focuses on potential indirect displacement effects, considering both non-storm and storm event influences on property values and rents.

NON-STORM CONDITIONS

The assessment of indirect residential and business displacement for this alternative is organized into the two project factors that could influence property values—flood protection measures and open space and connectivity improvements.

Flood Protection Measures

By 2025, existing residents and businesses in the study area within the existing flood hazard area would be less susceptible to coastal flooding during design storm events due to the Preferred Alternative's flood protection measures. Within the flood hazard area portions of the study area, the addition of the alternative's flood protection measures could lead to an increase in residential and commercial property values over time due to a number of influences. These influences include the substantial reduction of risk of property damage from flooding and the reduction of costs associated with investing in resiliency measures for individual properties. These influences could result in increases in market-rate residential and commercial rents within the existing flood hazard area portions of the study area (e.g., from the value of knowledge that your home or business would not be displaced due to flooding).

Current business activity in the existing flood hazard area portions of the study area largely consists of food service and retail establishments—including grocery, convenience, and miscellaneous retailers—that cater predominantly to existing residents. Under the Preferred Alternative, businesses within the socioeconomic study area would benefit from reduced susceptibility to flooding during a storm event, and any temporary or permanent business closures related to a major storm event. While this reduced business risk would enhance the value of properties, potentially leading to increased rents, such an influence is not expected to result in significant indirect commercial displacement. As illustrated in **Figure 5.2-6**, many commercial uses within the study area are located outside of or on the outskirts of the protected area. Therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the protected area and would not have the potential for significant effects throughout the overall study area. Also, there is an existing trend toward market-rate commercial development in the study area, with planned development totaling over 1 million sf of office space and approximately 280,000 sf of retail uses. Additionally, any new commercial space in new developments expected by 2025 would be subject to flood-resistant building

[12] Calculated losses during a design storm event include direct physical damage to buildings, human impacts, displacement, business interruption, and transportation impacts.

standards prior to completion of the flood protection system. Therefore, the Preferred Alternative would not result in significant indirect residential or business displacement pressures within the study area.

With respect to both residential and commercial market conditions in the study area, the Preferred Alternative is not expected to substantively alter existing trends. In the future with or without this alternative, the study area will continue to be an attractive area to live and work, and will experience substantial new development as well as increases in property value and rents. The Preferred Alternative is not expected to substantively alter existing trends and, therefore, would not have significant adverse effects due to indirect residential or commercial displacement.

Open Space and Connectivity Improvements

The added open space and connectivity features in the Preferred Alternative, including the shared-use flyover bridge, are not expected to result in increased residential property values and rent increases that could lead to significant indirect residential displacement within the study area. The Preferred Alternative's resiliency features would allow park improvements to better withstand storm events. This alternative's design approach would eliminate potential damage and post storm repair costs to the park. Therefore, as related to indirect residential displacement, the residential value attributable to proximity to the waterfront park is unchanged.

For the following reasons, this alternative is not expected to result in significant indirect residential displacement within the study area. First, the Preferred Alternative does not add a new use to the project area that would have the potential to fundamentally alter real estate values. The project area currently includes large public open spaces—including East River Park—that offer active and passive recreation options to study area residents and visitors, and which as described in Chapter 5.3, "Open Space," are highly utilized. Thus, the proposed project would not create new public parkland that could affect property values, but would elevate, protect, and reconstruct the existing parks (e.g., East River Park, Murphy Brothers Playground, and Asser Levy Playground) in the study area that already influence property values. Second, recent trends already show study area market housing costs to be well above rents affordable to low- and moderate-income households. These trends are expected to continue with or without this alternative's park and neighborhood connection improvements in place, and this alternative is not anticipated to accelerate those trends substantially. Third, there is little existing, and limited opportunity to develop additional, market housing abutting the project area, where values and rents would have the greatest potential to increase as a result of proximity to the park improvements. Fourth, the majority of existing housing directly abutting the project area consists of NYCHA housing developments. Thus, even with the Preferred Alternative's open space and connectivity improvements in place, rents in these developments are protected from local market forces and, therefore, would not be affected by changes in market conditions generated by the proposed project. Similarly, area households who live in other forms of rent-regulated housing—including the approximately 5,000 units within Peter Cooper Village and Stuyvesant Town abutting the project area—would not see rent increases as a result of potential market changes generated by the proposed project. The Preferred Alternative is also not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. First, the resiliency features would not increase visitation to East River Park or other parks in the study area, thus to the extent that commercial rents are influenced by consumer spending, commercial rents are not expected to increase due to the proposed project. Should there be some increase in visitation attributable to the proposed project, there are few businesses directly abutting the project area that would be affected by any increases in expenditure potential. As stated

above and highlighted in **Figure 5.2-6**, most of the businesses in the study area are located several blocks away from the project area, and not located on streets leading to the improved pedestrian connections across the FDR Drive, where businesses could be affected by any potential increased pedestrian traffic. Third, with multiple residential projects expected to be completed by 2025 and the associated increases in population and spending potential, any effects on commercial rent increases would be attributable to these projects and not the proposed project. Fourth, although this alternative would provide park and neighborhood connection improvements, the alternative does not present new uses or activities to the project area. So while visitation and associated consumer spending could increase, such an increase is expected to be minor and thus not substantially affect the study area's commercial market.

For all of these reasons, the additional open space and connectivity features included in the Preferred Alternative would not be expected to lead to significant indirect business displacement.

STORM CONDITIONS

Under the Preferred Alternative, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under the Preferred Alternative, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Similar to the Preferred Alternative, Alternative 2 would not result in the direct displacement of any residents or businesses. The following assessment therefore focuses on potential indirect displacement effects, considering both non-storm and storm event influences on property values and rents.

NON-STORM CONDITIONS

The findings with respect to potential indirect displacement are the same as for the Preferred Alternative. Added flood protection and resiliency design features in Alternative 2 are not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. The resiliency features would not increase visitation to East River Park before a storm event; thus, to the extent that commercial rents are influenced by consumer spending, commercial rents are not expected to increase as a result. In addition, although the resiliency measures would allow park improvements to be more immediately usable following a storm event, there are few businesses abutting the project area, and increases in pedestrian traffic to the project study area's commercial uses is not expected to substantially influence commercial rents. Moreover, as previously discussed, many commercial uses within the study area are located outside of or on the outskirts of the protected area; therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the protected area and would not have the potential for significant effects throughout the overall study area. Also, as noted above, there is an existing trend toward market-rate residential and commercial development in the study area, and much of the study area's housing (approximately 25 percent) is rent-regulated.

The minor open space modifications under this alternative would not result in major new additional publicly accessible open spaces that could contribute to making the area more attractive

as a residential neighborhood, nor would additional access points to existing open spaces be created. Thus, Alternative 2 is not expected to affect residential rents in the study area. Similarly, business conditions in the study area are not expected to materially change due to non-storm-related influences under this alternative. Therefore, under Alternative 2, the study area would not be expected to receive substantial additional pedestrian traffic nor the increased consumer spending potential associated with that visitation.

With respect to both residential and commercial market conditions in the study area, Alternative 2 is not expected to substantively alter existing trends.Alternative 2 is not expected to substantively alter existing trends and, therefore, would not have significant adverse effects due to indirect residential or commercial displacement.

STORM CONDITIONS

Residents and businesses within the 100-year floodplain area under Alternative 2 would be less vulnerable to flooding during storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under Alternative 2, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Similar to the Preferred Alternative, Alternative 3 would not result in the direct displacement of any residents or businesses. The following assessment therefore focuses on potential indirect displacement effects, considering both non-storm and storm event influences on property values and rents.

NON-STORM CONDITIONS

The findings with respect to potential indirect displacement are the same as for the Preferred Alternative. Added resiliency design features in Alternative 3 are not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. The resiliency features would not increase visitation to East River Park before a storm event, thus to the extent that commercial rents are influenced by consumer spending, commercial rents are not expected to increase as a result. In addition, although the resiliency measures would allow park improvements to be more immediately usable following a storm event, there are few businesses abutting the project area, and increases in pedestrian traffic to the project study area's commercial uses is not expected to substantially influence commercial rents.

By 2025, existing residents and businesses in the study area within the existing flood hazard area would be less susceptible to coastal flooding during storm events due to Alternative 3's flood protection measures described above. The addition of these measures could lead to an increase in residential and commercial property values over time due to the same influences as previously described in the Preferred Alternative. Potential increases in property value attributable to Alternative 3's storm protection system elements are not expected to result in significant indirect residential or business displacement pressures within the study area for the same reasons as detailed for the Preferred Alternative.

Under Alternative 3, the concern with respect to potential indirect displacement is whether park improvements could lead to increases in residential and commercial property values over time due

to the following influences: the enhanced waterfront open space amenities that could make the study area neighborhoods a more desirable location in which to live; from increased pedestrian traffic and associated consumer spending at study area businesses; and from potential increased spending associated with higher income households that may be attracted to the neighborhood.

For the same reasons as the Preferred Alternative, this alternative is not expected to result in significant indirect residential or business displacement within the study area.

STORM CONDITIONS

Under Alternative 3, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under Alternative 3, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Similar to the Preferred Alternative, Alternative 5 would not result in the direct displacement of any residents or businesses. The following assessment therefore focuses on potential indirect displacement effects, considering both non-storm and storm event influences on property values and rents.

NON-STORM CONDITIONS

Alternative 5 includes similar flood protection objectives and the same general open space improvements as described in Alternative 4; therefore, this assessment only addresses the additional connectivity enhancements provided by this alternative.

The enhanced connectivity would not be expected to substantially increase visitation to East River Park; thus, to the extent that commercial rents are influenced by consumer spending, commercial rents are not expected to increase. In addition, most of the business activity in the study area is located several blocks away from the project area, and not located on streets leading to the improved park connections where business activity would most likely benefit from any increased pedestrian or bicyclist traffic that may occur primarily in the north-south direction.

STORM CONDITIONS

Under Alternative 5, residents and businesses within the 100-year floodplain area would be less vulnerable to flooding during storm events. Therefore, as with the other alternatives described above, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise occur during storm events. ✷

Chapter 5.3: Open Space

A. INTRODUCTION

Based on the guidance of the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, an open space analysis is conducted to determine whether a proposed project would result in a direct impact caused by the elimination or alteration of open space and/or an indirect impact resulting from overtaxing available open space. This chapter compares conditions in the future with the proposed project and conditions in the future without the proposed project to determine the potential for significant adverse effects to open space. The analysis considers the 2025 analysis year to identify potential significant adverse effects and identifies mitigation measures that would be appropriate to address potential significant adverse effects.

STUDY AREA

The *CEQR Technical Manual* was used to determine the open space study area. The study area is based on the distance a person is assumed to be willing to walk to reach a neighborhood open space. Residents are assumed to be willing to walk approximately 10 minutes (about a ½-mile distance) to reach both passive and active neighborhood open spaces. The proposed project would be implemented along the Franklin D. Roosevelt East River Drive (FDR Drive) and extend from Montgomery Street on the south to East 25th Street on the north (see **Figure 5.3-1**). The proposed project would be located adjacent to and within East River Park, Murphy Brothers Playground and Asser Levy Playground, which are under the jurisdiction of New York City Department of Parks and Recreation (NYC Parks), as well as Stuyvesant Cove Park, which is under the jurisdiction of the New York City Department of Small Business Services (SBS) and managed by New York City Economic Development Corporation (NYCEDC). The proposed project would be located primarily within parks or within City right-of-way, adjacent to a predominantly residential user population, and would not provide or induce a new residential or commercial population. Therefore, this EIS evaluates the effects to open space for census tracts with at least 50 percent of their area within a ½-mile distance from the boundaries of Project Areas One and Two. All census tracts that have less than 50 percent of their area within the study area have been excluded (see **Figure 5.3-1**).

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative would not result in significant adverse effects to any existing or planned open spaces within the study area. The No Action Alternative would not alter the size or use of existing open spaces; the open space projects identified in **Appendix A1** would continue to be implemented as planned. However, the No Action Alternative would not provide comprehensive coastal flood protection for the protected area, as defined in Chapter 2.0, "Project Alternatives." During a coastal storm event, the protected area, including open spaces, could be adversely impacted, potentially experiencing effects similar to that of Hurricane Sandy or other

3/18/2019

Source: Source: U.S. Census Bureau TIGER/Line Shapefiles (2017)

Project Area One
Project Area Two
Open Space Study Area
Census Tracts
Park Area Improved with Land and Water Conservation Funds
Open Space Resources
Recreational Fields
Tracks, Courts, and other features
Parks and Gardens

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Open Space Study Area
Figure 5.3-1

extreme coastal storm events. Targeted resiliency measures may reduce the effects of storms in certain locations but would not provide comprehensive flood protection for the protected area.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

The Preferred Alternative would not result in significant adverse effects to existing or planned open spaces within the study area. Overall, the Preferred Alternative would not alter the amount of open space, nor would this alternative introduce new worker and residential populations to the study area. By elevating East River Park and reconstructing Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground, the Preferred Alternative provides the opportunity for a holistic reconstruction, reimagining, and expansion of the types of user experiences in the park, while also enhancing neighborhood connectivity and resiliency. Increased improvements to landscaping along the waterfront and to the waterfront esplanade itself would also be included in this alternative. These benefits would ensure improved resiliency, operations, usability, and functionality of East River Park during pre- and post-storm periods. In addition, the Preferred Alternative would alleviate shared-use path congestion at the Con Edison facility with the construction of a flyover bridge (which would be complete by 2025). The Preferred Alternative is expected to be complete by 2023. A total of 981 trees would require removal throughout the project area, but would be replaced or replanted in accordance with a NYC Parks-approved landscape restoration plan to address the proposed tree removal, such that there would be a net overall increase in the number of trees within the park, and would also protect the long-term viability of trees and ecological resources by protecting them from damaging salt water inundation and providing for planting that is more appropriate for the park.

OTHER ALTERNATIVES

The remaining three alternatives, The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive Alternative (Alternative 5) would not result in significant adverse effects to any existing or planned open spaces within the study area. None of the With Action Alternatives would substantially alter the size or use of existing open spaces, nor would they introduce new worker and residential populations to the study area. Each alternative would slightly alter the ratio of active to passive recreation space, with Alternative 3 converting the most acreage from active to passive (2.9 acres compared to the No Action Alternative). Alternatives 2 and 5 would result in active and passive ratios nearly the same as the No Action Alternative. As described in Chapter 5.6, "Natural Resources," trees within the study area—specifically within East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground—would be removed with the parks redesigns and to support construction of the proposed flood protection system. Trees would be replaced or replanted in accordance with a NYC

Parks-approved landscape restoration plan. However, the trees in Alternatives 2 and 3 would not be fully protected in the long-term, leaving them vulnerable to damage from storm-related salt-water inundation.

C. REGULATORY CONTEXT

The proposed project is located in the Borough of Manhattan in New York City. Open space evaluated within the study area is governed by the State of New York via the New York City Housing Authority (NYCHA), private organizations, and the following New York City agencies: NYC Parks, Small Business Services (SBS), and the New York City Department of Education (DOE). The duties of these agencies include enforcing rules and regulations, site design, and performing maintenance and operational duties of their respective open space resources. Flood protection features that would be located within a public park owned by the City and under the jurisdiction (either partly or wholly) of NYC Parks are not governed by the New York City Zoning Resolution or subject to Waterfront Zoning regulations.

The Federal Land and Water Conservation Fund Act (LWCFA), 16 U.S.C. §§ 460l-4 to 460l-11 is commonly referred to as Section 6(f), as the provision was originally contained in Section 6(f)(3) of the LWCFA, Public Law 88-578 of 1962, before codification. The United States Department of the Interior (DOI), through the National Park Service (NPS), provides funding under the LWCFA for State and local efforts to plan, acquire, or develop land to advance outdoor recreational activities. The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) serves as the New York State agency that administers LWCFA funds received from DOI.

LWCFA funds were used for the improvement of an approximately 2.88-acre area on the northern edge of East River Park stretching from East 6th Street to East 10th Street as seen in **Figure 5.3-1**. The area received $178,402 in LWCFA funds in 1973 for rehabilitation and improvement of existing facilities, including sport fields, site improvements, landscaping, sewer, water and electrical systems, and design and engineering. Under the LWCFA, this area cannot be converted to any non-recreational purpose for more than six months unless it undergoes a conversion.

D. METHODOLOGY

Open space is defined as publicly or privately-owned land that is publicly accessible and available for leisure, play, or sport, or is set aside for the protection and/or enhancement of the natural environment. An open space analysis focuses on officially designated existing or planned public open space. Direct effects may occur when public access is limited, or the type and amount of public open space are altered as a result of a proposed project. Other direct effects may include the imposition of noise, air pollutant emissions, or shadows on public open space that may alter its usability. Indirect effects may occur when the population generated by a proposed project overtaxes the capacity of existing open spaces so that their service to the population of the affected area would be substantially or noticeably diminished. In this case there would be no new population generated by the proposed project.

This assessment evaluates the significance of the change in the availability of open space relative to demand from the population within the study area in the 2025 analysis year. The analysis also evaluates the usability of the open space that may be altered by the proposed project.

OPEN SPACE USER POPULATIONS

To determine the number of residents located within the study area, data were compiled from the 2010 U.S. Census for the study area tracts.

INVENTORY OF OPEN SPACE RESOURCES

All public open spaces within the study area were inventoried to determine size, character, and condition. Field surveys were conducted during optimal weather at various time periods in June, July, and August 2015. Additional information was obtained from NYC Parks and the New York City Department of City Planning (DCP). The field surveys also identified user groups present and utilization levels of park amenities.

Public open spaces were organized into active and passive open spaces. Open space that is used for sports, exercise, or active play is classified as active; open space that is used for relaxation, such as sitting or strolling, is classified as passive. Public open spaces may be under the jurisdiction of a governmental or private entity and are accessible to the public on a regular basis. Privately owned open spaces and open spaces available to limited users or that are available on an inconsistent basis (such as community gardens) were excluded.

As noted above, a portion of East River Park from East 6th Street to East 12th Street, consisting of one and one-half basketball courts, a playground and a portion of the East River Promenade, previously received LWCFA grant funds. This 2.88-acre area on the northern edge of East River Park was improved and rehabilitated with funds from the LWCFA. Section 6(f) of the Land and Water Conservation Fund Act requires that property improved or developed with LWCFA assistance shall not be converted to any use other than public outdoor recreation without the approval of the Secretary of the Interior (delegated to the Director of the NPS).

ADEQUACY OF OPEN SPACE RESOURCES

The amount of useable open space acreage in relation to the study area population—referred to as the open space ratio—is then compared with guidelines provided in the *CEQR Technical Manual*. Two sets of guidelines provided in the *CEQR Technical Manual* are used to determine the adequacy of open space. The first guideline is a City-wide median open space ratio of 1.5 acres per 1,000 residents. The second is the City's optimal planning goal of 2.5 acres per 1,000 residents—2.0 acres of active and 0.5 acres of passive open space per 1,000 residents.

E. AFFECTED ENVIRONMENT

There are 30 publicly available open spaces within the study area, which include one open space in Project Area One (East River Park) and four open spaces in Project Area Two (Captain Patrick J. Brown Walk, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground). These are described in the sections below.

OPEN SPACE USER POPULATION

Table 5.3-1 lists the census tracts that comprise the study area. Based on the 2010 Census, the residential population of the study area is 157,263.

Table 5.3-1
Existing Residential Population in the Open Space Study Area

Census Tract	Residential Population
2.01	3,058
2.02	7,316
6	11,367
10.01	1,434
10.02	6,547
12	3,397
14.01	3,005
14.02	2,782
20	4,917
22.01	6,398
22.02	2,189
24	5,434
26.01	3,772
26.02	4,227
28	7,114
34	6,612
44	16,538
48	7,229
60	4,511
62	4,437
64	8,090
66	11,740
68	7,614
70	8,871
72	8,664
Total	**157,263**

OPEN SPACE INVENTORY

There are 30 publicly available open spaces within the study area, which collectively total 85.15 acres. Open spaces are identified on **Table 5.3-2** and shown in **Figure 5.3-1**.

Table 5.3-2
Project Area One and Project Area Two
Open Space Study Area Inventory

Key #	Name	Owner	Amenities	Acres	Total Active	Total Passive	Use Level
1	East River Park	NYC Parks	East River Promenade, East River Bikeway, passive seating, lawn areas, two playgrounds with water fountains, picnic and barbequing areas, amphitheater, eight baseball fields, two and one-half basketball courts, two volleyball courts, 12 tennis courts, three soccer fields, a track, and athletic fields.	45.88	23.88	22.00	High
2	Captain Patrick J. Brown Walk	SBS	Pathway, seating	1.00	0.75	0.25	High
3	Stuyvesant Cove Park	SBS	Pathways, seating, landscaping, and program space	1.9	0.95	0.95	High
4	Ahearn Park	NYC Parks	Small public square with seating	0.09	0.0	0.09	ND
5	Ascot	Old Glory Real Estate	Small playground with seating	0.09	0.0	0.09	ND
6	Bellevue South Park	NYC Parks	Basketball courts, playground and fitness equipment	1.59	1.59	0.0	ND
7	Luther Gulick Playground	NYC Parks	Basketball courts, playgrounds, seating, handball courts, and spray showers	1.45	1.00	0.45	Moderate
8	Captain Jacob Joseph Playground	NYC Parks	Playground	0.14	0.14	0.0	ND
9	Cherry Clinton Playground	NYC Parks	Basketball courts, handball courts, fitness equipment, and playgrounds	0.48	0.40	0.08	ND
10	Corlears Hook Park	NYC Parks	Baseball field, playground, and spray showers	4.36	4.00	0.36	High
11	Dry Dock Playground and Pool	NYC Parks	Outdoor pool, playground, spray showers, and basketball courts	1.5	1.5	0.0	ND
12	Hamilton Fish Park	NYC Parks	Basketball courts, fitness equipment, outdoor pool, recreation center, handball courts, spray showers, and playgrounds	4.3	4.3	0.0	High (seasonal)
13	J.H.S. 104 (Peter's Field)	NYC Parks/DOE	Basketball courts, tennis courts, and playgrounds	0.88	0.88	0.0	Moderate
14	Henry M. Jackson Playground	NYC Parks	Basketball courts, playground, seating, and handball courts	0.61	0.50	0.11	ND
15	Joseph C Sauer Park	NYC Parks	Playgrounds	0.40	0.30	0.10	Moderate
16	Little Flower Playground/NYCHA Open Space	NYC Parks/NYCHA	Basketball courts, handball courts, spray showers, playgrounds, seating, and landscaped areas	1.29	1.29	0.0	Light
17	Lillian D Wald Playground	NYC Parks	Basketball courts, fitness equipment, and playgrounds	0.68	0.68	0.0	Light
18	Wald Playground	NYC Parks	Playground and basketball courts	0.53	0.53	0.0	Light
19	Lower East Side Playground	NYC Parks/DOE	Playground and basketball courts	0.83	0.83	0.0	Light
20	Murphy Brothers Playground	NYC Parks	Basketball courts, playgrounds, and handball courts	1.27	1.03	0.24	Light
21	Baruch Playground and NYCHA Open Space	NYC Parks/NYCHA	Basketball courts, handball courts, playgrounds, seating, and landscaped areas	2.32	2	0.32	Light
22	Sol Lain Playground	NYC Parks/DOE	Basketball courts, spray showers, and playground	0.89	0.89	0.0	Moderate
23	Augustus St. Gaudens Playground	NYC Parks/DOE	Basketball courts and playground	0.64	0.64	0.0	Heavy

Table 5.3-2 (cont'd)
Project Area One and Project Area Two
Open Space Study Area Inventory

Key #	Name	Owner	Amenities	Acres	Total Active	Total Passive	Use Level
24	Asser Levy Playground	NYC Parks	Basketball courts, football fields, indoor and outdoor pools, playgrounds, running track, fitness equipment, handball courts, and recreation center	2.44	2.44	0.0	High
25	Seward Park H.S. Fields	DOE	Basketball courts, track, and tennis courts	1.01	1.01	0.0	High
26	Stuyvesant Square	NYC Parks	Landscaping, paths, and seating	3.93	0.0	3.93	Light
27	Vincent F. Albano Jr. Playground	NYC Parks	Handball courts and playgrounds	0.35	0.35	0.0	ND
28	Vladeck Park	NYC Parks	Landscaping, seating, play equipment, and pathways	0.79	0.25	0.54	Light
29	Seward Park	NYC Parks	Basketball courts, playgrounds, volleyball courts, and spray showers	3.36	2.36	1	High
30	Windsor Court	MHP Land Associates	Landscaping and seating	0.15	0.0	0.15	ND
			Total for Study Area	**85.15**	**53.66**	**31.49**	**-**

Notes: NYC Parks=New York City Department of Parks and Recreation; NYCHA=New York City Housing Authority; DOE=Department of Education; SBS = New York City Department of Small Business Services, ND = No Data

PROJECT AREA ONE

Open space within Project Area One consists of the entirety of the East River Park. East River Park is a 45.88-acre public park operated by NYC Parks and located between the FDR Drive to the west and the East River to the east, Jackson Street to the south and East 13th Street to the north. Access to the park is available from the northern and southern ends of the park as well as via several bridges that span the FDR Drive located along the western side of the park: Corlears Hook bridge, Delancey Street bridge, East Houston Street overpass, East 6th Street bridge, and the East 10th Street bridge.

East River Park is a heavily utilized park due to the number and variety of amenities available and its proximity to dense housing. East River Park contains a variety of passive and active recreation spaces, including the East River Promenade, a pedestrian walkway located directly adjacent to the East River extending the length of the park, and a shared-use path. The shared-use path, adjacent to the FDR Drive within East River Park, is part of the extensive East River Greenway that stretches from The Battery to East Harlem. Together, the East River Promenade and the shared-use path are utilized daily by commuters and recreational enthusiasts and provide a critical link for pedestrians and cyclists between southern and northern Manhattan along the East River. Additionally, East River Park contains passive areas such as seating and lawns, two playgrounds with water fountains, picnic and barbequing areas, and an amphitheater, which hosts events such as the City Parks Foundation SummerStage Events. Making up a significant portion of the park, active uses include eight baseball fields, two and one-half basketball courts (one located near Delancey Street and one-and-a-half located near East 10th Street), 12 tennis courts, two volleyball courts, three soccer fields, a running track, and athletic fields. Within East River Park, the Lower East Side Ecology Center Compost Facility is located at the southern end of the park, which also utilizes a former fireboat house (Fireboat House) for office space.

Peak usage of the East River Promenade and the East River Bikeway by cyclists and joggers occurs during early mornings and evenings. Benches and tables located along the Promenade are

often used throughout the day by individuals of all ages for social gathering, fishing, and enjoying waterfront views. On weekdays, weeknights, and weekends, the fields and courts are heavily utilized for pick-up games and organized team events. Throughout the year, fields are heavily used each day of the week, with seasonal usage of each field averaging several thousand participants. As a member of an organized league, a formal request to NYC Parks for use of a field or court must be made and permits are issued. If unoccupied by a formal game, fields and courts are available to the public for informal use (pickup games). In order to facilitate this, established seasonal request periods have been created: spring and summer (March 17 through August 31), fall (September 1 through November 30), and winter (December 1 through March 16). Courts and fields may be reserved for various times of the day with the last games concluding by 10:00 PM. All tennis courts, track, and ball fields may be subject to permit reservations for organized games.

The area of the park improved with LWCFA funds is currently used for a combination of active and passive outdoor recreational uses, including a playground, two basketball courts, a picnic and barbecue area, a lawn, a portion of the East River bikeway, and a portion of the East River Promenade. Public access is available via a pedestrian bridge at 10th Street.

During Hurricane Sandy, storm surge from the East River overtopped the bulkhead along East River Park, inundating the park with damaging waves and floodwaters. Following the storm, the combination of strong wind, storm surge, and flooding resulted in the impairment of the structural integrity of trees in East River Park. As a result, falling tree branches damaged fences, lights, flagpoles, field services, and buildings. Dozens of trees were knocked down or had to be removed following the storm as a result of saltwater intrusion and water inundation. An additional 258 trees in the park were removed in 2014 due to saltwater inundation from Hurricane Sandy. The health of others continues to deteriorate, and additional removals are expected. Damage to Park amenities included flooding of the Track and Field House, which damaged the heating system, and the Tennis House, which damaged mechanical equipment, as well as the Fireboat House and Fireboat House pump station.

PROJECT AREA TWO

Open space in Project Area Two consists of the Captain Patrick J. Brown Walk, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground. Captain Patrick J. Brown Walk is the name given to the northern portion of the East River Bikeway between East River Park and Stuyvesant Cove Park. Serving as both a walkway and bikeway, Captain Patrick J. Brown Walk runs for approximately 0.5 miles between East River Park and Stuyvesant Cove Park and is largely a brick-paved walkway. Peak usage for Captain Patrick J. Brown Walk occurs during morning and evening commutes similar to the East River Park Bikeway and East River Promenade. The northern portion of Captain Patrick J. Brown Walk contains benches for seating but based on field observations, the primary use of the path is for walking, running, and bicycling.

North of Captain Patrick J. Brown Walk, the pathway continues into Stuyvesant Cove Park. Located along 0.3 miles of waterfront and consisting of 1.9 acres, Stuyvesant Cove Park provides passive recreation, gardens, and a paved area which is used for educational programming and special events (e.g., movies). Stuyvesant Cove Park is under SBS jurisdiction, managed by NYCEDC, and is largely maintained by volunteer groups, such as the Stuyvesant Cove Park Association, New York Cares, the Comprehensive Development Inc., and Solar One. In addition to the walking, jogging, and bicycling paths, park users may fish, or utilize benches and tables for social gathering or waterfront viewing. The northernmost portion of the park includes the Solar One building, which is maintained by a non-profit organization of the same name. The Solar One Environmental Education Center is proposed to be rebuilt as part of a separate project.

Murphy Brothers Playground and Asser Levy Playground are both located to the west of the FDR Drive and fall under NYC Parks jurisdiction. Consisting of approximately 1.27 acres, Murphy Brothers Playground is located east of Stuyvesant Town and includes a mixture of active and passive recreational amenities, such as tee-ballfields, a basketball court, playground equipment, hopscotch squares, and benches. Asser Levy Playground, located just north of Peter Cooper Village, comprises the Asser Levy Recreation Center, located just north of East 23rd Street, as well as the playground complex adjacent to the recreation center. The totality of Asser Levy Playground is 2.44 acres. Asser Levy Recreation Center houses a diverse set of active areas, including an indoor pool within the recreation center building and a free outdoor pool located east of the recreation center building. Asser Levy Playground contains specially designed free-form game tables, wood and concrete benches, drinking fountains, as well as pull-up bars, balance boards, steps and ramps, chain ladders, and parallel bars. The playground was expanded in 2015 to include portions of the former Asser Levy Place and now contains a diverse mix of outdoor recreational opportunities. Neighborhood residents and visitors play ping pong, badminton, chess, soccer, football, tee-ball, exercise, jog, practice yoga or enjoy shaded seating on what was once a two-way street. Outdoor adult fitness equipment is also available.

OPEN SPACE STUDY AREA

The open space study area contains 30 publicly accessible open spaces and recreational facilities that serve the surrounding residential and commercial populations.

Within the study area, 28 spaces are publicly owned by the City and/or State and two are privately owned and publicly accessible. NYC Parks operates and manages 19 open spaces; two open spaces are jointly operated by NYC Parks and NYCHA; one open space is operated by DOE; two are operated by SBS; and four open spaces are jointly operated by NYC Parks and DOE. As described in detail below, the two remaining privately owned open spaces are accessible by the public and associated with building properties.

NYC PARKS OPERATED OPEN SPACES

- Corlears Hook Park is located at the intersection of Jackson and Cherry Streets along the East River Drive in Community Board 3. At approximately 4.36 acres, this park provides views of the East River and East River Park, the Williamsburg and Manhattan Bridges, and the Brooklyn Navy Yard. Additionally, active recreation park amenities include baseball fields, playgrounds, a dog park, and spray showers. Corlears Hook Park is connected to East River Park and the East River Park Amphitheater via a bridge. This is the southernmost bridge that provides access to East River Park.
- Vladeck Park is a community park located in the southern portion of the study area one block north of Pier 42 at 668 Water Street, in Community Board 3. The 0.79-acre park provides landscaping, seating and pathways.
- Located in Community Board 3, Henry M. Jackson Playground is 0.61 acres and provides amenities such as basketball courts, playground, seating, and handball courts. Henry M. Jackson Playground is located two blocks south of the Williamsburg Bridge and two blocks west of Project Area One at Jackson Street and Madison Street.
- Lillian D. Wald Playground is a 0.68-acre recreation field and playground in Community Board 3. The open space is located at Cherry and Montgomery Streets two blocks north of Pier 42 in the southern portion of the study area. Lillian D. Wald Playground provides active uses in the form of basketball courts, playgrounds and fitness equipment.

- At the corner of Cherry and Clinton Streets is the Cherry Clinton Playground. The 0.48-acre playground is located approximately one block east of the southernmost portion of Project Area One. Clinton Cherry Playground provides active recreational features such as basketball and handball courts, fitness equipment and playgrounds, along with several seating areas.
- Wald Playground is a 0.53-acre park consisting of active recreational amenities such as a playground and basketball courts. Wald Playground is located within the Lillian Wald Houses Development in Community Board 3 at East Houston Street and FDR Drive and directly west of Project Area One.
- Captain Jacob Joseph Playground is located at Rutgers Street and Henry Street in Community Board 3. The neighborhood park provides 0.14 acres of playground space within the southern portion of the study area.
- Seward Park is located in the center of Canal Street, Essex Street, Jefferson Street, and East Broadway in the southern portion of the study area. The 3.36-acre park is located in Community Board 3 and provides active recreation in the form of basketball courts, playgrounds, volleyball courts, and spray showers in addition to passive seating and landscaping through the park.
- Ahearn Park is a small paved park area located between Grand Street, East Broadway, and Willet Street in Community Board 3. Located in the southern portion of the study area, the small triangular plaza park is 0.09 acres and provides seating and landscaping.
- The Luther Gulick Playground is a neighborhood park located in Community Board 3 at Columbia and Delancey Streets. The park is located south of the Williamsburg Bridge and approximately three blocks east of Project Area One. At 1.45 acres, the park provides a number of active and passive recreational resources including basketball and handball courts and playgrounds.
- Hamilton Fish Park is located between East Houston Street and Stanton Street approximately three blocks west of the center of Project Area One. At 4.3 acres, this park in Community Board 3 includes a recreation center that has been designated as a New York City Historic Landmark. The recreation center provides fitness equipment and educational programming. Additional active recreation within Hamilton Fish Park includes basketball courts, handball courts, outdoor pools, playgrounds, and spray showers.
- Dry Dock Playground and Pool is a community park located at Szold Place and East 10th Street, in Community Board 3. The 1.5-acre park provides basketball courts, outdoor pools, spray showers, and playgrounds.
- Joseph C. Sauer Park is located on East 12th Street between Avenue A and Avenue B, three blocks west of the northernmost Project Area One boundary. At 0.40 acres, Joseph C. Sauer Playground provides passive recreation and several playground amenities in Community Board 3.
- Stuyvesant Square is a neighborhood park located in Community Board 6. At 3.93 acres, Stuyvesant Square is located between East 15th Street and East 17th Street, Rutherford Place, and Perlman Place and is bisected by Second Avenue. The park is a passive recreation park that features landscaping with benches and tables.
- Bellevue South Park is located from East 26th Street to East 28th Street along Second Avenue and adjacent to Bellevue Hospital. Northeast of Project Area Two, the park is approximately 1.59 acres and located in Community Board 6. Amenities in Bellevue South Park include

exercise stations, volleyball and basketball courts, decorative floral and animal sculptures, and playgrounds.

- Vincent F. Albano Jr. Playground is located at the corner of East 29th Street and Second Avenue in the northernmost portion of the study area. This playground in Community Board 6 is 0.35 acres and provides active recreation in the form of handball courts and playgrounds.

DOE OPERATED OPEN SPACES

Within the study area, DOE operates one open space. The Seward Park H.S. Fields, which is 1.01 acres and located adjacent to Seward Park on Essex Street between Grand Street and Canal Street. Seward H.S. Fields has basketball courts, a running track, handball courts, and tennis courts.

JOINTLY OPERATED OPEN SPACES

There are two open spaces which are jointly operated by NYC Parks and NYCHA within the study area, both located within Community Board 3: Little Flower Playground and Baruch Playground. Located on Madison Street between Clinton and Rutgers Streets in the southernmost portion of the study area, Little Flower Playground is 1.29 acres and provides amenities such as basketball and handball courts, spray showers, playgrounds, seating, and landscaped areas. Baruch Playground is located at the corner of Baruch Place and Mangin Street directly west of Project Area One and north of the Williamsburg Bridge. Amenities on the 2.32-acre Baruch Playground include basketball and handball courts, playgrounds, seating, and landscaped areas.

Four open spaces within the study area are jointly operated by NYC Parks and DOE. These spaces are Sol Lain Playground, J.H.S. 104 (Peters Field), Lower East Side Playground, and Augustus St. Gaudens Playground. Sol Lain Playground is associated with Public School (P.S.) 134 and located on Henry Street between Grand and Pitt Streets and includes basketball courts, a playground, and spray showers on its 0.89 acres of open space. J.H.S. 104 (Peters Field) is 0.88 acres and is located on Second Avenue between East 20th and East 21st Streets, two blocks west of the northern portion of Project Area Two. It has basketball courts, tennis courts, and playgrounds. The Lower East Side Playground is 0.83 acres and located on the western edge of the study area on East 11th Street between First Avenue and Avenue A. Amenities at the Lower East Side Playground include a playground and basketball courts. Augustus St. Gaudens Playground is approximately 0.64 acres and located on Second Avenue between East 19th and East 20th Streets. Located at Augustus St. Gaudens Playground are basketball courts and playgrounds.

PRIVATELY OPERATED OPEN SPACES

Two open spaces within the study area are associated with commercial properties. Though privately owned, these open spaces are publicly accessible and, therefore, are included in the inventory. The two properties include Ascot Park owned by Old Glory Real Estate and Windsor Court owned by MHP Land Associates. Ascot Park is located at East 28th Street between Park Avenue South and Lexington Avenue. The 0.09-acre space features a small playground and seating areas. The 0.15-acre open space at Windsor Court is located at East 31st Street between Third and Fourth Avenues and includes landscaping and seating.

ADEQUACY OF OPEN SPACES

As described above, the analysis of the study area focuses on open space resources and amenities similar to those in East River Park, which may be directly affected by the proposed project. The proposed project would have a direct effect on East River Park, Stuyvesant Cove Park, Captain

Patrick J. Brown Walk, Murphy Brothers Playground, and Asser Levy Playground, as described in Section F, "Environmental Effects," but would not introduce a significant new user population. With a total of approximately 85.15 acres of open space, of which 53.66 acres are for active use and 31.49 acres are for passive use, and a total residential population of 157,263, the study area has an overall open space ratio of approximately 0.54 acres per 1,000 residents. This is lower than the City's planning goal of 2.5 acres of combined active and passive open space ratio per 1,000 residents and is lower than the citywide median of 1.5 acres per 1,000 residents.

Overall, the existing ratio suggests that the area currently experiences a shortage of open space typical of many neighborhoods within the City. The shortage in active open space is more pronounced, as the study area's residential active open space ratio is only 0.34 (see **Table 5.3-3**), which is substantially less than the City's active open space planning goal of 2 acres per 1,000 residents and the Citywide Community District median ratio of 1.5 acres per 1,000 residents.

Table 5.3-3
½-Mile Study Area Existing Conditions

Study Area Population	
Residents	157,263
Open Space Acreage	
Active	53.66
Passive	31.49
Total	85.15
Open Space Ratios	
Active	0.34 acres/1,000 Residents
Passive	0.20 acres /1,000 Residents
Total	0.54 acres/1,000 Residents

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The build year for the proposed project is 2025 and accordingly, the No Action Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). A list of these planned projects is included in **Appendix A1**.

Open spaces located in the study area, including East River Park, Captain Patrick J. Brown Walk and Stuyvesant Cove Park, would therefore remain in a similar condition, function, and layout as described above in Section E, "Affected Environment," and under the jurisdiction of their managing entities (e.g., NYC Parks, DOE, SBS, etc.). As described in Chapter 2.0, "Project Alternatives," there are several projects planned or under construction in the protected area (as defined in Chapter 2.0, "Project Alternatives"), some of which have the potential to affect open spaces within the study area. **Appendix A1** identifies the projects that are currently proposed for construction in the study area for the 2025 analysis year. There are no current proposals to alter the City's rules and regulations governing open spaces; thus, it is assumed that these would remain the same.

It is assumed that general user interaction would fluctuate over time and vary depending on season, as is common to all open spaces. User populations within the study area may grow over time, increasing the usage of open spaces in the project area and study area. New York City population projections anticipate increases in populations within Manhattan as 3.3 percent between 2010 and 2020 and then an additional 2.3 percent between 2020 and 2030. A conservative estimate for the study area based on these assumptions would result in a population of 166,188 by the 2025 analysis year. However, as described in Chapter 5.1, "Land Use, Zoning, and Public Policy," this growth in population is not expected to result in a significant change to the overall land use pattern or neighborhood character within the study area. Changes to open spaces in the No Action Alternative are identified in **Table 5.3-4**.

Table 5.3-4
½-Mile Study Area No Action Conditions

Study Area Population	
Residents	166,188
Open Space Acreage	
Active	54.48
Passive	36.25
Total	90.73
Open Space Ratios	
Active	0.33 acres/1,000 Residents
Passive	0.22 acres/1,000 Residents
Total	0.55 acres/1,000 Residents

Project Area

Within the project area, there are three open space projects that involve renovation and rehabilitation of existing parks or amenities and would not increase or significantly alter open space. A capital project is funded to upgrade the existing composting operations in the area which is now operated by the Lower East Side Ecology Center. This proposed facility would improve the composting site by formalizing and containing the composting components and provide educational and public access opportunities.

Renovation of the Fireboat House would include construction of an access ramp compliant with the Americans with Disabilities Act of 1990 and installation of solar panels. The project would upgrade an existing building within East River Park and would neither reduce nor increase the amount of open space of the park.

As discussed in Chapter 2.0, "Project Alternatives," Solar One is proposing to replace their existing facility in Stuyvesant Cove Park with an 8,000-square-foot green arts and energy education center. As currently envisioned, the Solar One Environmental Education Center would be a two-story building with a solar canopy and vegetated screens along the east and west facades. The center would have indoor and outdoor classrooms and an outdoor stage for concerts and performances.

Study Area

Within the study area, there are several park rehabilitation and reconstruction projects ongoing or proposed that are anticipated to be complete by the 2025 analysis year, including Asser Levy Playground, Baruch Playground, Corlears Hook Park, East River Park, Hamilton Fish Park, Luther Gulick Playground, and Seward Park. These proposed open space projects involve the renovation or rehabilitation of existing parks or amenities. The construction activities include increasing

accessibility under the Americans with Disabilities Act of 1990, playground reconstruction, reconstructing ball fields and basketball courts, dog run reconstruction, and comfort station reconstruction. The majority of these proposed projects would involve renovation of existing spaces and would not significantly alter the quantity of open space area.

Funded through HUD's National Disaster Resilience Competition (NDRC), the Trust for Public Land (TPL) school playground project consists of renovation and improvement of existing playground facilities at two public schools in the Two Bridges neighborhood in Manhattan, New York City. Currently, the existing playgrounds are not open to the public during non-school hours. Improvements to open spaces at P.S. 184 Shuang Wen School, located at Cherry Street and Montgomery Street, and P.S. 2 Meyer London, located at Madison Street and Pike Street, totaling 1.16 acres, would result in redesigned playspaces, which may include features such as running tracks, athletic courts, upgraded play equipment, trees, gardens and plantings, gazebos, outdoor classrooms, benches and other seating, game tables, student artwork, signage, trash and recycling receptacles, and drinking fountains. This project would also incorporate green infrastructure features such as artificial turf fields with gravel underlays, bioswales, permeable pavers, and rain gardens into project design.

There are four sites within the study area that would increase accessible open space to the community: Pier 42 Park, Pier 35, the East River Waterfront Esplanade – Phase IV, and the Two Bridges Large Scale Residential Development (LSRD) – Site 5 (Rutgers Slip Open Space). The construction of these sites would introduce a combined 5.58 acres of publicly accessible open space and would increase open space within the ½-mile study area to 90.73 acres by the 2025 analysis year.

At the southern end of Project Area One, NYC Parks is proposing to construct Pier 42 as a public waterfront open space that would increase accessible open space within the study area. For many years, the Pier 42 property consisted of warehouse space and parking, located just south of East River Park between the East River and the FDR Drive. A masterplan for the overall redevelopment of Pier 42 as an open space was approved by a Community Board 3 sub-committee and the New York City Public Design Commission (PDC). Phase 1A of the Pier 42 redevelopment included the demolition of the pier shed. Phase 1B would include the redevelopment of the upland park (north and east of Phase 1A) with amenities such as an entry garden in the western section, a playground, a comfort station, a grassy knoll rising approximately seven feet above grade, solar powered safety lighting throughout the park, and access from the shared-use path along the FDR Drive service road or Montgomery Street. The Pier 42 project would introduce approximately 2.93 acres of new passive open space to the study area by 2021.

In response to the community's desire for increased access along the East River Waterfront, Pier 35 would provide a new waterfront park atop the existing pier. The park would include pedestrian pathways, a series of landscaped lawns, a new tree canopy, and seating areas offering views of the Brooklyn and Manhattan Bridges. Additionally, designs include the installation of a Department of State grant-funded, "Mussel Beach," a tidal zone habitat feature that would attract colonies of mussels and promote healthy river ecology. A portion of Pier 35 was opened to the public in December 2018 and the full park is expected to be opened in 2019, adding a total of 0.65 acres of passive open space to the study area.

The East River Esplanade offers both active and passive recreational open space, including bicycle and pedestrian paths, exercise equipment, benches, and bocce ball courts. New York City's Economic Development Commission (NYCEDC), working in partnership with other city agencies, is currently implementing improvements to the East River Waterfront Esplanade. Phase

IV of the project, a portion of the East River Esplanade—under the FDR between Catherine Slip and Pike Street—is anticipated to be expanded and completed by 2025. This area is expected to offer an additional approximately 1.23 acres of recreational open space and would include new seating and play equipment along the waterfront.

The Two Bridges-LSRD project would develop three new residential developments within the Two Bridges neighborhood, just south of the proposed project area, and would contain up to 2,775 new residential units as well as new retail and community facility space. On Site 5 of the Two Bridges-LSRD project site, the existing private Rutgers Slip Open Space would be enlarged and made public, totaling approximately 0.77 acres of dedicated publicly accessible open space. Of the 0.77 acres of open space, 0.21 acres would be active and 0.56 would be passive. The Rutgers Slip Open Space is anticipated to be available to the public by 2021.

In the event of a storm under the No Action Alternative, no flood protection measures would be implemented, and open spaces in the study area could experience adverse effects similar to what was experienced during Hurricane Sandy, or potentially worse with future sea level rise.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Project Area

By elevating the park, the Preferred Alternative provides the opportunity for a holistic reconstruction, reimagining, and expansion of the types of user experiences in East River Park, while also enhancing neighborhood connectivity and resiliency.

Under the Preferred Alternative, the existing programming within East River Park would be reconfigured. The existing amphitheater would be relocated towards the waterfront with the programming replaced in kind, and a multi-use lawn with stepped seating and a stage would be constructed in its place. The two existing embayments along the shoreline would be relocated and designed for enhanced user interaction with the East River shoreline and views. The relocated and reconfigured park-side bridge ramps would integrate into the raised park's landscape and would require the relocation of the existing basketball courts and multi-use turf field towards the Williamsburg Bridge. Ball Fields 3 through 6 would be reconfigured and relocated to allow for a new East Houston Street park entrance, which would create smoother transitions to the fields, raised landscape, and shared-use path. Existing playground, picnic, and barbeque areas would be rebuilt and expanded, and Ball Fields No. 7 and 8 would be combined into one multi-use field, resulting in the loss of one ballfield. The Preferred Alternative would enhance open spaces, open space resiliency, and improve access to East River Park via reconstruction of three bridges spanning the FDR Drive (Corlears Hook Bridge, Delancey Street Bridge, East 6th Street Bridge), and improving the East Houston Street Bridge landing.

The Preferred Alternative would allow for the continued recreational usage of the park. Similarly, the portion of East River Park that received LWCFA funds between East 6th Street to East 10th would be renovated and continue to provide for outdoor recreational use. As with the rest of the park, the LWCFA area would be protected from inundation during storm events and from sea level rise. The LWCFA area would be universally accessible through reconstructed bridges at 10th Street and the shared-use flyover bridge, which would be completed and opened to the public in 2025.

Under the Preferred Alternative, modifications of the existing park landscape in East River Park would result in minor redistributions of active and passive open spaces. Of the 23.05 acres of

active space in East River Park under the No Action Alternative, 0.06 acres would be converted to passive open space under the Preferred Alternative, resulting in 22.99 acres of active space and 22.89 acres of passive space. East River Park's overall amount of open space would remain 45.88 acres. In Project Area Two, a proposed floodwall along the western edge of FDR Drive at Murphy Brothers Playground and Asser Levy Park would replace the existing playground fence but would increase the footprint, therefore occupying approximately 0.05 acres of existing open space. The flood protection features would not impede park patrons' usage of the open space and the addition of aforementioned resiliency features within East River Park would allow for user interaction to resume more quickly following a storm event.

The Preferred Alternative would entail the removal of 981 trees within the project area and vicinity, but trees would be replaced or replanted in accordance with a NYC Parks-approved landscape restoration plan. Trees and other landscaped areas that are planted as a result of a NYC Parks approved landscape restoration plan for construction of the flood protection system would include salt tolerant native species, among a diverse selection of 52 tree species. Tree replacement would be provided in accordance with Chapter 5 of Title 56 of the Rules of New York (NYC Parks Rules) and Local Law 3 of 2010. The planting plan would also aim to improve ecological habitat and be resistant to the effects of salt spray and wind using the concept of different types of groves (see Figure 5.6-7). The planting plan would incorporate these groves of trees with a diverse mix of tree species for ecology, shade, and resiliency and would depart from the existing formal landscape to allow the park user to experience an escape from the hard surfaces of the urban landscape (see Figure 5.6-8).

Most significantly, by raising the park, this alternative would provide protection to the majority of East River Park from future storm flooding and sea level rise without losing any acres of usable public space. This alternative would also result in new and updated park buildings, amenities, and underground infrastructure. Following the completion of the park enhancements and flood protection installation of the Preferred Alternative in 2023, the flyover bridge superstructure would be installed and opened to the public in 2025. The 15-foot wide flyover bridge would be constructed to alleviate shared-use path congestion at the Con Edison facility between East 13th Street and East 15th Street known as the "pinch point." These activities would leave existing park amenities largely intact as design features of the Preferred Alternative have been configured to result in minimal intrusion into open spaces as they exist currently.

Study Area

The Preferred Alternative would not add residential or worker populations in the study area and no changes to open space in the broader study area are expected. Under the Preferred Alternative, the active and passive open space ratio would remain the same as compared to the No Action Alternative at 0.33 acres per 1,000 residents for active space and 0.22 per 1,000 residents for passive space. As with other alternatives, the study area's total open space ratio would remain 0.55 (see **Table 5.3-5**), substantially less than the City's planning goal of 2.5 acres per 1,000 residents. These ratios fall short of the City's planning goals of 2.0 acres per 1,000 residents for active space and 0.5 acres per 1,000 residents for passive space.

Table 5.3-5
½-Mile Study Area Preferred Alternative Conditions

Study Area Population	
Residents	166,188
Open Space Acreage	
Active	54.40
Passive	36.28
Total	90.68
Open Space Ratios	
Active	0.33 acres/1,000 Residents
Passive	0.22 acres/1,000 Residents
Total	0.55 acres/1,000 Residents

Operation and Maintenance

As described in Chapter 2.0, "Project Alternatives," operation and maintenance during non-storm conditions would include routine inspection of the closure structures, levees, floodwalls, and drainage components. The equipment would be tested regularly, and staff would practice deployment and emergency operations. The level of maintenance required of floodwalls and gates would vary depending on the type of structure and type of maintenance required, such as slope maintenance, erosion repair, crack repair, turf repair, and filling. Activities associated with regular maintenance of the flood protection structure are not anticipated to impede the use of open spaces within the project area.

In the event of a design storm under the Preferred Alternative, flood protection features within the project area would be in place and waterfront parks, including those within the project area, would be closed for public safety. During the storm event, the flood protection system would be in operation, including mobilization of closure structures and, as applicable, drainage management components. Post-storm, the open spaces would be cleared of debris and restored.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Project Area

Within Project Area One, the landscape south of the Williamsburg Bridge would rise to meet the reconfigured Delancey Street Bridge ramp, which would require the relocation of the existing basketball courts to an area located north of the Williamsburg Bridge. This would also result in a loss of the un-programmed asphalt area adjacent to the existing basketball courts. The new raised landscape and reconfigured Delancey Street Bridge ramp would result in the elimination of the multi-purpose field. The multi-purpose field would be removed from use and would not be relocated or replaced. To support park operations, vehicular roads and maintenance areas are a necessary component of East River Park. Under Alternative 2, vehicular roads within the park and existing buildings would be retained for park maintenance and operations purposes, would not increase in size, or reduce the amount of open space within East River Park. The current and future vehicular roads would not result in a reduction of open space, and where applicable, would double as both recreational space for runners and maintenance access for vehicles when needed (consistent with how they function today). Further, the two maintenance areas located north of the soccer field and south of the tennis courts, respectively, would remain in their current condition and size. The portion of East River Park that received LWCFA funds between East 6th Street to East 10th Street would continue to provide for outdoor recreational uses.

Compared to the No Action Alternative, the conversion of active to passive space in East River Park would moderately reduce active open space to 22.60 acres from 23.05 acres and increase passive open space to 23.28 acres from 22.83 acres. A loss of a multi-use field would occur. However, the total open space within East River Park would remain the same.

Alternative 2 would cause a minor acreage reduction in usable open space from two open spaces within Project Area Two by removing approximately 0.05 acres of active and passive open space from Murphy Brothers Playground and Asser Levy Playground. Portions of the existing perimeter fences (i.e., adjacent to the FDR Drive) in passive space at Murphy Brothers Playground and in active space at Asser Levy Park would be replaced with a 405-linear-foot floodwall and a 200-linear-foot floodwall, respectively. Any portions of these playgrounds that would be affected by construction would be replaced in kind. The loss of this open space is not expected to adversely affect the use of the park; however, the change from a chain link fence to a floodwall would be a notable presence to park users.

Alternative 2 would result in minor changes to the features within existing open spaces that span the project area. The existing shared-use path would be reconstructed and passive recreation and landscaped spaces within East River Park and Stuyvesant Cove Park would be enhanced.

As described in Chapter 5.6, "Natural Resources," construction of the proposed project would require removal of a significant number of trees; however, a NYC Parks-approved landscape restoration plan to address the proposed tree removal would dictate the replacement or replanting of trees within these parks. Once construction is completed, this alternative would allow for the continued recreational usage of all open spaces within the project area.

Study Area

Under Alternative 2, the residential open space ratio within the study area would remain 0.55 acres per 1,000 residents (see **Table 5.3-6**), the same as under the No Action Alternative and substantially less than the planning goal of 2.5 acres per 1,000 residents. The residential active and passive open space ratios within the study area would also remain the same as under the No Action Alternative. These fall short of the City's planning goals of 2.0 acres per 1,000 residents for active space and 0.5 acres per 1,000 residents for passive space.

Table 5.3-6
½-Mile Study Area Alternative 2 Conditions

Study Area Population	
Residents	166,188
Open Space Acreage	
Active	54.01
Passive	36.67
Total	90.68
Open Space Ratios	
Active	0.33 acres/1,000 Residents
Passive	0.22 acres/1,000 Residents
Total	0.55 acres/1,000 Residents

Operation and Maintenance

Operations and maintenance would be similar to the Preferred Alternative, although more unavoidable adverse effects from a design storm would be anticipated within East River Park. These adverse effects would be temporary and open spaces would gradually return to pre-storm

conditions upon restoration, though the severity of the storm event and level of effort to repair existing facilities within unprotected areas may prolong the complete restoration of open spaces. Following the storm event, maintenance crews would clean debris from parks. Following the completion of post-storm maintenance and operations, the flood protection system would be returned to non-storm conditions. Alternative 2 would have flood protection systems in place by 2025, as compared to 2023 for the Preferred Alternative.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Project Area

Under Alternative 3, the project would incorporate a more extensive reconfiguration and reconstruction of the bulk of the East River Park landscape, recreational fields, playgrounds, and amenities. The topography of the park would be elevated along the line of protection and slope down towards the existing at-grade esplanade. In addition, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to provide universal access, and a new raised and landscaped park-side plaza landing at the entrance to the park from the East Houston Street overpass would be created.

The relocated and reconfigured Delancey Street Bridge ramps would become gentle sloping paths integrated into the raised landscape. The park-side Delancey Street Bridge ramp and shared-use path would require the relocation of the existing sports courts to the area directly south of the Williamsburg Bridge. The adjacent area north of the Williamsburg Bridge would be converted to a NYC Parks maintenance yard. In addition, the new raised landscape at Delancey Street would result in shifting and enlarging the location of the existing 12 tennis courts. The existing Tennis House would remain. The Reflections Labyrinth located north of the tennis courts would be converted to a vegetated passive area connecting the shared-use path to the west, with the pedestrian circulation area to the east.

At the existing East Houston Street entryway, a combination of ramps and an entry plaza would connect the Shared-use path directly to the East Houston Street entrance. This new entry plaza would create smoother transitions between the fields, shared-use path, and East Houston Street overpass and provide passive open space for park visitors to view adjacent recreational fields. The existing NYC Parks service yard would be relocated adjacent to the FDR Drive and replaced with pedestrian paths and planted areas. Near East 10th Street, the two ballfields would be combined into a single field surrounded by raised spectating areas, and the playground, picnic and barbecue areas would be rebuilt and expanded. Additional green space is proposed in this location to create a greener entry into East River Park. The portion of East River Park that received LWCFA funds between East 6th Street to East 10th Street would continue to provide for outdoor recreational use. While some portions of East River Park would be raised above the current grade, most of East River Park would remain within the 100-year floodplain and would not meet the design flood criteria. Furthermore, facilities within the Park would not be reinforced or otherwise protected from flooding.

Under Alternative 3, modifications of the existing park landscape in East River Park would result in a transfer of 2.93 acres of active open space to passive open space compared to the No Action Alternative, resulting in 20.12 acres of active space and 25.76 acres of passive space. East River Park's overall amount of open space would remain 45.88 acres.

In Project Area Two, similar to Alternative 2, a floodwall is proposed along the western edge of FDR Drive at Murphy Brothers Playground and Asser Levy Park. The floodwall would replace

the existing playground fence, occupying approximately 0.05 acres of existing open space. Unlike Alternative 2, these playgrounds would be reconfigured and reconstructed. Additionally, portions of Stuyvesant Cove Park would be constructed as a raised landscape and the shared use path would be enhanced due to the construction of the shared-use flyover bridge.

As described in Chapter 5.6, "Natural Resources," a significant number of trees would require removal for the implementation of Alternative 3, but trees would be replaced or replanted according to a NYC-Parks approved landscape restoration plan. Once implemented, Alternative 3 would not preclude the continued recreational usage of all open space within the entire project area, and in fact would enhance several open spaces.

Study Area

Alternative 3 would not add residential or worker populations in the study area but would alter the percentage of active to passive recreation space within the study area as compared to the No Action Alternative. However, overall open space acreage would remain the same. Under Alternative 3, the active open space ratio would decrease from 0.33 to 0.31 acres per 1,000 residents, and the passive open space ratio would increase from 0.22 to 0.24 acres per 1,000 residents in comparison to the No Action Alternative. The decrease in active open space is due to the loss of one ballfield and reconfiguration of active space amenities, like tennis courts, basketball courts, and athletic fields, to allow for some regulation-sized sports facilities while incorporating new passive spaces into previously underutilized spaces surrounding fields where possible. The study area's total open space ratio would remain 0.55 acres per 1,000 residents (see **Table 5.3-7**), substantially less than the City's planning goal of 2.5 acres per 1,000 residents. Also, these ratios fall short of the City's planning goals of 2.0 acres per 1,000 residents for active space and 0.5 acres per 1,000 residents for passive space.

Table 5.3-7
½-Mile Study Area Alternative 3 Conditions

Study Area Population	
Residents	166,188
Open Space Acreage	
Active	51.53
Passive	39.15
Total	90.68
Open Space Ratios	
Active	0.31 acres/1,000 Residents
Passive	0.24 acres/1,000 Residents
Total	0.55 acres/1,000 Residents

Operation and Maintenance

Operation and maintenance of Alternative 3 would be similar to those described in Alternative 2. In the event of a storm under Alternative 3, flood protection features within the project area would be in place. Under Alternative 3, storm-related adverse effects would be reduced or avoided for certain park elements in East River Park with proposed resiliency measures.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Open space programming and availability within the project and study areas under Alternative 5 would be the same as what was described above for the Preferred Alternative but assumes a build

year of 5 years and would be completed in 2025.Operation and maintenance of Alternative 5 would be similar to the Preferred Alternative; however, the raised northbound lanes of the FDR Drive would eliminate the need for closure structures between East 13th Street and East 18th Street, further reducing the operations and maintenance effort in this area.

MITIGATION

The proposed project would require a NYC Parks-approved landscape restoration plan to address the tree removal that is proposed. These trees would be replaced or replanted in accordance with this pre-approved landscape restoration plan that includes 1,442 replacement trees within the study area and off-site plantings as necessary. Tree replacement would be provided in accordance with Chapter 5 of Title 56 of the Rules of New York (NYC Parks Rules) and Local Law 3 of 2010. Trees and other landscaped areas that are planted as a result of a NYC Parks approved landscape restoration plan for construction of the flood protection system would include salt tolerant native species, among a diverse selection of 52 tree species. The planting plan would also aim to improve ecological habitat and be resistant to the effects of salt spray and wind using the concept of different types of groves. The planting plan would incorporate these groves of trees with a diverse mix of tree species for ecology, shade, and resiliency and would depart from the existing formal landscape to allow the park user to experience an escape from the hard surfaces of the urban landscape. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions. The proposed project would not introduce a residential or worker population, placing an increased demand on open space; reduce the quality of open space features, conditions, or usability of open space; or induce a significant physical effect on open space by increasing shadow, noise, air pollutant emissions, or odors as compared to the No Action Alternative. Therefore, no mitigation is required beyond the NYC Parks-approved landscape restoration plan. ✷

Chapter 5.4: Historic and Cultural Resources

A. INTRODUCTION

This chapter identifies historic and cultural resources (including archaeological and architectural resources) in the Area of Potential Effect (APE) for the proposed project, probable effects on such resources, avoidance and minimization of harm to such resources, and coordination with appropriate agencies and stakeholders. The proposed project's potential effects on historic and cultural resources due to both construction and operation are considered in this chapter. Construction effects are also discussed in Chapter 6.3, "Construction—Historic and Cultural Resources."

The proposed project has two APEs: a Primary APE, in which construction and operation of the proposed project may directly or indirectly affect historic properties; and a more expansive, Secondary APE, in which the absence of the proposed project could result in direct effects to historic properties from future flood events. To facilitate the analysis of effects, the Primary APE has been subdivided to indicate the area in which the proposed project could cause potential direct construction-related effects (within 90 feet) and the area in which the proposed project could cause indirect visual or contextual effects (within 400 feet). Further, the APE for archaeological resources is limited to the portion of the project area from Montgomery Street to Rivington Street, the portion of the project area along East 23rd Street to East 25th Street, and the locations of the upland drainage management improvements.

The analysis in this Environmental Impact Statement (EIS) was prepared in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as implemented by federal regulations appearing in 36 CFR § 800, in consultation with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), acting in its capacity as the New York State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), and the New York City Landmarks Preservation Commission (LPC). Comment letters from SHPO, LPC, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge-Munsee Community Band of Mohicans are included in **Appendix E**.

B. PRINCIPAL CONCLUSIONS

ARCHAEOLOGICAL RESOURCES

Two Phase 1A Archaeological Documentary Studies were prepared for the APE in March 2016, and a Supplemental Phase IA Archaeological Documentary Study was prepared in March 2019. The March 2016 reports identified the following broad categories of historic-period archaeological resources that could be located in the APE—river bottom remains, landfill retaining structures and landfill deposits, historic streetbed resources, and former city block resources. Because of the potential presence of these resources, as mitigation, additional archaeological investigation will be performed in accordance with Section 106 regulations, based on a scope of work reviewed and approved by LPC and SHPO; this archaeological

investigation would include pre-construction testing and/or monitoring during project construction performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidelines in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that work be halted until the tribe is notified and the artifact can be evaluated by an archaeologist. The additional archaeological investigation will be stipulated in a Programmatic Agreement (PA) that is being prepared and will be included in the Final EIS (FEIS). It is expected that the PA will be executed among the U.S. Department of Housing and Urban Development (HUD), the New York City Office of Management and Budget (OMB), NYC Parks, SHPO, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, and ACHP.

ARCHITECTURAL RESOURCES

There are 17 architectural resources within the Primary APE. In addition, there are 42 known architectural resources located within the Secondary APE beyond the boundaries of the project area.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Non-Storm Conditions

One planned New York City Department of Parks and Recreation (NYC Parks) project within Project Area One could affect architectural resources that have been determined eligible for listing on the State and National Registers of Historic Places (S/NR)—construction of an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (#4). This architectural resource would be offered some protection from accidental damage through Building Code Section BC 3309: Protection of Adjoining Property.

In addition, three projects within the 400-foot portion of the Primary APE could affect architectural resources in the No Action Alternative—reconstruction of the Baruch Playground within the Bernard Baruch Houses (#9, S/NR-eligible), resiliency measures at the Baruch Houses (#9, S/NR-eligible), and rehabilitation work at the Asser Levy Public Baths (#12, NYCL, S/NR).

Storm Conditions

In the absence of a comprehensive flood protection system, architectural resources located within the APEs would remain at risk to flooding, with the exception of the Bernard Baruch and

Jacob Riis Houses, which would be protected by resiliency measures being implemented by the New York City Housing Authority (NYCHA).

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Non-Storm Conditions

The Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible) through the installation of closure structures. As will be stipulated in the PA, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Construction of the Preferred Alternative would occur within 90 feet of the Asser Levy Public Baths (#12, S/NR, NYCL) and a small portion of the Jacob Riis Houses (#15, S/NR-eligible). In addition, construction of the drainage management components would occur within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement Construction Protection Plans (CPPs) for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

It is not expected that the Preferred Alternative would result in any contextual effects on architectural resources. As will be stipulated in the PA, an effort would be made to design the floodwalls adjacent to the Asser Levy Public Baths (#12, S/NR, NYCL) so that they are compatible with the historic building, and the design would be coordinated with LPC.

Storm Conditions

In a future storm condition, the following two S/NR-eligible architectural resources could experience adverse direct effects from storm surge and flooding: the Williamsburg Bridge (#2) and East River Bulkhead (#3).

The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be located on the landward side of the flood protection system that would be constructed under the Preferred Alternative. It would, therefore, be protected from damage that could result from storm surge and flooding in a future storm condition. The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area Two, however, would not be protected. Therefore, in a future storm condition, that portion of the FDR Drive could experience adverse direct effects from storm surge and flooding.

The architectural resources located within the 400-foot portion of the Primary APE and within the Secondary APE are landward of the flood protection system that would be constructed under the Preferred Alternative. Therefore, unlike with the No Action Alternative, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

OTHER ALTERNATIVES

Effects to architectural resources in both the non-storm and storm conditions would be the same with the Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2) and the Flood Protection System on West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3) and largely the same with the Flood Protection System East of FDR Drive Alternative (Alternative 5).

Unlike the Preferred Alternative and Alternatives 2 and 3, Alternative 5 would reconstruct the section of the FDR Drive (#1, S/NR-eligible) between approximately East 13th and East 18th Streets. However, it is not expected that this work would have adverse effects on the FDR Drive, as only an approximately 6-block section of the 9.44-mile-long FDR Drive would be reconstructed. Further, because the FDR Drive currently has elevated sections, raising the northbound lanes within a portion of Project Area Two would not affect the overall appearance of the highway, and it would still convey its historic significance. Also, the FDR Drive has been altered over time. Further, Alternative 5, unlike the Preferred Alternative and Alternatives 2 and 3, would protect the section of the FDR Drive between East 13th and East 18th Streets from storm surge and flooding.

MITIGATION

ARCHAEOLOGICAL RESOURCES

As will be stipulated in the PA, additional archaeological investigation prior to or during construction will be performed in accordance with Section 106 regulations. Such scope of work will be prepared in consultation with LPC and SHPO, and this further phase of archaeological work would include testing and/or monitoring conducted in consultation with LPC and SHPO and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The testing and/or monitoring would not be done during the EIS process but would occur before and/or during project construction. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed as per the *CEQR Technical Manual*.

ARCHITECTURAL RESOURCES

The City, in consultation with LPC and SHPO, would develop and implement CPPs for the following architectural resources, or portions of multi-building resources, located within 90 feet of project construction: the FDR Drive (#1, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible) to avoid inadvertent construction-period damage to these

architectural resources. The development and implementation of the CPPs will be stipulated in the PA. In addition, as will be stipulated in the PA, an effort would be made to design the floodwalls that would be located adjacent to the Asser Levy Public Baths (#12, NYCL, S/NR), so that they are compatible with the architectural resource, and the design of the floodwalls would be coordinated with LPC.

C. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following federal and state laws under which each of the alternatives has been analyzed to result in a determination of environmental effects with project implementation.

NATIONAL HISTORIC PRESERVATION ACT (SECTION 106)

Section 106 mandates that federal agencies consider the effects of their actions on any properties listed on or determined eligible for listing on the National Register of Historic Places and afford the federal ACHP a reasonable opportunity to comment on such undertakings. The lead federal agency, in consultation with the SHPO and consulting parties, must determine whether a proposed project would have any adverse effects on historic properties within the area of potential effect. Section 106 requires consultation with the SHPO, federally recognized Indian tribes that might attach religious and cultural significance to historic properties affected by the project, and additional consulting parties with a demonstrated interest in the project based on a legal or economic relation to affected properties or on an interest in the project's effects on historic properties. In addition, ACHP may elect to participate in consultation, if certain criteria are met.

The review under Section 106 can be conducted in coordination with analyses conducted for the National Environmental Policy Act (NEPA). In addition, because the views of the public are essential to informed federal decision-making in the Section 106 process, the public should be informed about the project and its effects on historic properties and given the opportunity to comment. This public comment element can be combined with the public participation component required by NEPA. The public participation efforts being conducted for the proposed project are described in Chapter 3.0, "Process, Agency Coordination, and Public Involvement."

Section 101(d)(6)(B) of the NHPA requires the lead federal agency to consult with any Indian tribe that attaches religious and cultural significance to historic properties that may be affected by the undertaking. The lead federal agency shall ensure that consultation in the Section 106 process provides the Indian tribe a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects.

The basic steps of the Section 106 process are as follows:

- In consultation with the SHPO, the federal agency establishes an APE for the project, carries out appropriate steps to identify historic properties within the APE, and, in consultation with the SHPO, applies the National Register criteria for those properties that have not been previously evaluated for National Register eligibility. For properties of religious and cultural significance to participating Indian tribes, the federal agency also consults with the Tribal Historic Preservation Officer (THPO) or designated tribal representative to assess eligibility.

- If historic properties are identified, the federal agency, in consultation with the SHPO, applies the criteria of adverse effect (36 CFR § 800.5(a)(1) to identified historic properties within the APE, taking into consideration any views provided by consulting parties and the public. For properties of religious and cultural significance to tribal nations, the federal agency also consults with the THPO or designated tribal representative. In general, an adverse effect is found if the project may cause a change in the characteristics of the historic property that qualify it for inclusion in the National Register. The federal agency notifies the SHPO, ACHP, participating Indian tribes, and other consulting parties of its finding and provides supporting documentation meeting standards outlined in the regulations. The information is also made available to the public.
- If the assessment finds that the proposed project may have an adverse effect, consultation continues among the SHPO, ACHP, and other consulting parties to seek measures that would avoid, minimize, or mitigate adverse effects on historic properties. Members of the public are also provided an opportunity to articulate any views on resolving the project's adverse effects. This mitigation is typically implemented through an MOA or PA.
- Consultation typically results in an MOA or PA, outlining agreed-upon measures to avoid, minimize, or mitigate the project's effects on historic properties. Execution of the MOA or PA and implementation of its terms satisfy the requirements of Section 106, and the project proceeds under the terms of the MOA or PA. A PA for the proposed project is being prepared and will be included in the FEIS (see **Appendix E** for a draft outline of the PA stipulations). It is expected that the PA will be executed among HUD, OMB, NYC Parks, SHPO, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, and the Stockbridge-Munsee Community Band of Mohicans.

At the request of OMB, HUD[1] issued a notice in the Federal Register on November 17, 2015, advising the public of the preparation of an EIS and initiating the Section 106 process.

In addition to HUD, OMB (as NEPA lead agency), and SHPO, participants in Section 106 consultation for the proposed project include NYC Parks, acting as lead agency under the State Environmental Quality Review Act (SEQRA) and CEQR, LPC, and three federally recognized Indian tribes—the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans. In March 2019, ACHP notified HUD of its decision to participate in Section 106 consultation for the proposed project, based on the Criteria for Council Involvement in Reviewing Individual Section 106 Cases (Appendix A to 36 CFR § 800).

As a result of Hurricane Sandy, in May 2013, a Programmatic Agreement was executed among the Federal Emergency Management Agency (FEMA), SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP (see **Appendix E**). This Programmatic Agreement ensures that federal disaster assistance programs in the State of New York are administered in accordance with certain stipulations to satisfy FEMA's Section 106 responsibilities. Other Federal agencies providing financial assistance for

[1] As described in Chapter 1.0, "Purpose and Need," the City of New York has entered into a grant agreement with HUD to disburse Community Development Block Grant-Disaster Recovery (CDBG-DR) Funds for the construction of the project. The City is the grantee of the CDBG-DR funds for Hurricane Sandy, which would be provided to OMB, and HUD has provided for assumption of its NEPA authority and NEPA lead agency responsibility to OMB for the purposes of administering the CDBG-DR Program in New York City.

the type of disaster assistance programs covered by the Agreement may, with the concurrence of ACHP, FEMA, and SHPO, satisfy their Section 106 responsibilities by accepting and complying with the terms of the Agreement. OMB has assumed HUD's environmental responsibilities as the Responsible Entity for New York City and has agreed to accept the terms and conditions of the Programmatic Agreement via Appendix D to the Programmatic Agreement and to take into account the effects of its undertakings and satisfy its Section 106 responsibilities for the Community Development Block Grant-Disaster Recovery (CDBG-DR) program for activities in New York City (see **Appendix E**).

NEW YORK STATE HISTORIC PRESERVATION ACT

The New York State Historic Preservation Act of 1980 (NYSHPA) closely resembles NHPA, and requires that state agencies consider the effect of their actions on properties listed on or determined eligible for listing on the State Register of Historic Places. When a project is being reviewed pursuant to Section 106 of the NHPA (and 36 CFR Part 800), the procedures of Section 14.09 of the NYSHPA do not apply, and any review and comment by SHPO must be within the framework of Section 106 procedures (NYSHPA § 14.09[2]). The proposed project is not reviewed separately under Section 14.09 of the NYSHPA.

NEW YORK CITY LANDMARKS LAW

The New York City Landmarks Law establishes LPC and gives it the authority to designate landmarks, interior landmarks, scenic landmarks, and historic districts, following the criteria provided in the Local Laws of the City of New York, New York City Charter, Administrative Code, Title 25, Chapter 3. Buildings, properties, or objects are eligible for landmark status when a part is at least 30 years old. Landmarks have a special character or special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the city, state, or nation.

The New York City Landmarks Law also gives LPC the authority to regulate any construction, reconstruction, alteration, or demolition of such landmarks and districts. Under the Landmarks Law, no new construction, alteration, reconstruction, or demolition can take place on privately owned properties that are landmarks, landmark sites, within designated New York City historic districts or pending designation as NYCLs until the LPC has issued a Certificate of No Effect on protected architectural features, Certificate of Appropriateness, or Permit of Minor Work. Publicly owned resources are also subject to review by LPC before the start of a project; however, LPC's role in projects sponsored by other city or state agencies generally is advisory only. Projects reviewed under CEQR that physically affect Landmarks or properties within New York City historic districts require mandatory review by LPC, in the case of private properties, and approval of LPC, in the case of certain City property.

D. METHODOLOGY

DEFINITION OF THE AREA OF POTENTIAL EFFECT

A required step in the Section 106 process is determining the APE, which is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist" (36 CFR § 800.16[d]). The APE is influenced by the scale and nature of an undertaking.

The APE for the proposed project has been developed in consultation with OMB, NYC Parks, and SHPO based on proposed work activities and their potential to affect historic properties, including potential direct and indirect effects caused by the construction and operation of the proposed project.

In general, adverse effects on architectural resources may include both direct physical effects—demolition, alteration, or damage from construction—and indirect effects, such as the introduction of visual, audible, or atmospheric elements that may alter the characteristics of the historic property that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property's historic features. Archaeological resources are potentially affected by direct effects from construction activity resulting in disturbance to the ground surface (including submerged ground surfaces) such as excavation, grading, pile-driving, cutting and filling, dredging, and staging. The criteria for adverse effects, as defined by ACHP, are described in greater detail below.

The proposed project has two APEs: a Primary APE, in which construction and operation of the proposed project may directly or indirectly affect historic properties; and a more expansive, Secondary APE, in which the absence of the proposed project could result in direct effects to historic properties from future flood events. To facilitate the analysis of effects, the Primary APE has been subdivided to indicate the area in which the proposed project could cause potential direct construction-related effects (within 90 feet) and the area in which the proposed project could cause indirect visual or contextual effects (within 400 feet). The Secondary APE corresponds to the protected area described in Chapter 2.0, "Project Alternatives." The APEs are depicted in **Figure 5.4-1**.

Direct effects may include physical damage or destruction of a resource or its setting. The portion of the Primary APE in which there is the potential for the proposed project to cause direct effects includes all locations that could potentially be subject to direct ground-disturbing activities and adjacent areas within 90 feet. Project activities are anticipated to include demolition, excavation, pile-driving, cutting and filling, and staging. As defined in the New York City Department of Buildings (DOB) *Technical Policy and Procedure Notice (TPPN) #10/88* and in conformance with New York City Building Code Chapter 3309.4.4, adjacent construction is defined as any construction activity that would occur within 90 feet of a historic resource.

Indirect effects may include the introduction of visual, audible, or atmospheric elements that alter the characteristics of a historic property that qualify it for inclusion in the National Register. To account for potential indirect effects, the Primary APE extends 400 feet from the project area, following the guidelines of the *CEQR Technical Manual*.

IDENTIFICATION OF HISTORIC PROPERTIES WITHIN THE APE

The methodology used for identifying historic properties in the APEs is described below. Historic properties identified in the APEs are described below.

ARCHAEOLOGICAL RESOURCES

Archaeological resources are physical remnants, usually buried, of past human activities on a site. They can include archaeological resources associated with Native American populations that used or occupied a site and can include stone tools or refuse from tool-making activities, remnants of habitation sites, and similar items. These resources are also referred to as

Source: NYC Landmarks Preservation Commission, NYS OPRHP

Project Area One

Project Area Two

Primary (400-foot) APE

Secondary APE

Known Historic and Cultural Resources

East 10th Street Historic District (NYCL, S/NR-eligible)

Lower East Side Historic District and Extension (S/NR)

Stuyvesant Square Historic District (NYCL, S/NR)

FDR Drive (S/NR)

❷ *Individual Architectural Resources*

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources Inventory:
Area of Potential Effect

Figure 5.4-1

"precontact," since they were deposited before Native Americans' contact with European settlers. Archaeological resources can also include remains from activities that occurred during the historic period, which began with the European colonization of the New York area in the 17th century; such resources can include remains associated with European contact with Native Americans, battle sites, landfill deposits, structural foundations, and domestic shaft features such as cisterns, wells, and privies.

On sites where later development occurred, archaeological resources may have been disturbed or destroyed by grading, excavation, and infrastructure installation and street improvements. However, some resources do survive in urban environments despite extensive development. Deposits can be protected when covered with pavement (i.e., a parking lot) or with a building with a shallow foundation and no basement. In both scenarios, archaeological deposits can be sealed beneath the ground surface, protected from further disturbance.

Archaeological Investigations typically proceed in a multi-phase process generally consisting of Phase I (determining the presence or absence of archaeological resources through documentary research and field testing), Phase II (gathering sufficient information to assess State and National Register eligibility), and Phase III (mitigating unavoidable effects through data recovery or other form of mitigation). The need for the next phase is dependent upon the results of the preceding phase.

On October 27, 2015, a report was submitted to LPC and SHPO that assessed whether any locations within the proposed project area could be eliminated from further in-depth archaeological study due to a lack of potential archaeological sensitivity.[2] That report determined that the APE for archaeological resources should be limited to the portion of the project area from Montgomery Street to Rivington Street and to the portion of the project area along East 23rd Street to East 25th Street. Further, the report concluded that no further archaeological consideration of the portion of the project area between Rivington Street and East 23rd Street was warranted, because that portion of the project area was under water through much of the 19th century. In addition, piers and wharves that were historically located in that portion of the project area dated to the late 19th and early 20th centuries when the construction of waterfront features had become standardized. The report also concluded that the project area had no sensitivity for precontact-period (i.e., Native American) archaeological resources. In a letter dated October 30, 2015, LPC concurred with the conclusions of the report. On December 10, 2015, SHPO concurred with the proposed definition of the APE for archaeological resources. Therefore, two Phase 1A Archaeological Documentary Studies were prepared in March 2016 for LPC and SHPO review, one for the portion of the APE between Montgomery and Rivington Streets and one for the portion of the APE from East 23rd to East 25th Street.

As part of the Phase 1A reports for the proposed project, research was conducted at the New York State Museum (NYSM) and SHPO to review previously identified archaeological sites located within one mile of the APE and previously completed cultural resource surveys for areas in or adjacent the APE. In addition, cartographic research and a site walkover survey by a Registered Professional Archaeologist were conducted to evaluate historic and modern land use factors that may have resulted in ground disturbance and affected potential archaeological resource preservation. The Phase 1A reports are summarized below.

[2] Historical Perspectives, Inc., *Refinement of Archaeological Area of Potential Effect, East Side Coastal Resiliency Project, Montgomery Street to East 25th Street, Manhattan, New York County, New York*. October 2015.

As requested by SHPO and LPC in letters dated January 7, 2019 and January 28, 2019, respectively, a Supplemental Phase 1A Archaeological Documentary Study was prepared in March 2019 that addresses project design refinements made subsequent to approval of the 2016 reports. Specifically, the Supplemental Phase 1A report addresses the upland drainage management improvements that lie outside of the original APE for archaeology and design refinements for the Preferred Alternative.

See **Appendix E** for SHPO and LPC correspondence.

ARCHITECTURAL RESOURCES

Once the APEs were determined, a list of officially recognized architectural resources within the APEs was compiled that includes National Historic Landmarks (NHL), S/NR-listed properties or properties determined eligible for such listing, New York City Landmarks (NYCLs) and Historic Districts, and properties that have been found by LPC to appear eligible for designation, considered for designation ("heard") by LPC at a public hearing, or calendared for consideration at such a hearing (these are "pending" NYCLs).

Criteria for listing on the National Register are in the Code of Federal Regulations, Title 36, Part 63, and LPC has adopted these criteria for use in identifying architectural resources for CEQR review. Following these criteria, districts, sites, buildings, structures, and objects are eligible for the National Register if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and: (1) are associated with events that have made a significant contribution to the broad patterns of history (Criterion A); (2) are associated with significant people (Criterion B); (3) embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); or (4) may yield information important in prehistory or history. Properties that are younger than 50 years of age are ordinarily not eligible, unless they have achieved exceptional significance. Official determinations of eligibility are made by OPRHP/SHPO.

LPC designates historically significant properties in the City as NYCLs and/or Historic Districts, following the criteria provided in the Local Laws of the City of New York, New York City Charter, Administrative Code, Title 25, Chapter 3. Buildings, properties, or objects are eligible for landmark status when a part is at least 30 years old. Landmarks have a special character or special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the city, state, or nation. There are four types of landmarks: individual landmark, interior landmark, scenic landmark, and historic district.

An initial list of 13 potential historic resources—properties that appeared to meet the eligibility criteria for S/NR listing and/or NYCL designation—within the APEs was also compiled. These were identified based on field surveys of the APEs conducted by an architectural historian who met NPS Professional Qualification Standards for Architectural History, codified under 36 CFR § 61, and additional research. The inventory of 13 potential resources was submitted to SHPO and LPC for their evaluation and determination of eligibility. SHPO, in a letter dated April 25, 2016, found nine of the potential resources to be eligible for S/NR listing, while withholding determinations for three properties pending further evaluation. Additional consultation with SHPO was undertaken in the fall and winter of 2016. Of the nine potential architectural resources previously determined eligible, SHPO subsequently determined in December 2016 that four of the resources were in fact not eligible based on additional research and information.

Of the three previously undetermined properties, SHPO subsequently determined, in evaluations dated August 30, 2016 and December 6, 2016, that two of them meet the eligibility criteria for S/NR listing. Further, in December 2017, SHPO determined that East River Park did not meet the eligibility criteria for S/NR listing due to a loss of integrity. LPC did not find any of the potential architectural resources to warrant designation as NYCLs. See **Table 5.4-1** for the list of 17 historic resources in the APEs (see **Appendix E** for SHPO and LPC correspondence).

EVALUATION OF POTENTIAL EFFECTS ON HISTORIC PROPERTIES

Once the historic properties in the APEs were identified, the effects of the proposed project on those resources were assessed. As described above, effects on historic properties identified in this chapter may include both direct effects and indirect effects. Assessments of effects are based on ACHP's Criteria of Adverse Effect codified in 36 CFR § 800.5(a)(1) and (2). The assessment may result in three possible effects findings: no effect (no historic properties affected); no adverse effect; or adverse effect. According to ACHP's criteria, an adverse effect is found "when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Examples of adverse effects include, but are not limited to, "physical destruction or damage of all or part of the property;" "removal of the property from its historic location; change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;" and "introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features." Adverse effects may include "reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

E. AFFECTED ENVIRONMENT

ARCHAEOLOGICAL RESOURCES

AREA OF POTENTIAL EFFECT – MONTGOMERY STREET TO RIVINGTON STREET

The Phase IA Archaeological Documentary Study for the APE between Montgomery and Rivington Streets determined that the entire APE was once under the East River and was landfilled at various times between the 1810s and about 1850, with city streets created to separate and define newly formed blocks. These blocks supported a range of structures over time, primarily mixed residential and commercial buildings and industrial facilities. Bulkheads and pierheads established the extent of waterfront resource boundaries. The APE became more developed over time and by the late 1930s, when the East River Drive (now the FDR Drive) and East River Park were created, each city block was almost completely covered with structures. Further, numerous piers were located along the waterfront. Historical maps and photographs show that these structures, including the piers, were demolished in preparation for construction of the East River Drive and East River Park. Based on previous archaeological studies within and adjacent to the APE, the Phase 1A report identified broad categories of potential historic-period archaeological resources that could be located in the APE. These categories and the potential sensitivity of the APE to host them are discussed below.

River Bottom Remains

River bottom remains are those items discarded onto the river floor prior to or during landfilling, and it is possible that archaeologically sensitive deposits are present on the historic river bottom within the APE. The depth of such deposits would depend on the vertical extent of the historic landfill and historic strata, which varies across the APE from 12 feet to 40 feet in thickness

Landfill Retaining Structures and Landfill Deposits (Including Sunken Vessels)

Landfill retaining structures can include repurposed historic piers, wharves, and docks, as well as timber structures built specifically for retaining fill, sometimes also referred to as bulkheads. At times, derelict maritime vessels were used as landfill retaining structures or as part of the landfill. Landfill by nature contains soil, but may also include concentrations of artifacts or other refuse material, such as ash, sometimes referred to as "cinders" in early soil boring logs.

Since the entire APE was once under water, there is a potential for historic landfill retaining structures from the first half of the 19th century throughout most of the APE. The exception is the former area bounded by Corlears Street, Water Street, and the East River (now the approximate location of the East River Park amphitheater), which was not enclosed by bulkheads and landfilled until the 1870s or 1880s. The current bulkhead that forms the eastern edge of East River Park dates to the 1930s, when the park was created, and SHPO has determined that East River Park does not meet the eligibility criteria for S/NR listing. In addition, it is not expected that there would be any historic landfill retaining structures between the historic bulkhead line and the current bulkhead line, as this area was landfilled in the 20th century in conjunction with the creation of East River Park.

While it is possible that landfill retaining structures could be found within the upper reach of the soil column (approximately 2 to 4 feet below the existing ground surface), previous archaeological investigations at other locations along the East River suggest that most of these types of resources are located at deeper depths. Additionally, the level of disturbance throughout the APE from various earthmoving episodes, including installation of utilities, construction of foundations and basements, and reconfiguration of the area during roadway and park construction, further suggests that the likelihood of encountering intact resources is diminished at these relatively shallow depths. Recent soil borings did not record any elements at these depths that appear to represent these resources (such as concentrations of wood).

Historic Streetbed Resources – Utilities, Transportation Elements, Artifact Deposits

The APE formerly contained a number of historic streets, including portions of Front Street, South Street, Montgomery Street, Gouverneur Street, Jackson Street, Corlears Street, Water Street, Cherry Street, East Street, Tompkins Street, Grand Street, Broome Street, Delancey Street, and Rivington Street. Most of these street segments were eliminated when the East River Drive and East River Park were built in the 1930s and 1940s.

Each of the former city streets had subsurface utilities. The lines of extant utilities attest to the former street locations. While it is unlikely that any of the iconic wooden water mains from before 1842 (when the Croton Aqueduct system began operation) would be located under any of these streets (as those mains were installed further south in Lower Manhattan), it is possible that early water and sewer lines from the 1850s and 1860s could still exist under city streets, if they were not removed during subsequent utility work.

Some of the historic streets had streetcar tracks. Those streets with tracks included portions of Montgomery Street, Front Street, South Street, Corlears Street, and Grand Street. While

subsequent disturbance to the streetbeds from utility replacement and construction of the East River Drive and East River Park likely eliminated many of these tracks, it is possible that segments could survive beneath these areas. It is also possible that former street pavements, such as cobblestones or paving blocks, may be found beneath some areas.

Archaeological monitoring of utility work in streetbeds of Lower Manhattan has shown that concentrations or pockets of discarded artifacts can be found beneath historic streets. It is not possible to predict where such dumping grounds may be located, although archaeologists have had some subsequent success tracing the provenance of certain artifact caches to neighboring businesses.

Areas of the APE that correspond with the footprints of historic streets may be sensitive for the varied types of resources described above if later disturbance has not affected them. Within the upper 2 to 4 feet of the soil column, there is less likelihood of encountering buried utilities, although it is possible that streetcar tracks, earlier street paving, and possible artifact dumps may be present.

Former City Block Resources – Foundation Remains, Historic Shaft Features

Those portions of the APE that were formerly developed within city blocks historically contained a variety of residential, commercial and industrial buildings and structures, as well as waterfront-related shipyards, coal yards, lumber yards, and the like. Potential archaeological resources on former city blocks could include former foundations or other components from these buildings, as well as shaft features, such as privies, wells, and cisterns, from domestic and commercial buildings that predate the introduction of municipal water and sewer lines in the 1850s and 1860s. Those locations that contained commercial yards such as shipyards, lumber yards, coal yards, and lime yards, would not be expected to have a significant archaeological footprint.

The likelihood of recovering yard remains depends on the level of disturbance, which varies by location. Those former yards that had subsequent buildings with basements would have been disturbed to the deepest extent, ranging from possibly 8–10 feet below grade. Some information is available about which buildings had basements from Sanborn fire insurance maps, although it is possible that not all basements were recorded. Building records for these former structures, which might also offer confirmation of basements, are no longer extant, as it was common practice to discard records of buildings after they were demolished. The remainders of the former lots have likely been disturbed from episodes of construction and demolition on the blocks and creation of East River Drive and East River Park. Although the depth of this disturbance is harder to discern, it is probable that the upper few feet might have been affected in most locations. Further, the construction of the Williamsburg Bridge included portions of historic lots south of Delancey Street, which should be assumed to be significantly disturbed.

As currently proposed, nearly all components of the flood protection systems proposed for Alternatives 2 through 5 in the APE between Montgomery and Rivington Streets are slated for locations on the river side of the FDR Drive. The exceptions are several proposed floodwalls along Montgomery and South Streets at the southern end of Project Area One and, under Alternatives 3 and 4, the Delancey Street and East 10th Street bridges over the FDR Drive, and under Alternative 4, the Corlears Hook bridge over the FDR Drive. Based on historic maps from the 1850s, the Phase 1A report identifies locations on former city blocks that may be sensitive for domestic, commercial, and/or industrial archaeological resources that were not later covered by buildings with basements, focusing primarily on areas south and/or east of the FDR Drive.

Summary

In summary, landfill retaining structures may exist throughout the APE (excepting the approximate area where the current East River Park amphitheater is located) and other potential archaeological resources may be situated in former streetbeds and historic city blocks. **Figures 5.4-2a through 5.4-2f** show the areas of potential archaeological sensitivity in the APE as identified in the 2016 Phase 1A Archaeological Documentary Studies. In letters dated February 23, 2016 and March 14, 2016, LPC and SHPO, respectively, concurred with the sensitivity determinations in the Phase 1A report, and in letters dated March 18, 2019, SHPO and LPC concurred with the findings of the Supplemental Phase 1A Archaeological Documentary Study. Further, in written communications from April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans determined that no religious or culturally significant sites of interest to their tribes are located within the project area. In February 2019, additional consultation was undertaken with the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans regarding project refinements made since 2016. Responses are pending. See **Appendix E** for correspondence.

AREA OF POTENTIAL EFFECT – EAST 23RD STREET TO EAST 25TH STREET

The Phase IA Archaeological Documentary Study for the APE between East 23rd and East 25th Streets determined that the entire APE was once under the water of the East River and was landfilled at various times between the 1830s and the 1940s, with city streets created to separate and define newly formed blocks. Both East 23rd Street and East 24th Street began as piers and were later filled in to create streets. It is possible that remains of these piers, and possibly a former ferry house at the intersection of East 23rd Street and Avenue A, may still exist beneath the present streetbeds and sidewalks of these two streets. Based on previous archaeological studies within and adjacent to the APE, the Phase 1A report identified broad categories of potential historic-period archaeological resources that could be located in the APE. These categories and the potential sensitivity of the APE to host them are discussed below.

River Bottom Remains

Since the entire APE was once under water, it is possible that archaeologically sensitive deposits are present on the historic river bottom within the APE.

Landfill Retaining Structures and Landfill Deposits (Including Sunken Vessels)

Since the entire APE was once under water, there is potential for the presence of archaeologically sensitive historic landfill retaining structures from the first half of the 19th century along East 23rd Street and East 25th Street. The remainder of the APE was landfilled after this period.

While it is possible that landfill retaining structures could be found within the upper reach of the soil column (approximately 2 to 4 feet below the existing ground surface), previous archaeological investigations at other locations along the East River suggest that most of these types of resources are located at deeper depths.

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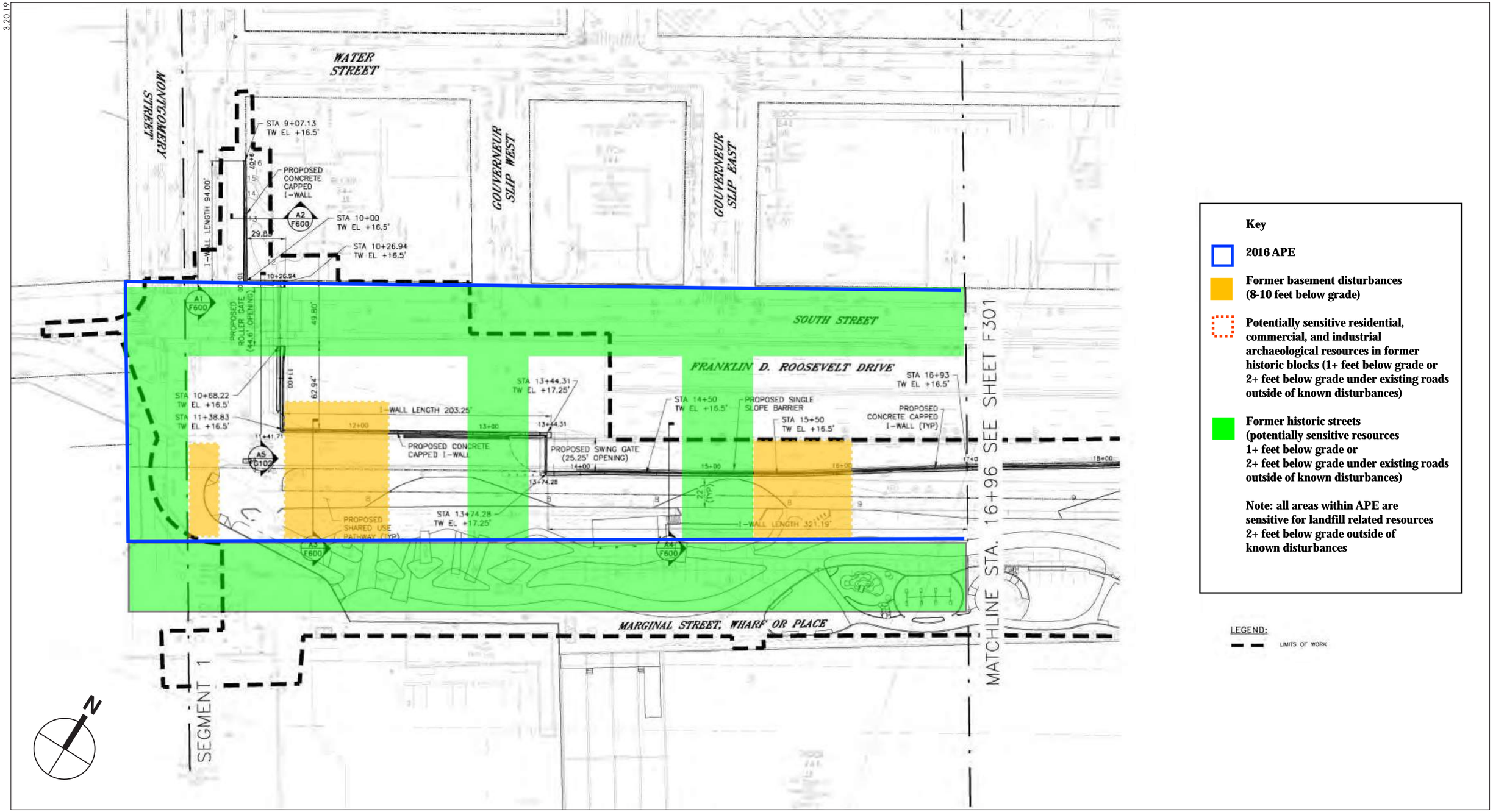

Key

2016 APE

Former basement disturbances (8-10 feet below grade)

Potentially sensitive residential, commercial, and industrial archaeological resources in former historic blocks (1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Former historic streets (potentially sensitive resources 1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Note: all areas within APE are sensitive for landfill related resources 2+ feet below grade outside of known disturbances

LEGEND:

LIMITS OF WORK

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Montgomery Street to Gouverneur Slip East
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2a

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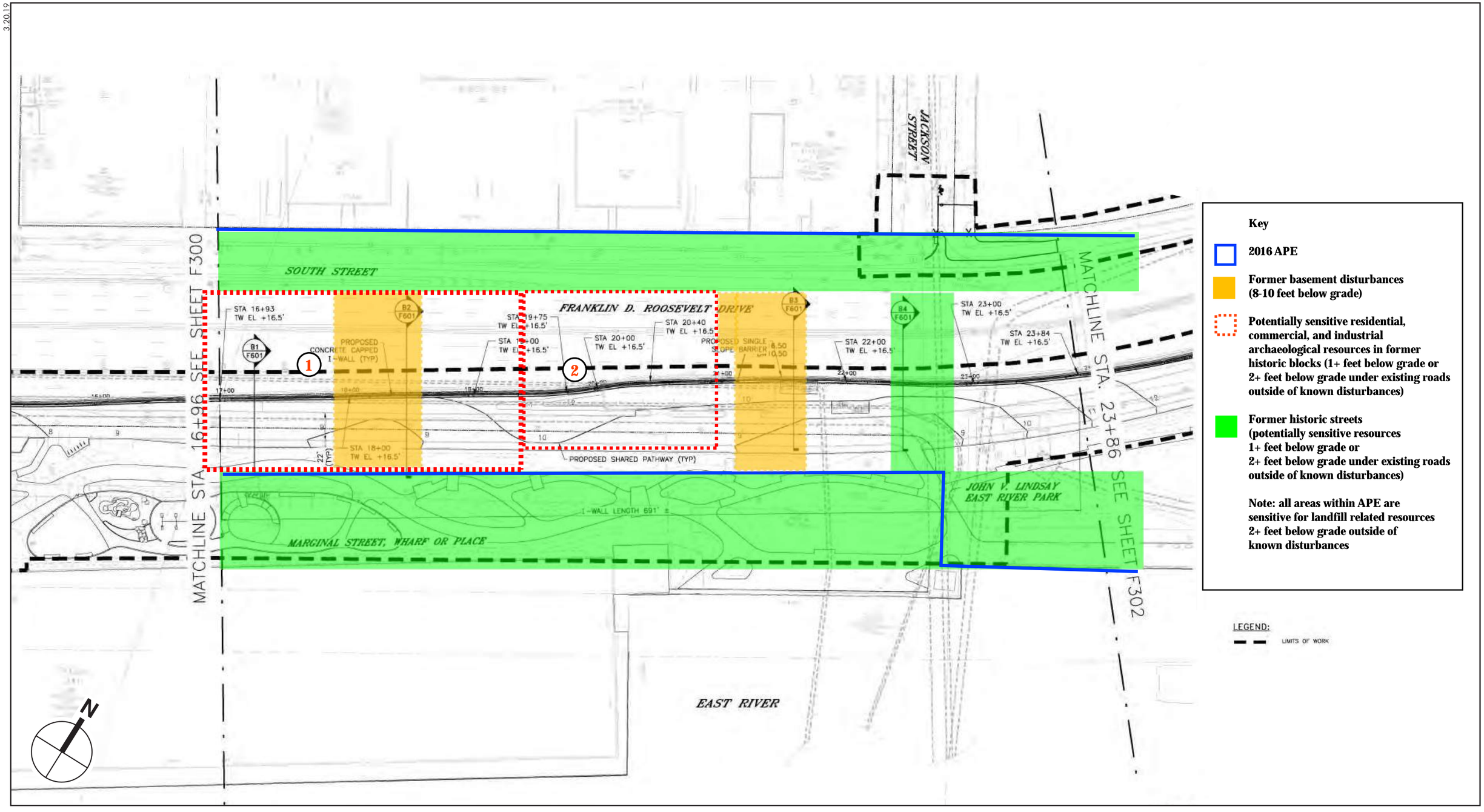

Key

2016 APE

Former basement disturbances (8-10 feet below grade)

Potentially sensitive residential, commercial, and industrial archaeological resources in former historic blocks (1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Former historic streets (potentially sensitive resources 1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Note: all areas within APE are sensitive for landfill related resources 2+ feet below grade outside of known disturbances

Gouverneur Slip East to Jackson Street
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2b

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

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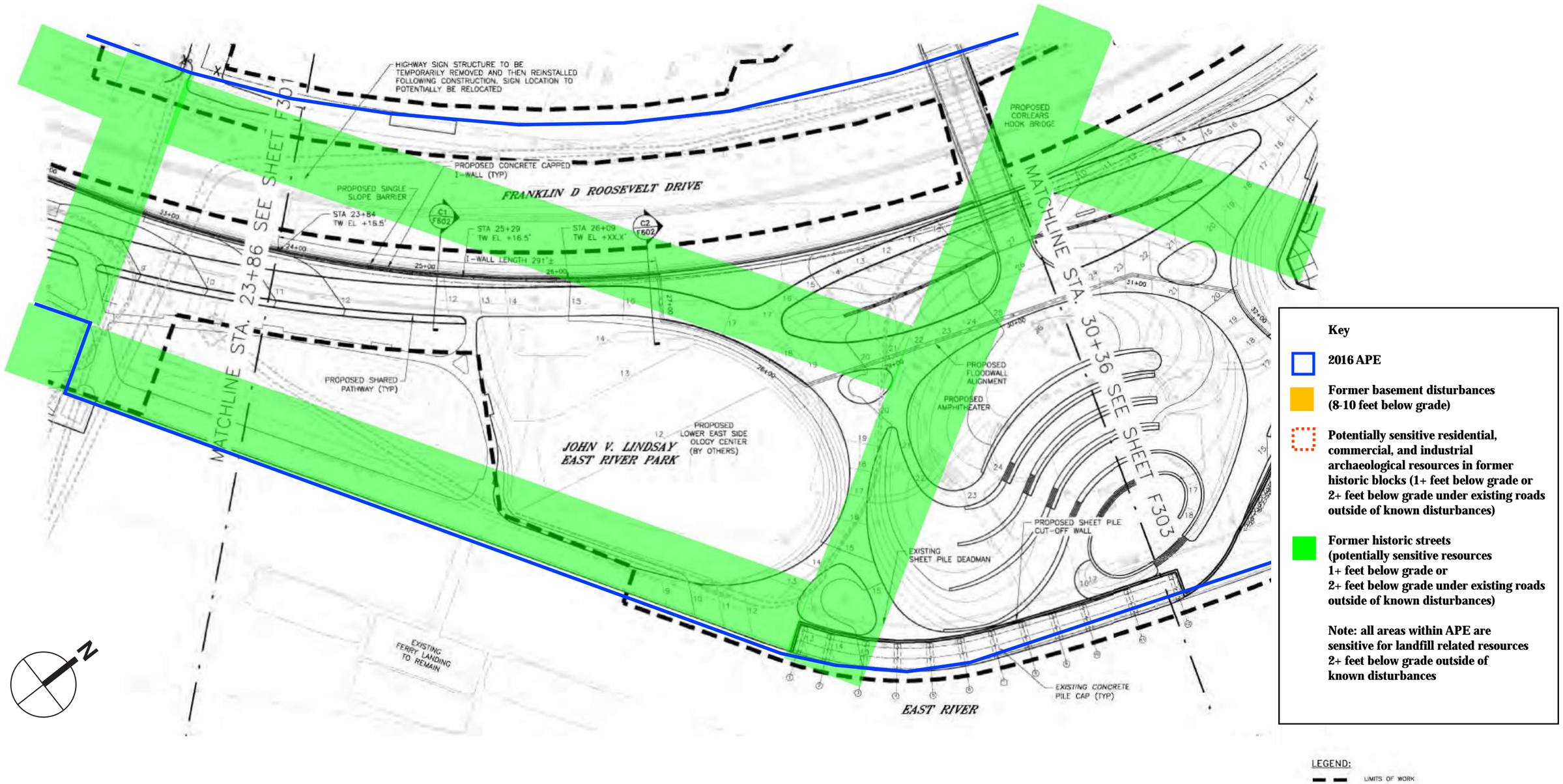

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

East River Park Amphitheater
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2c

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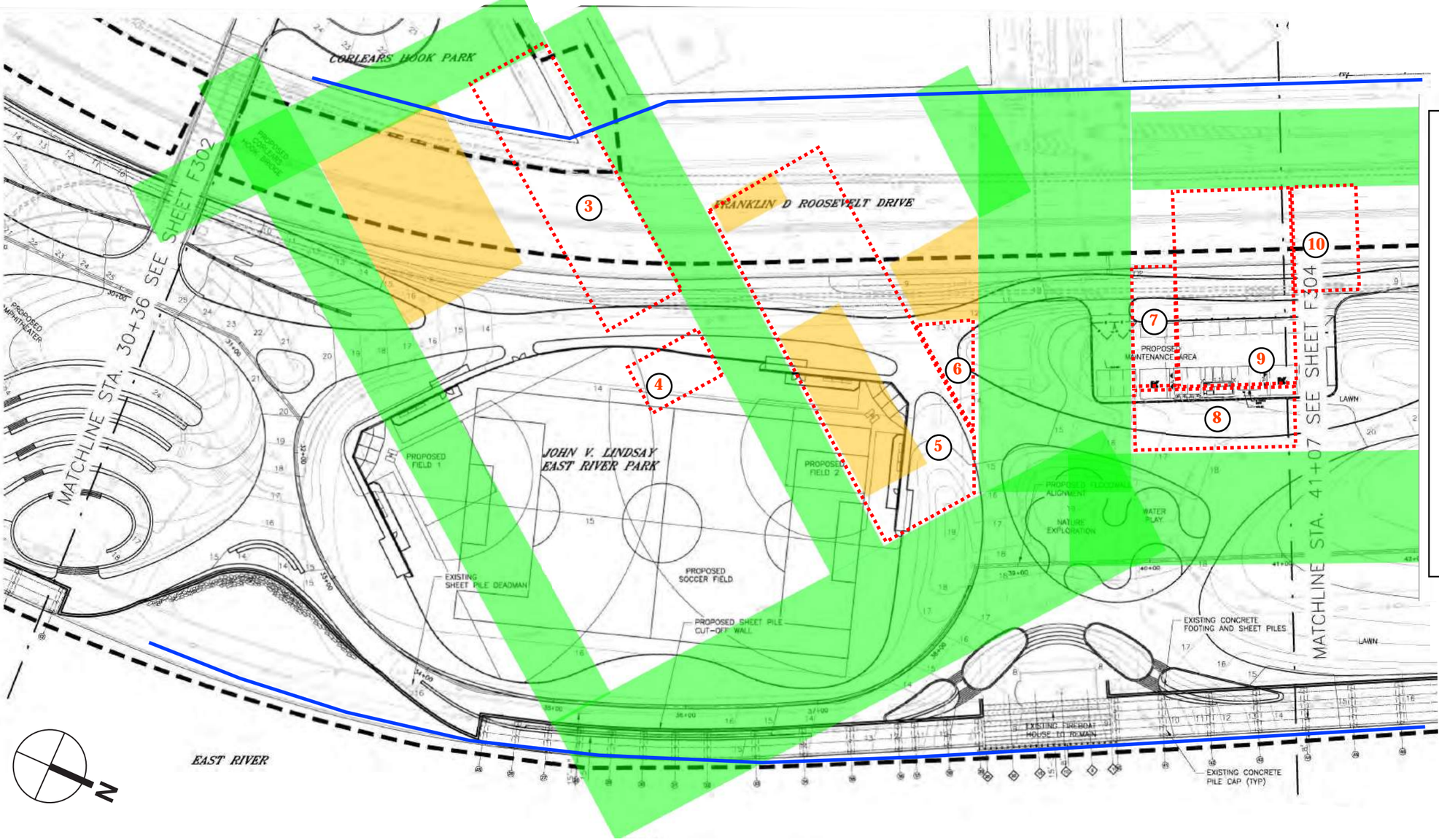


Key

2016 APE

Former basement disturbances (8-10 feet below grade)

Potentially sensitive residential, commercial, and industrial archaeological resources in former historic blocks (1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

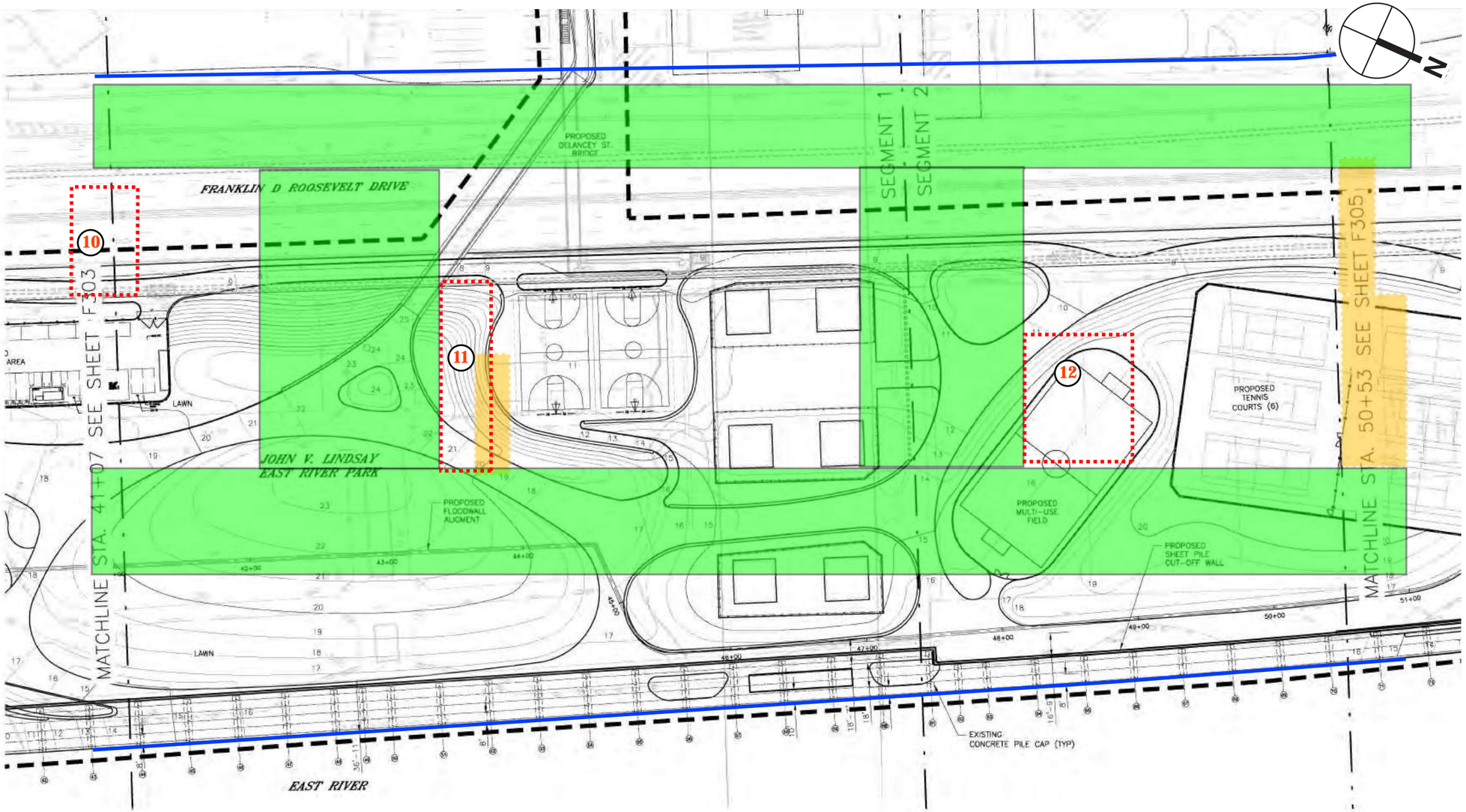
Former historic streets (potentially sensitive resources 1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Note: all areas within APE are sensitive for landfill related resources 2+ feet below grade outside of known disturbances

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Grand Street
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2d

3.20.19



Key

2016 APE

Former basement disturbances (8-10 feet below grade)

Potentially sensitive residential, commercial, and industrial archaeological resources in former historic blocks (1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Former historic streets (potentially sensitive resources 1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Note: all areas within APE are sensitive for landfill related resources 2+ feet below grade outside of known disturbances

LEGEND:

LIMITS OF WORK

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Delancey Street
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2e

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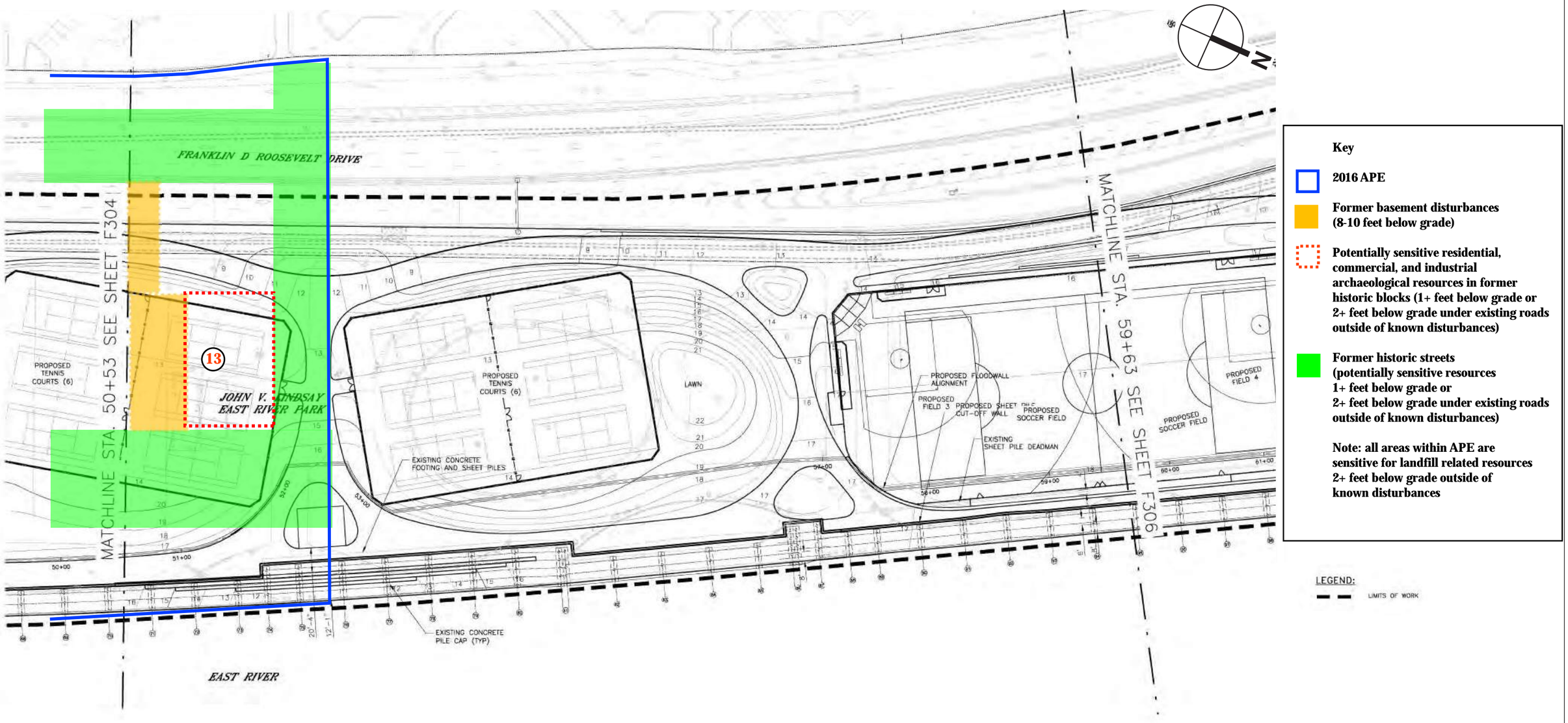


Key

2016 APE

Former basement disturbances (8-10 feet below grade)

Potentially sensitive residential, commercial, and industrial archaeological resources in former historic blocks (1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Former historic streets (potentially sensitive resources 1+ feet below grade or 2+ feet below grade under existing roads outside of known disturbances)

Note: all areas within APE are sensitive for landfill related resources 2+ feet below grade outside of known disturbances

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Rivington Street
Area of Potential Effect – Montgomery to Rivington Streets
Areas of Archaeological Sensitivity
Figure 5.4-2f

Historic Streetbed Resources – Utilities, Transportation Elements, Artifact Deposits

The APE contains portions of East 23rd, East 24th, and East 25th Streets. These street segments began as piers, East 23rd and East 25th Streets in the late 1830s and East 24th Street in the 1870s, and the streets were landfilled in stages during the course of the second half of the 19th century.

Each of the city streets has subsurface utilities. While it is unlikely that any of the iconic wooden water mains from before 1842 (when the Croton Aqueduct system began operation) would be located under any of these streets (as those mains were installed further south in Lower Manhattan), it is possible that early water and sewer lines from the 1850s and 1860s could still exist under city streets, if they were not removed during subsequent utility work.

East 23rd Street had streetcar tracks by the 1870s. While subsequent disturbance to the streetbeds from utility replacement may have disturbed or eliminated these tracks, it is still possible that segments could survive beneath the street. It is also possible that former street pavements, such as cobblestones or paving blocks, may be found beneath some areas.

Archaeological monitoring of utility work in streetbeds of Lower Manhattan has shown that concentrations or pockets of discarded artifacts can be found beneath historic streets. It is not possible to predict where such dumping grounds may be located, although archaeologists have had some subsequent success tracing the provenance of certain artifact caches to neighboring businesses.

East 23rd Street may be sensitive for these varied types of resources if later disturbance has not affected them. Within the upper 2 to 4 feet of the soil column, there is less likelihood of encountering buried utilities, although it is possible that streetcar tracks, earlier street paving, and possible artifact dumps may be present. These resources, however, would be more likely to be found in the present streetbed than within the sidewalks.

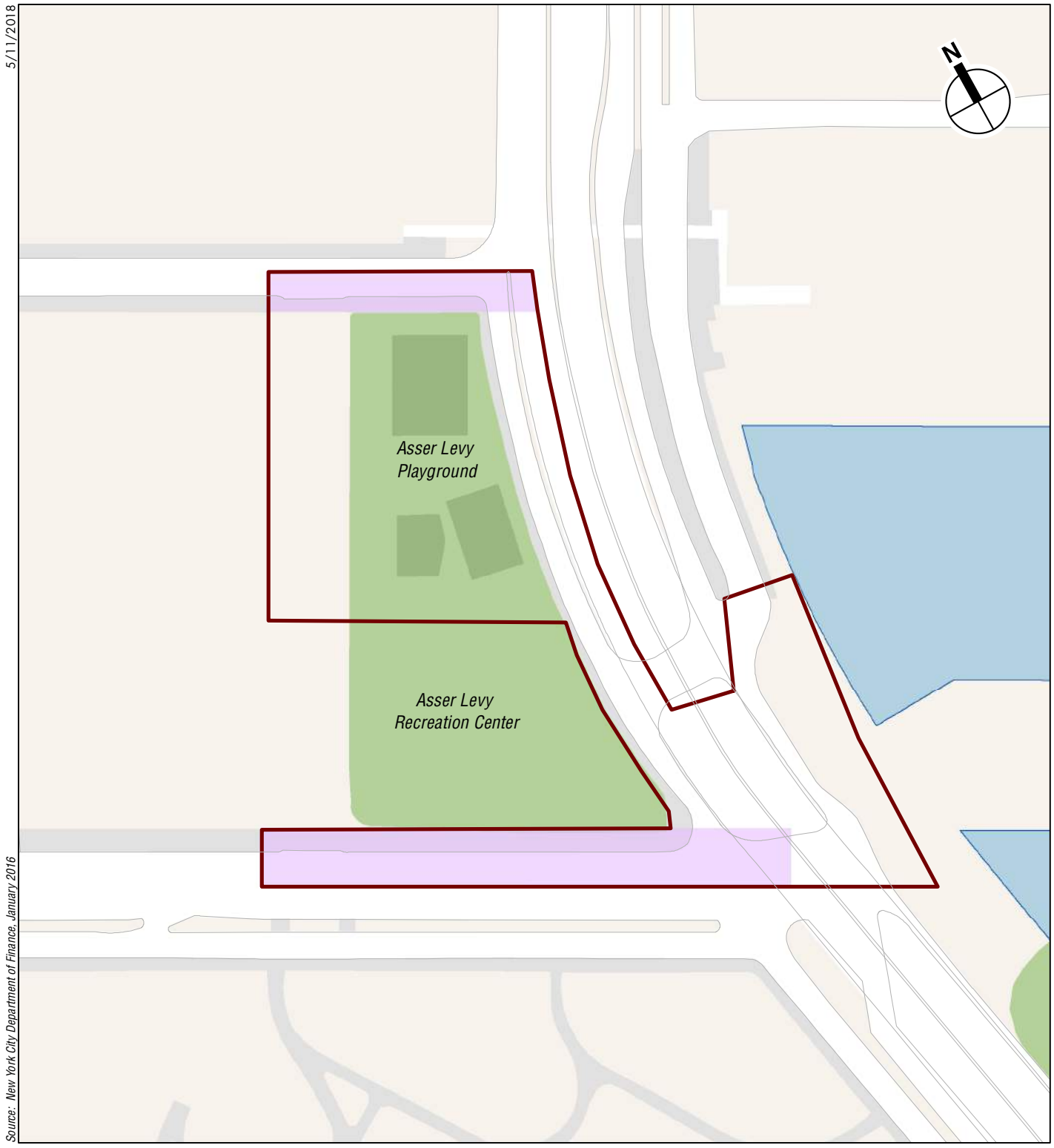
Former City Block Resources – Foundation Remains, Historic Shaft Features

The only portion of the APE that includes the interior portion of a city block is the portion of Asser Levy Playground between the former alignment of East 24th Street and East 25th Street. This area was not landfilled until the 1890s, when it became a cement and concrete mixing facility. It then became part of the public park in the late 1930s. Therefore, the Phase 1A report concluded that there is no archaeological sensitivity within this portion of the block.

Summary

In summary, the Phase 1A report determined that the East 23rd and East 25th Street portions of the APE may possess historic period archaeological sensitivity. **Figure 5.4-2g** shows the areas of potential archaeological sensitivity in the APE. In letters dated February 29, 2016 and March 14, 2016, LPC and SHPO, respectively, concurred with the sensitivity determinations in the Phase 1A report. Further, in written communications from April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans determined that no religious or culturally significant sites of interest to their tribes are located within the project area.

After LPC and SHPO review of the Phase 1A report, a small area at Asser Levy Playground that extends into the former East 24th Street was added to the APE. In a letter dated April 3, 2017, LPC noted that this area was included within the area assessed in the Phase 1A report and that LPC had no archaeological concerns for this area in Asser Levy Playground.



Area of Potential Effect -
East 23rd to East 25th Streets
Areas of Archaeological Sensitivity
Figure 5.4-2g

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

AREA OF POTENTIAL EFFECTS — UPLAND DRAINAGE MANAGEMENT COMPONENTS

The March 2019 Supplemental Phase 1A Archaeological Documentary Study determined that a large portion of the upland drainage area was once under the waters of the East River and that locations within the upland drainage area were landfilled beginning at the end of the 18th century. After landfilling, the specific locations of the proposed upland drainage management improvements shown on **Figure 5.4-3** were historically in roadways or locations developed with buildings and a coal yard. A portion of the northernmost proposed parallel conveyance (at Avenue C and East 23rd Street) was studied in 2016 as part of the APE between East 23rd and East 25th Streets; that area is potentially sensitive for archaeological resources as described above.

The Supplemental Phase 1A Archaeological Documentary Study determined that the locations of the proposed M22-M23 parallel conveyance and the South Interceptor Gate and Building may be archaeologically sensitive. The portion of Water Street associated with the M22-M23 parallel conveyance may have historic-period archaeological sensitivity given the use of the area during the colonial and early American period and the uncertain degree of subsequent disturbance. The portions of Gouverneur Slip West, Jackson Street, and the FDR Drive Service Road/Corlears Hook Park associated with the M22-M23 parallel conveyance and the interceptor gate and building may be archaeologically sensitive for landfill retaining structures and historic streetbed resources. The Supplemental Phase 1A Archaeological Documentary Study determined that the other locations of the proposed upland drainage management improvements (that were not studied in the 2016 Phase 1A Archaeological Documentary Studies) do not possess any archaeological sensitivity due to documented prior disturbance and the lack of potential archaeological resources. In letters dated March 18, 2019, SHPO and LPC concurred with the findings of the report.

ARCHITECTURAL RESOURCES

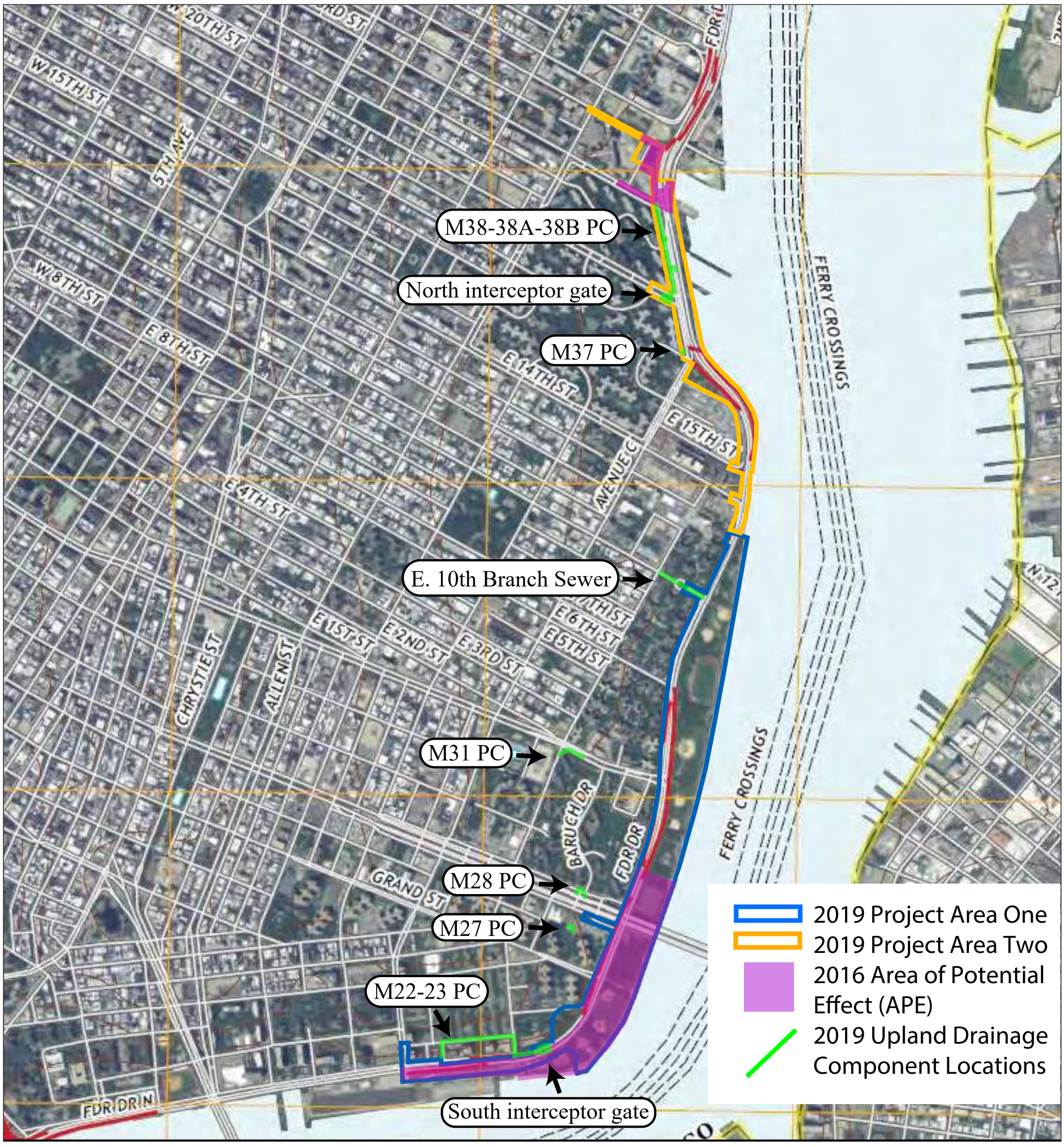
PRIMARY APE

There are 17 architectural resources in the Primary APE. These resources are shown on **Figure 5.4-1**, listed in **Table 5.4-1**, and described below.

Project Area One

There are four architectural resources located within Project Area One.

(#1) Franklin Delano Roosevelt Drive, S/NR-eligible. The FDR Drive is 9.44 miles long, beginning at the end of the Battery Park underpass and running north along the East River to the 125th Street/Triborough Bridge exit. Originally known as the East River Drive, the FDR Drive meets National Register Criterion A in the fields of transportation and community/regional planning as an important link in New York City's transportation infrastructure. The FDR Drive, the West Side Highway, the Henry Hudson Parkway, the Harlem River Drive, and the Triborough Bridge approach form a crucial highway loop around Manhattan. Construction began on the FDR Drive in 1934 under the direction of Robert Moses and was largely completed by 1967. The section of the highway that runs through the project area was originally constructed as a boulevard. Conversion of the boulevard to a controlled-access parkway occurred in 1960. Though segments of the structure have undergone alterations through the years, this linear resource has been determined to retain sufficient integrity overall to convey its historic significance.



Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Area of Potential Effect – Upland Drainage Components
Figure 5.4-3

Through most of Project Area One, the FDR Drive runs at grade, passing under bridges at Corlears Hook Park, Delancey Street, East 6th Street, and East 10th Street and an overpass at East Houston Street. It is a six-lane highway with a center guardrail and concrete walls along the outer lanes (see **Figure 5.4-4**). In the southernmost portion of Project Area One, the FDR Drive is an elevated viaduct between approximately Gouverneur Slip East and Montgomery Street. It continues south as a viaduct to the Battery Park underpass.

Table 5.4-1
Primary APE—Architectural Resources

Map Ref. Letter #	Name/Type	Address/Location	NHL	S/NR	S/NR-eligible	NYCL-eligible	NYCL
Project Area One							
1	FDR Drive	Battery Park underpass to East 125th Street			X		
2	Williamsburg Bridge	Across East River Park at Delancey Street			X		
3	East River Bulkhead	Whitehall to Jackson Streets			X		
4	Engine Co. 66 Fireboat House	East River Park near Grand Street			X		
Project Area Two							
1	FDR Drive	Battery Park underpass to East 125th Street			X		
400-Foot Study Area							
5	Former Gouverneur Hospital	621 Water Street		X			
6	Gouverneur Hospital Dispensary	2 Gouverneur Slip East			X		
7	Lower East Side Historic District	Bounded by East Houston, Essex, Allen, and Division Streets, with blocks on East Broadway and Henry and Madison Streets		X		X	
8	Henry Street Settlement Buildings	263-267 Henry Street and 281 East Broadway		X			X
9	Baruch Houses	Bounded by FDR Drive, East Houston, Delancey, and Columbia Streets			X		
10	Public School 97 (Bard High School)	525 East Houston Street			X		
11	Lavanburg Homes	126 Baruch Place			X		
12	Asser Levy Public Baths	384 Asser Levy Place		X			X
13	East River Housing Cooperative	Bounded by FDR Drive, and Delancey, Lewis, Jackson and Cherry Streets			X		
14	Rivington Street Baths	Located within Baruch Houses			X	X	
15	Jacob Riis Houses	Bounded by FDR Drive, Avenue D, and East 6th and East 14th Streets			X		
16	Stuyvesant Town	Bounded by First Avenue, East 14th and East 20th Streets, Avenue C, and FDR Drive			X		
17	Peter Cooper Village	Bounded by First Avenue, East 20th and East 23rd Streets, and FDR Drive			X		

Notes:
NHL: National Historic Landmark
S/NR: Listed on the State and National Registers of Historic Places.
S/NR-eligible: Officially determined eligible for listing on the State and National Registers of Historic Places.
NYCL: New York City Landmark
Heard: Application has been heard at the NYC Landmarks Preservation Commission.
NYCL-eligible: Determined to appear eligible for designation as a NYCL.
Sources: New York State Office of Parks, Recreation, and Historic Preservation Cultural Resource Information System (CRIS), https://cris.parks.ny.gov/Login.aspx?ReturnUrl=%2f; NYCityMap, http://gis.nyc.gov/doitt/nycitymap/; Lower Manhattan Development Corporation, *East River Waterfront Esplanade and Piers Final Environmental Impact Statement (FEIS)*, May 18, 2007; NYCEDC, *Seward Park Mixed-Use Development Project FEIS*, August 10, 2012; Field surveys, July 2015; SHPO letter dated April 25, 2016.

(#2) Williamsburg Bridge, S/NR-eligible. The Williamsburg Bridge was constructed in 1903 from plans by Leffert L. Buck with ornamental detailing added by Gustav Lindenthal. This steel

2.5.19

FDR Drive (#1). View north to Corlears Hook Park bridge from Jackson Street **1**

FDR Drive (#1). View north from Houston Street **2**

suspension bridge spans the East River and connects Delancey Street on the Lower East Side of Manhattan to Marcy Avenue in Williamsburg, Brooklyn. It is 7,308 feet long with a main span of 1,600 feet and was the longest and heaviest suspension bridge in the world when it was built. The bridge is designed with two towers located within the East River close to the Manhattan and Brooklyn shorelines, and the span is suspended from four steel cables (see view 3 of **Figure 5.4-5**). On land, metal piers and granite abutments further support the span. Steel latticework extends almost the entire distance of the bridge. The J/M/Z subway runs over the bridge.

Three metal, arched piers are located within Project Area One (see view 4 of **Figure 5.4-5**). The two legs of each arched pier have an open framing system and sit on tall granite-faced footings capped by concrete. A perimeter ring of security bollards encloses the piers within East River Park. The piers of the Manhattan-side tower sit on granite-faced footings within the river. On the west side of the FDR Drive, a massive granite abutment supports the span as it transitions to a viaduct that meets grade at Clinton Street to the west.

(#3) East River Bulkhead, S/NR-eligible. The New York City Department of Docks, under the leadership of George B. McClellan, began construction of the bulkhead along the East River waterfront from Whitehall Street to Jackson Street in the early 1870s as part of a major seawall construction campaign. Like the S/NR-eligible bulkhead along the Hudson River waterfront between Battery Place and West 59th Street, which was part of the same construction initiative, surviving portions of the original East River bulkhead structure are significant under Criterion C for their engineering and architectural qualities.

Only the northernmost end of the bulkhead between Montgomery and Jackson Streets is located within Project Area One. According to annual reports of the Department of Docks, this section of the bulkhead north of Montgomery Street was likely reconstructed circa 1939 with the south end of East River Park, which was built partly on landfill under the leadership of Robert Moses. The section of the bulkhead immediately to the south between Pier 35 and Pier 42 (outside of Project Area One but within the Primary APE) was constructed in 1910. The bulkhead is not visible behind the platform and shed of Pier 42. However, the portion of the bulkhead east of Pier 42 is exposed. The visible portion of the bulkhead closest to the Pier 42 piershed appears to be concrete, followed to the east by a granite block section topped by replacement blocks of a lighter color, and then there is another concrete section with broken blocks above.[3] The granite seawall ends approximately 250 feet east of Pier 42. The bulkhead within Project Area One is in overall fair condition, with some displaced stone, missing stones, and approximately 75 percent mortar loss from the mean high water line to the mud line.[4]

(#4) Former Marine Engine Co. 66 Fireboat House, S/NR-eligible. Located on the waterfront in the alignment of Grand Street, the former Marine Engine Co. 66 Fireboat House is a two-story brick Moderne-style building constructed around 1941. At the northern end of the building, there is a tall, square tower that was originally capped by a lantern, and a curved window bay is located at the southern end. Recessed courses and concrete coping provide some ornamentation (see **Figure 5.4-6**). Marine Engine Co. 66 was placed in service in 1898 with one fireboat, the William L. Strong. Prior to the construction of East River Park, the marine engine company

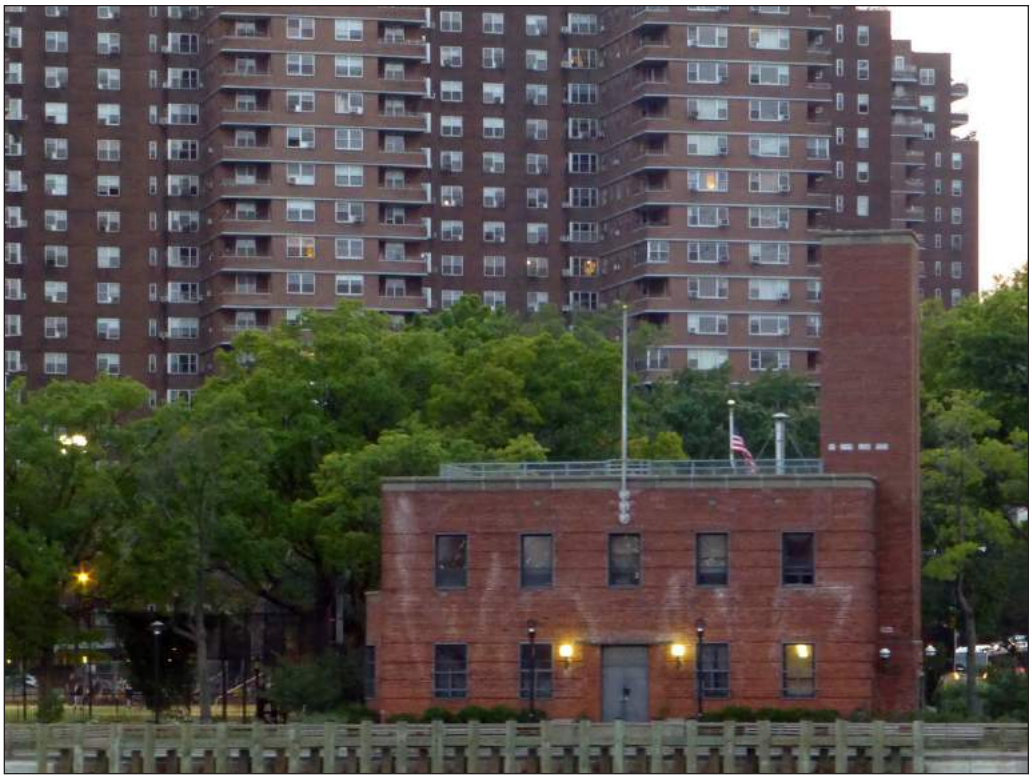
[3] 2007, Lower Manhattan Development Corporation, *East River Waterfront Esplanade and Piers FEIS*; *Underwater Inspection and Condition Survey, Pier 42—Final Inspection Report* conducted in December 2013 by McLaren Engineering Group.

[4] *Underwater Inspection and Condition Survey, Pier 42—Final Inspection Report* conducted in December 2013 by McLaren Engineering Group.

Williamsburg Bridge (#2). View north within East River Park **3**

Williamsburg Bridge (#2). View north within East River Park adjacent to FDR Drive **4**

Fireboat house (#4). View within East River Park **5**



Fireboat house (#4). View from East River **6**

occupied a pier at the foot of Grand Street. The Fireboat House closed in the mid-1990s, at which point NYC Parks assumed ownership. The building now houses the Lower East Side Ecology Center. In a letter dated April 25, 2016, SHPO determined that the former Marine Engine Co. 66 Fireboat House appears eligible under Criterion A in the area of community planning and Criterion C in the area of architecture. Following that determination, SHPO requested additional information on the Fireboat House, which was provided. In an evaluation dated February 8, 2017, SHPO affirmed that the Fireboat House meets eligibility Criteria A and C.

Project Area Two

There is one architectural resource (the FDR Drive) located within Project Area Two, which is also located in Project Area One. No potential architectural resources that appeared to meet the eligibility criteria for S/NR listing and/or NYCL designation were identified in Project Area Two.

(#1) Franklin Delano Roosevelt Drive, S/NR-eligible. As described above, the FDR Drive meets Criterion A. Within Project Area Two, the FDR Drive becomes elevated just east of Avenue C (see **Figure 5.4-7**). It continues as a viaduct north of the APE.

400-Foot Portion of the Primary APE

As shown on **Figure 5.4-1** and listed in **Table 5.4-1**, there are 13 architectural resources located within the 400-foot portion of the Primary APE beyond the boundaries of the project area.

(#5) Gouverneur Hospital, S/NR. The former Gouverneur Hospital is a brick, five-story Renaissance Revival-style structure occupying the full block between Water and South Streets and Gouverneur Slips East and West. Its U-shaped design is composed of a central section on Water Street and two projecting wings that terminate in curved ends with bracketed metal balconies (see **Figure 5.4-8**). Ornamentation includes terra cotta window arches, keystones, entablatures, and quoins. The Water Street entrance is set within a grand terra cotta arch with a scrolled keystone and flanking roundels. This building is the second Gouverneur Hospital to have stood on this site and was constructed around the still-functioning older building, which was subsequently demolished. When it opened in 1901, the building was the most modern and best-equipped hospital in the city. The architect John Rochester Thomas was noted for his designs of public and institutional buildings in the eastern U.S. The hospital's original hipped roof of terra-cotta blocks covered with slate was replaced by a fifth story in 1930. In addition, the original wing balconies were replaced with the current ones. Following its loss of accreditation in 1961, the hospital was used as a school for the developmentally disabled under the New York State Willowbrook Hospital system until 1978. Community Access acquired and then renovated the building in the early 1990s. Since 1994, it has served as supportive housing for individuals with mental illnesses or HIV/AIDS. The former Gouverneur Hospital meets Criterion C in the area of architecture.

(#6) Gouverneur Hospital Dispensary, S/NR-eligible. The former Gouverneur Hospital Dispensary is located at the northeast corner of Gouverneur Slip East and South Street. It was designed by McKim, Mead & White and built in 1914–1917. The building was originally used as a dispensary for patients of the nearby Gouverneur Hospital; it also contained residences for nurses. The seven-story building is rectangular in form and clad in brick with stone ornament (see view 10 of **Figure 5.4-9**). The rear of the building, facing Water Street, is unornamented and surrounded by a chain link fence. In 1977, the building was converted to housing for homeless individuals suffering from substance abuse. The former Gouverneur Hospital

FDR Drive (#1). View north at Avenue C **7**

Gouverneur Hospital (#5). Water Street façade **8**

Gouverneur Hospital (#5). South Street façade **9**

Gouverneur Hospital Dispensary (#6). Water Street façade **10**

Lower East Side Historic District (#7), Vladeck Houses. View south on Jackson Street from Madison Street **11**

Dispensary meets Criterion C in the area of architecture and Criterion A in the area of healthcare and medicine for its association with Gouverneur Hospital.

(#7) Lower East Side Historic District and Extension, S/NR. The Lower East Side Historic District and Extension comprises 38 blocks in the Lower East Side neighborhood, largely beyond the boundaries of the APEs. The main portion of the roughly L-shaped district is bounded by East Houston Street on the north, Essex Street on the east, Allen Street on the west, and Division Street on the south. The district also includes several blocks along Henry and Madison Streets and East Broadway and the Vladeck Houses on Madison Street between Gouverneur and Jackson Streets. Residential structures with ground-floor commercial spaces constitute the majority of the historic district. Most of these buildings are 19th-century, five- and six-story, brick and stone-clad tenements with cornices. Other resources in the district include Federal and Greek Revival-style row houses, industrial loft structures, cast-iron and brick commercial buildings, Seward Park, and several synagogues and other institutional buildings. The Lower East Side Historic District is historically significant for its association with immigration in America between 1820 and 1940 and meets Criteria A and C in the areas of architecture, ethnic history, social history, and religion.

The southeast portion of the historic district that falls within the Primary APE contains a portion of the Vladeck Houses. Envisioned as a slum clearance and neighborhood revitalization project, the Vladeck Houses occupy an approximately 15-acre site bounded by Henry, Madison, Jackson, Cherry, Water, and Gouverneur Streets. They are named after labor activist Baruch Charney Vladeck. Constructed in 1939–40, the complex consists of 24 six-story buildings designed by William F.K. Ballard and Sylvan Bien under the supervision of R. H. Shreve of Shreve, Lamb and Harmon, architects of the Empire State Building. The administration of Mayor Fiorello LaGuardia developed the Vladeck Houses as the city's first municipally sponsored housing development, although most of the project ended up being financed by the federal government. The buildings are arranged in a zig-zag pattern set at 45-degree angles to the street, and linear parks and playgrounds occupy more than half of the grounds (see view 11 of **Figure 5.4-9** and view 12 of **Figure 5.4-10**).

(#8) Henry Street Settlement, 263-267 Henry Street and 281 East Broadway, S/NR, NYCL. This collection of four brick buildings houses the Henry Street Settlement, which Lillian Wald founded in 1893 to assist and Americanize the immigrant population of the Lower East Side (see view 13 of **Figure 5.4-10**). The two Federal-style houses at 263 and 265 Henry Street date to 1827 with later alterations that include façade changes to 263 Henry Street. The Colonial Revival building at 267 Henry Street is a 1900 update of an older Greek Revival house, and the Federal-style row house at 281 East Broadway dates to around 1829. These four buildings are also located within the Lower East Side Historic District.

Adjacent to the east at 269 Henry Street (within the Lower East Side Historic District) is a four-story Romanesque Revival firehouse built in 1884 as Engine Company 15 and designed by Napoleon LeBrun & Sons, prolific 19th-century designers of firehouses in Manhattan.

(#9) Bernard Baruch Houses, S/NR-eligible. SHPO has determined a number of NYCHA's post-World War II housing complexes in New York City eligible for listing on the S/NR. Within the Primary APE, these include the Bernard Baruch Houses (#9) and the Jacob Riis Houses (#14). In an evaluation dated August 30, 2016, SHPO determined that the Bernard Baruch Houses meet Criterion A in the areas of social history, politics/government, and community development and Criterion C in the areas of architecture and community planning and development.

Lower East Side Historic District (#7). View south through Vladeck Houses from Madison Street **12**

Henry Street Settlement, 263-267 Henry Street (#8) **13**

The Bernard Baruch Houses are bounded by East Houston Street, the FDR Drive, Delancey Street, and Columbia Street. Baruch Drive runs north-south through the complex, and the eastern end of Rivington Street extends partially into the complex. Built between 1954 and 1959 by NYCHA with federal assistance, the Bernard Baruch Houses occupy 27 acres and consist of 17 residential towers of heights between 7 and 14 stories set within landscaped grounds. Emery Roth & Sons were the architects. The free-standing brick buildings have unornamented zig-zagged façades, and they are set at varying angles to each other to provide river views for many of the apartments (see view 14 of **Figure 5.4-11**). The complex also includes the large Baruch Playground, which contains a small brick comfort station with a hipped roof, basketball and handball courts, play equipment, and soccer fields. In addition, the complex includes a 23-story senior center from 1977 and a modernist church at the northeast corner of Columbia and Rivington Streets—the DeWitt Reformed Church, designed by Edgar Tafel and built in 1957 from salvaged bricks.

(#10) Public School 97, S/NR-eligible. Located at 525 East Houston Street within the Baruch Houses, Public School 97 (now Bard High School Early College) dates to 1915. Although it has an East Houston address, it fronts on a remnant of Mangin Street, a former north-south street that ran through the area. It is a five-story brick, Collegiate Gothic building (see view 15 of **5.4-11**). Public School 97 meets Criterion C in the area of architecture. It may also meet Criterion A in the area of education.

(#11) Lavanburg Homes, S/NR-eligible. Located on the west side of Public School 97 at 126 Baruch Place, the Lavanburg Homes are model tenements built in 1927 by the Lavanburg Foundation, a low-income non-profit housing corporation established by industrialist and philanthropist Fred L. Lavanburg. The 6-story model tenement has an E-plan with two street-facing courtyards (see view 16 of **Figure 5.4-12**). Decorative brickwork and stone trim provides some ornamentation. Sommerfeld and Sass were the architects. The Lavanburg Homes meet Criteria A and C in the areas of social history and architecture.

(#12) Asser Levy Public Baths, S/NR, NYCL. The Asser Levy Public Baths are located within the Asser Levy Playground on the former Asser Levy Place and East 23rd Street, near the FDR Drive. Constructed in 1904-06 to the designs of Brunner & Aiken, the Asser Levy Public Baths were the largest free public baths built under the 1895 State law that provided for the establishment of free public baths throughout New York State. Although it is a small one-story building with a cruciform footprint, its main (west) façade on Asser Levy Place has the monumental façade of a Roman Bath—raised above the street with two flights of stairs, with three arched openings, paired stone columns supporting a heavy stone entablature and cornice, and a balustraded parapet with massive stone urns (see view 17 of **Figure 5.4-12** and view 18 of **Figure 5.4-13**). The south façade on East 23rd Street is primarily faced in brick; there are stone water and drip courses and recessed and arched windows set within recessed square openings. A simple stone cornice encircles the building, and there is a tall brick stack above the building's eastern end. The building is set back from East 23rd Street behind a planted area enclosed by a metal fence. An outdoor swimming pool from the 1960s is located at the southeast corner of the building. A plain brick wall and metal fence enclose the pool. A playground is located on the north side of the pool. The Asser Levy Public Baths continue to function as a City-owned public recreation and pool facility. It meets Criterion A in the area of social/humanitarian history and Criterion C in the area of architecture.

(#13) East River Housing Cooperative, S/NR-eligible. The East River Housing Cooperative consists of four residential buildings and one commercial building on a 12-acre site bounded by

Baruch Houses (#9). View west from East River Park near tennis courts **14**

Public School 97 (#10) **15**

Lavanburg Homes (#11) **16**

Asser Levy Public Baths (#12). Main (west) façade **17**

Asser Levy Public Baths (#12). South (West 23rd Street) façade **18**

East River Housing Cooperative (#13). View west from East River Park near Delancey Street **19**

Delancey Street, the FDR Drive, and Cherry, Lewis, and Jackson Streets. Grand Street bisects the complex. Constructed between 1953 and 1955, the East River Housing Cooperative was the first middle-income residential development undertaken in New York City under Title 1 of the National Housing Act of 1949, which provided for federal assistance to local communities in slum clearance and to private enterprise in residential development projects. The cooperative development was largely financed through a low-interest mortgage loan by the International Ladies Garment Workers Union (ILGWU). The ILGWU also provided low-interest loans to union members for shares in the cooperative, although there were no restrictions on non-union membership or on race and religion. ILGWU president David Dubinsky, Eleanor Roosevelt, Mayor Robert F. Wagner, and other politicians attended the dedication ceremony in October 1955.

The four residential buildings are nearly identical in footprint and massing, although two are 20 stories and two are 21 stories. Herman Jessor was the architect; he also designed other cooperative residential developments throughout the city that were sponsored by unions, like the Seward Park Cooperative at Grand and Essex Streets (1959) and Co-Op City in the Bronx (1965–1970). Each modernist brick building is arranged into three parallel apartment blocks connected by a central, perpendicular core that contains apartments and the elevators for each section; this massing creates eight bays and four large light courts (see view 19 of **Figure 5.4-13**). The corner apartments of each bay have recessed balconies, and there are larger balconies on the top three floors. Landscaped lawns with mature trees and playgrounds surround the residential buildings. The two-story commercial building occupies a triangular parcel occupied by Grand, Madison, and Jackson Streets. An auditorium (now occupied by a dance company) is located at the western end of the building on the second floor. The complex also includes two parking lots (one on Delancey Street and one on Cherry Street) and a power plant at the corner of Lewis and Delancey Streets. In a letter dated April 25, 2016, SHPO determined that the East River Housing Cooperative appears eligible under Criterion A in the areas of social history, politics/government, and community development and possibly under Criterion C in the areas of architecture and community planning and development.

(#14) Rivington Street Bath, S/NR-eligible. The vacant three-story brick building located within the Bernard Baruch Houses is the former Rivington Street Bath. Built in 1901, it was the first municipally funded public bath in New York City and was originally located at 326 Rivington Street. When the Baruch Houses were constructed, the public bath building was converted into a recreational facility. In 1892, the State Legislature approved a bill that authorized municipalities to establish public bathing facilities; in 1895, a new law made the establishment of public bathing facilities mandatory in cities above a certain size. The Rivington Street Bath (renamed the Baruch Public Bath in 1917 after Dr. Simon Baruch, an advocate of public baths and the father of Bernard Baruch) opened with 91 showers for men and women and both indoor and outdoor bathing pools. The brick bath building has a Renaissance Revival-style design detailed with arched openings, rustication, quoins, and a bracketed cornice (see view 20 of **Figure 5.4-14**). The door and window openings have been infilled with masonry. A modern mural is painted on the east façade. In a letter dated April 25, 2016, SHPO determined that the Rivington Street Bath appears eligible under Criterion A in the areas of community planning and social/humanitarian history and Criterion C in the area of architecture. The Rivington Street Bath is located at the southern end of the Baruch Playground.

(#15) Jacob Riis Houses, S/NR-eligible. The Jacob Riis Houses consist of 19 buildings, ranging in height from six to 14 stories, completed in 1949 on a site bounded by East 6th Street, the FDR Drive, East 14th Street, and Avenue D. The brick buildings have either modified H-plans or X-

Rivington Street Baths (#14) **20**

Jacob Riis Houses (#15). View north from East River Park at East 6th Street pedestrian bridge **21**

plans, and the façades rise without setbacks and with unornamented façades (see view 21 of **Figure 5.4-14**). James Mackenzie and the firm of Walker & Gillette were the architects. The freestanding buildings are set within landscaped grounds. East 10th Street bisects the development; a landscaped traffic circle is located in the middle of the street. The north and south sections of the Jacob Riis Houses each have a landscaped mall oriented north-south. In 1965, landscape architect M. Paul Friedberg redesigned a central lawn into these malls, which create an interior open area and provide playgrounds, a basketball court, benches, and an amphitheater. The amphitheater is original to the 1965 design. In an evaluation dated December 6, 2016, SHPO determined that the Jacob Riis Houses may meet Criterion A in the areas of social history, politics/government, and community development and Criterion C in the areas of architecture and community planning and development.

(#16) Stuyvesant Town, S/NR-eligible. After the New York State Legislature made amendments to the Urban Redevelopment Companies Law that encouraged private firms to undertake slum clearance projects, the Metropolitan Life Insurance Company developed Stuyvesant Town in 1943–1947—the company's second large-scale residential development, following Parkchester in the Bronx (from 1942). Approximately 600 buildings on 18 blocks were razed to make way for the massive development on a superblock bounded by East 14th and East 20th Streets, the FDR Drive, Avenue C, and First Avenue. The architects Irwin Clavan and Gilmore Clark planned the development with 35 freestanding, brick buildings of 13 and 14 stories arranged around a central oval. The residential buildings have rectilinear footprints of multiple bays and unornamented façades. Playgrounds and lawns are interspersed throughout the development. On the perimeter, the buildings are set to the street grid, and commercial spaces are located along portions of the First Avenue and East 14th and East 20th Street frontages (see view 22 of **Figure 5.4-15**). Entrances to a below-grade parking garage are located on Avenue C. Originally, only white families were allowed to rent apartments, but after significant public outcry, the Metropolitan Life Insurance Company changed the rental restrictions in 1950. Recently, alterations to ground-floor spaces throughout the complex have been made to create more transparent residential amenities. In a letter dated April 25, 2016, SHPO determined that Stuyvesant Town appears eligible under Criterion A in the areas of social history and community planning/development and Criterion C in the areas of architecture and landscape design.

(#17) Peter Cooper Village, S/NR-eligible. The Metropolitan Life Insurance Company also developed Peter Cooper Village across East 20th Street from Stuyvesant Town in 1947–1949. Unlike that development, Peter Cooper Village was constructed without land assembly by the City and without tax exemptions. Similar to Stuyvesant Town and designed by the same architect, Irwin Clavan, Peter Cooper Village consists of 21 buildings ranging in height from 12 to 15 stories on a superblock bounded by East 20th and East 23rd Streets, the FDR Drive, and First Avenue. The buildings of Peter Cooper Village have slab forms and are set at an angle to the street grid, with some buildings set at opposing diagonals to each other (see view 23 of **Figure 5.4-15**). Lawns and recreation areas are located throughout the grounds. In a letter dated April 25, 2016, SHPO determined that Peter Cooper Village appears eligible under Criterion A in the areas of social history and community planning/development and Criterion C in the areas of architecture and landscape design.

SECONDARY AREA OF POTENTIAL EFFECT (PROTECTED AREA)

There are 42 architectural resources located within the Secondary APE beyond the boundaries of the project area. These resources are shown on **Figure 5.4-1** and listed in **Table 5.4-2**. These

Stuyvesant Town (#16). View southwest on West 20th Street **22**

Peter Cooper Village (#17). View northwest at FDR Drive and East 20th Street **23**

resources comprise two historic districts, schools, churches, synagogues, row houses, libraries, banks, and other building types.

Table 5.4-2
Secondary APE—Architectural Resources

Map Ref. Letter #	Name/Type	Address	NHL	S/NR	S/NR-eligible	NYCL	NYCL-eligible
18	St. Augustine's Chapel	333 Madison Street		X		X	
19	Row houses	511-513 Grand Street		X		X	
20	Public School 110	285 Delancey Street			X		
21	Neighborhood Playhouse	466 Grand Street	X			X	
22	Bialystoker Synagogue	7 Bialystoker Place				X	
23	Lamppost 84	Former intersection of Broome and Sheriff Streets				X	
24	Junior High School 22 and NYPL, Hamilton Fish Park Branch	111 Columbia Street			X		X[1]
25	Hamilton Fish Play Center	130 Pitt Street				X	
26	Our Lady of Sorrows Church, Rectory, and School	103 Pitt Street, 213-215 Stanton Street, and 221 Stanton Street			X		X[1]
27	Orthodox Home	320 East 3rd Street			X[2]		X[1]
28	Row house	314 East 3rd Street					X[1]
29	San Ysidora Y San Leandro Orthodox Catholic Church of the Hispanic Rite	345-347 East 4th Street			X[2]		
30	Congregation Beth Hamedrash Hagadol Anshe Ungam	242 East 7th Street			X	X	
31	Row houses	258-266 East 7th Street			X		X[3]
32	Row house	268 East 7th Street					X[3]
33	Row house	269 East 7th Street			X[2]		
34	Row house	271 East 7th Street			X		
35	Row house	275 East 7th Street			X[2]		
36	Public National Bank of New York	106 Avenue C				X	
37	Wheatsworth Factory	444 East 10th Street				X	
38	Sixth Street Industrial School	630 East 6th Street			X		
39	United Brethren Mission and Congregation Ahawath Yeshurun Shara Torah	636-638 East 6th Street			X		
40	St. Brigid's Roman Catholic Church	119 Avenue B			X		
41	Tompkins Square Lodging House for Boys and Industrial School	296 East 8th Street				X	
42	Christodora House	147 Avenue B		X			
43	Charlie Parker Residence	151 Avenue B		X		X	
44	Public School 64	605-615 East 9th Street			X	X	
45	East 10th Street Historic District	East 10th Street between Avenues A and B			X	X	

Table 5.4-2 (cont'd)
Secondary APE—Architectural Resources

Map Ref. Letter #	Name/Type	Address	NHL	S/NR	S/NR-eligible	NYCL	NYCL-eligible
46	NYPL, Tompkins Square Branch	331 East 10th Street			X	X	
47	11th Street Public Bath	538 East 11th Street				X	
48	Father's Heart Ministry Center	543-547 East 11th Street		X		X	
49	St. Nicholas of Myra Orthodox Church	288 East 10th Street			X[2]	X	
50	Church of the Most Holy Redeemer	161-173 East Third Street			X		
51	Nazareth House	206-212 East 4th Street			X		
52	Roman Catholic Church of the Immaculate Conception	406-414 East 14th Street		X		X	
53	Former Stuyvesant High School	331 East 15th Street			X	X	
54	Stuyvesant Square Historic District	Bounded by East 18th, East 17, and East 15th Streets, N.D. Perlman Place, and Third Avenue		X		X	
55	Row houses	306-310 East 15th Street		X			
56	Hebrew Technical School for Girls	238-246 Second Avenue			X		
57	Mechanics and Metals National Bank	230 Second Avenue			X		
58	Row houses	326-330 East 18th Street		X		X	
59	Public School 40	319 East 19th Street			X		

Notes:
NHL: National Historic Landmark
S/NR: Listed on the State and National Registers of Historic Places.
S/NR-eligible: Officially determined eligible for listing on the State and National Registers of Historic Places.
NYCL: New York City Landmark
Heard: Application has been heard at the NYC Landmarks Preservation Commission.
NYCL-eligible: Determined to appear eligible for designation as a NYCL.
[1] LPC determined that this property appears eligible for NYCL designation in the *East Village/Lower East Side Rezoning Final Environmental Impact Statement* (FEIS).
[2] LPC determined that this property appears S/NR eligible in the *East Village/Lower East Side Rezoning FEIS*.
[3] LPC determined that the row houses at 258-266 East 7th Street, along with the row house at 268 East 7th Street, appear to be an LPC-eligible historic district in the *East Village/Lower East Side Rezoning FEIS*.
Sources:
New York State Office of Parks, Recreation and Historic Preservation CRIS, https://cris.parks.ny.gov/Login.aspx?ReturnUrl=%2f; NYCityMap, http://gis.nyc.gov/doitt/nycitymap/; NYC Department of City Planning, *East Village/Lower East Side Rezoning FEIS* (September 26, 2008).

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. However, as described in Chapter 2.0, "Project Alternatives," there are a number of projects planned or under construction in the Primary and Secondary APEs that are expected to be complete by the build year for the proposed project, 2025. Note that although the superstructure of the shared-use flyover bridge for the proposed project would be completed in 2025, the flood

protection and enhanced park and access features under Alternative 4 (the Preferred Alternative) would be completed in 2023.

ARCHAEOLOGICAL RESOURCES

Area of Potential Effect – Montgomery Street to Rivington Street

Construction of two planned projects could potentially affect archaeological resources that could potentially be present in the APE—construction of an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House at Grand Street and a capital project to upgrade the existing composting operations in the area that is currently operated by the Lower East Side Ecology Center.

Area of Potential Effect – East 23rd Street to East 25th Street

There are no planned projects that could potentially affect archaeological resources that could potentially be present in the APE.

Area of Potential Effect – Upland Drainage Management Improvements

There are no planned projects that could potentially affect archaeological resources that could potentially be present in the APE.

ARCHITECTURAL RESOURCES

Overview

In the future without the proposed project, the status of architectural resources could change. S/NR-eligible resources could be listed on the Registers, NYCL-eligible properties could be calendared for a designation hearing, and properties pending designation as Landmarks could be designated. It is also possible, given the proposed project's completion year of 2025, that additional sites could be identified as architectural resources and/or potential architectural resources in this time frame.

In the future without the proposed project, changes to architectural resources or to their settings could occur. For instance, indirect effects from future projects could include: a change in scale, visual prominence, or visual context of any building, structure, or object or landscape feature; screening or elimination of publicly accessible views; or introduction of significant new shadows or significant lengthening of the duration of existing shadows on a historic landscape or on a historic structure if the features that make the resource significant depend on sunlight. It is also possible that some architectural resources in the APE could deteriorate or experience direct effects through alteration or demolition, while others could be restored.

Architectural resources that are listed on the S/NR or that have been found eligible for listing are given a measure of protection under Section 106 of the National Historic Preservation Act from the effects of projects sponsored, assisted, or approved by federal agencies. Although preservation is not mandated, federal agencies must attempt to avoid adverse effects on such resources through a notice, review, and consultation process. Properties listed on the Registers are similarly protected against effects resulting from projects sponsored, assisted, or approved by State agencies under the State Historic Preservation Act. However, private owners of properties eligible for, or even listed on, the Registers using private funds can alter or demolish their properties without such a review process. Privately owned properties that are NYCLs, in New York City Historic Districts, or pending designation as NYCLs are protected under the New

York City Landmarks Law, which requires LPC review and approval before any alteration or demolition can occur, regardless of whether the project is publicly or privately funded. Publicly owned resources are also subject to review by LPC before the start of a project; however, LPC's role in projects sponsored by other city or state agencies generally is advisory only.

The 2014 New York City Building Code, in Section BC 3309: Protection of Adjoining Property, provides protection measures for all properties against accidental damage from adjacent construction by requiring that all buildings, lots, and service facilities adjacent to foundation and earthwork areas be protected and supported. Further, Section BC 3309.4.4 requires that "historic structures that are contiguous to or within a lateral distance of 90 feet…from the edge of the lot where an excavation is occurring" be monitored during the course of excavation work. In addition, the New York City Department of Buildings *TPPN #10/88* applies to NYCLs, properties within New York City Historic Districts, and NR-listed properties. *TPPN #10/88* supplements the standard building protections afforded by the Building Code by requiring a monitoring program to reduce the likelihood of construction damage to adjacent NYCLs and NR-listed properties (within 90 feet) and to detect at an early stage the beginnings of damage so that construction procedures can be changed.

Non-Storm Conditions

Primary Area of Potential Effect

Project Area One. Under the No Action Alternative, no new comprehensive coastal flood protection systems will be implemented in Project Area One.

There are, however, several projects planned or under construction in Project Area One, as described more fully in Chapter 2.0, "Project Alternatives." Two projects that could affect architectural resources in the No Action Alternative are described below.

One of the planned projects within Project Area One that could affect architectural resources is a NYC Parks project to improve facilities within East River Park. NYC Parks is proposing to construct an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (#4, S/NR-eligible) that complies with the Americans with Disabilities Act. In addition, NYC Parks plans interior renovations to the building. As the former Fireboat House has undergone previous interior renovations to house the Lower East Side Ecology Center and to provide public restrooms, it is not expected that the planned interior renovations would result in an adverse effect on the Fireboat House. However, depending on the plans for the exterior ramp, this project could adversely affect the integrity of the building's materials, design, and/or setting. This adjacent architectural resource would be offered some protection from accidental damage through Building Code Section BC 3309: Protection of Adjoining Property.

A portion of the S/NR-eligible East River Bulkhead (#3) lies within the Pier 42 project site. In accordance with a Programmatic Agreement between SHPO, LMDC, and ACHP, signed on August 3, 2007, for the East River Waterfront Esplanade and Piers Project, LMDC and the City are consulting with SHPO regarding the design of the Pier 42 project on or around the historic, granite portions of the East River Bulkhead. Further, the Pier 42 project will repair the portion of the bulkhead within the Pier 42 project site by grout replacement and by replacement of deteriorated modern concrete caps. Therefore, the Pier 42 project will not adversely affect the East River Bulkhead.

Project Area Two. There are no projects planned or under construction in Project Area Two that could affect architectural resources.

400-Foot Portion of the Primary Area of Potential Effect. There are several projects planned or under construction in the 400-foot portion of the Primary APE. Three of these projects could affect architectural resources in the No Action Alternative; they are described below.

NYC Parks plans to reconstruct the comfort station of the Baruch Playground located within the grounds of the Bernard Baruch Houses (#9, S/NR-eligible). The playground is an original feature of the Bernard Baruch Houses, but it has been renovated twice, in 1975 and 2000. While the Baruch Playground project could affect the integrity of the comfort station's materials, design, and/or setting, it is not expected that this project would affect the overall integrity of the Bernard Baruch Houses. Therefore, it would not result in any direct or indirect effects to the development. Building Code Section BC 3309: Protection of Adjoining Property would offer the adjacent Rivington Street Bath (#13, S/NR-eligible) some protection from accidental construction-related damage that could potentially result from the Baruch Playground project.

Hurricane Sandy damaged the Bernard Baruch (#9, S/NR-eligible) and Jacob Riis Houses (#14, S/NR-eligible). To prevent any further damages to these complexes from flooding, NYCHA is proposing resiliency measures for them. At the Bernard Baruch Houses, NYCHA proposes to install a floodwall along the west side of Baruch Drive, individually floodproof the buildings east of Baruch Drive, construct an electrical annex to each building east of Baruch Drive, and construct a new boiler plant in the center of the development. At the Jacob Riis Houses, NYCHA proposes to floodproof each building and construct an electrical annex to each building. Site restoration would also be undertaken at each development. These projects are undergoing environmental review pursuant to NEPA, and NYCHA is consulting with SHPO regarding the potential for these resiliency projects to result in adverse effects to the Bernard Baruch and Jacob Riis Houses.

NYC Parks is planning to reconstruct the roofing systems of the Asser Levy Playground. As the Asser Levy Public Baths (#11) portion of the Asser Levy Playground is a NYCL (and also listed on the Registers), this project will be coordinated with LPC so that there will be no adverse effects to this architectural resource.

Secondary Area of Potential Effect (Protected Area)

There are a number of projects under construction or planned or projected for development within the Secondary APE. Some of these projects could result in direct or indirect effects to architectural resources.

Storm Conditions

In the absence of the construction of comprehensive coastal flood protection systems within the project area, architectural resources located throughout the APEs would remain at risk of future flooding effects. However, the Bernard Baruch and Jacob Riis Houses would be protected, as described above.

REFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

ARCHAEOLOGICAL RESOURCES

Area of Potential Effect – Montgomery Street to Rivington Street

Construction of the floodwalls and closure structures under the Preferred Alternative would involve excavation to depths of 2 to 4 feet below the current grade to install the upper

components, and for pile caps. Impacts below these depths would be by sheet piles, which would be mechanically driven into the ground to depths of around 40 feet and would not afford visibility of any underlying soils. The Preferred Alternative would also include the installation of new sewers within East River Park, and the installation of the new sewers would involve the excavation of trenches to depths of between 15 and 20 feet below existing grade. Therefore, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA.

Area of Potential Effect – East 23rd Street to East 25th Street

The Phase 1A report identified historic-period archaeological sensitivity for the East 23rd and East 25th Street portions of the APE. The different types of potential archaeological resources within the sensitive areas may be found below the existing and former street and sidewalk pavement layers and bedding, which generally extend at least one foot below the present grade. Therefore, potential resources may be located beginning at one foot below grade. Most project effects of the Preferred Alternative would consist of excavation to depths of 2 to 4 feet below the current grade to install the upper components of floodwalls and closure structures, and for pile caps. Disturbance below these depths would be by sheet piles, which would be mechanically driven into the ground and will not afford visibility of any underlying soils. Areas where deeper and wider impacts may occur are where existing utilities could be encased or relocated. Therefore, additional archaeological investigation will be performed prior to or during construction.

Area of Potential Effect – Upland Drainage Management Improvements

The Supplemental Phase 1A Archaeological Documentary Study identified historic-period archaeological sensitivity for the locations of the proposed M22-M23 parallel conveyance and the South Interceptor Gate and Building. The interceptor gate would be installed at a depth of at least 36 feet below existing grade to connect with the existing interceptor. The new parallel conveyance would be installed between approximately 10 and 28 feet below grade. Therefore, additional archaeological investigation will be performed prior to or during construction.

Additional Archaeological Investigation

A scope of work for the additional investigation will be prepared in consultation with LPC and SHPO in accordance with Section 106 regulations, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. This further phase of archaeological work will be stipulated in the PA and would include testing and/or monitoring conducted in consultation with LPC and SHPO. The testing and/or monitoring would not be done during the EIS process but would occur before and/or during project construction. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidance in the *CEQR Technical*

Manual. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that worked be halted until the tribe is notified and the artifact can be evaluated by an archaeologist.

ARCHITECTURAL RESOURCES

Non-Storm Conditions

Primary Area of Potential Effect

Project Area One – Potential Direct Effects through Demolition or Alteration. In Project Area One, the Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible) through the construction of closure structures across the highway in the vicinity of Montgomery Street and East 13th Street. However, it is not expected that this work would have adverse effects on the FDR Drive. The highway has been modified over time through conversion from a boulevard to a controlled-access parkway, which involved the construction of exit ramps and overpasses and the installation of concrete barrier walls and medians, and the proposed construction of the closure structures would not affect the overall historical integrity of the highway, which runs from the Battery Park underpass to the 125th Street/Triborough Bridge exit. Construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Project Area One – Potential Direct Effects from Adjacent Construction. Construction of the Preferred Alternative would occur within 90 feet of the following three S/NR-eligible architectural resources located within Project Area One: the FDR Drive (#1); Williamsburg Bridge (#2); and Engine Co. 66 Fireboat House (#4) (see **Figure 5.4-16**). (For a more detailed discussion of project construction within 90 feet of these architectural resources, see Chapter 6.0, "Construction Overview.") Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these three architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. The plans would be expected to follow the guidelines of *TPPN #10/88*, which "requires a monitoring program to reduce the likelihood of construction damage to adjacent historic structures and to detect at an early stage the beginnings of damage so that construction procedures can be changed." It is expected that the CPPs will also be prepared in accordance with LPC's guidance document *Protection Programs for Landmarked Buildings* and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. With the CPPs in place, construction would not be expected to result in adverse effects to these three S/NR-eligible architectural resources. Further, construction adjacent to the FDR Drive and the Williamsburg Bridge would be coordinated with NYCDOT to ensure that they are protected during construction of the Preferred Alternative.

Project Area One – Potential Contextual Effects. It is not expected that the Preferred Alternative would result in any contextual effects on architectural resources located in Project Area One. As described in *the CEQR Technical Manual*, contextual effects can include a change in scale, visual prominence, or visual context of any building, structure, object, or landscape feature; screening or elimination of publicly accessible views; or introduction of significant new shadows or significant lengthening of the duration of existing shadows on an historic landscape or an historic structure if the features that make the structure significant depend on sunlight. The

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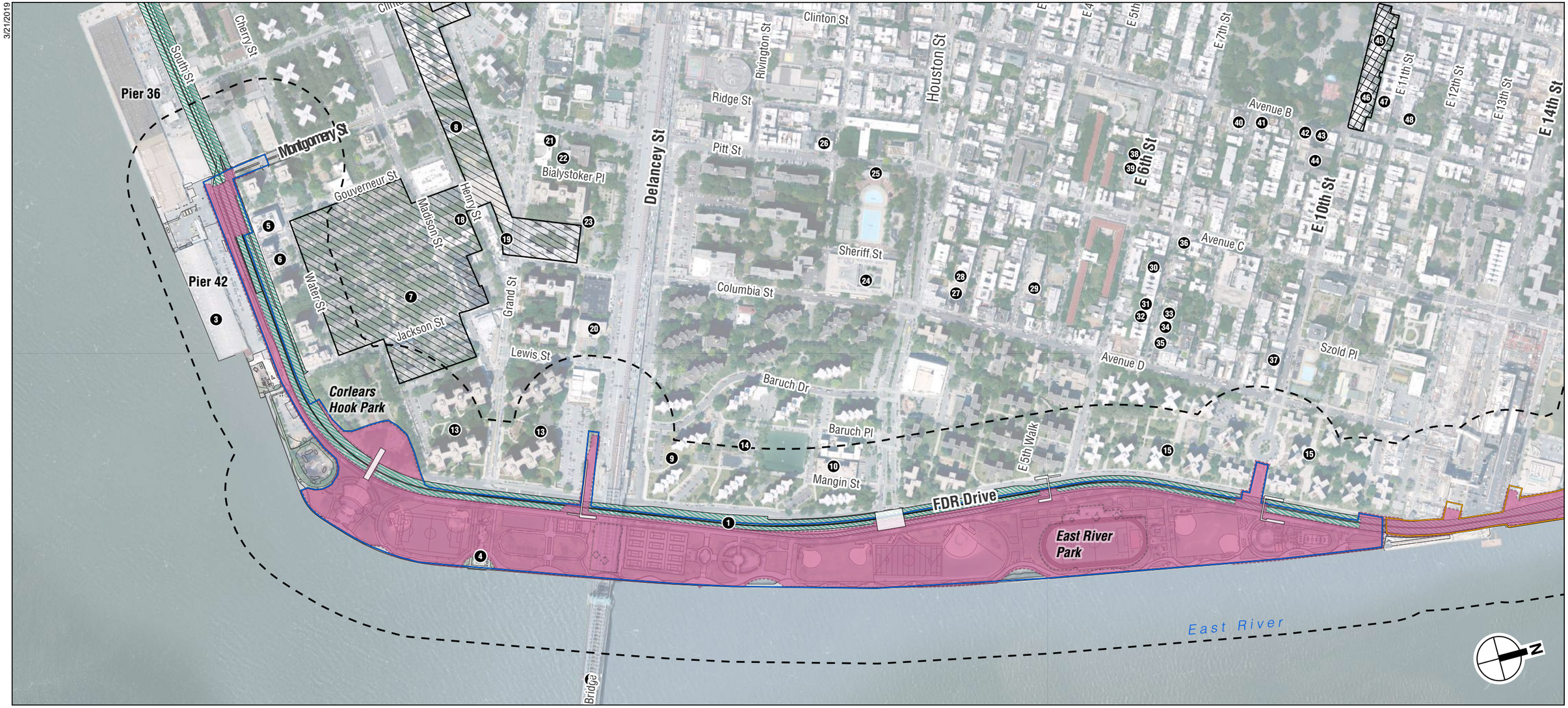

- *Project Area One*
- *Project Area Two*
- *Primary (400-foot) APE*
- *Individual Architectural Resources*
- *East 10th Street Historic District (NYCL, S/NR-eligible)*
- *Lower East Side Historic District and Extension (S/NR)*
- *Stuyvesant Square Historic District (NYCL, S/NR)*
- *FDR Drive (S/NR)*
- *Preferred Alternative Limits of Work*

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Preferred Alternative, Project Area One
Figure 5.4-16

Preferred Alternative would not result in any of these types of effects to architectural resources in Project Area One.

The proposed floodwalls, raised park, new bridges at Corlears Hook Park and Delancey and East 10th Streets, and the interceptor gate building at Corlears Hook Park would not result in a change in scale, visual prominence, or visual context of any of the architectural resources located in Project Area One. The Preferred Alternative would not affect the visual context of these resources, as it would not result in any land use changes, and East River Park would retain the character of a landscaped, waterfront park. Under the Preferred Alternative, raised areas would be constructed around the Engine Co. 66 Fireboat House (#4, S/NR-eligible). These raised areas would block limited eastward views of the fireboat house from Grand Street west of the FDR Drive, but this architectural resource is not considered a visual resource, these views are not significant, and this resource would continue to be visually prominent from within East River Park. The planted, raised areas would also change the immediate setting of the fireboat house, but its setting would remain that of a waterfront park, and there would not be an adverse contextual effect to the architectural resource. As none of the proposed design features would be greater than 50 feet tall, the Preferred Alternative would not have the potential to result in shadow effects on architectural resources. For a more thorough discussion of visual resources and views, see Chapter 5.5, "Urban Design and Visual Resources."

Project Area Two – Potential Direct Effects through Demolition or Alteration. In Project Area Two, the Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible) through the construction of closure structures across the highway at Avenue C. As with the construction in Project Area One that would directly affect the highway, it is not expected that construction of these closure structures would have adverse effects on the FDR Drive. As described above, the highway has been modified over time, and the installation of closure structures at Avenue C (considered individually and cumulatively with the work performed in Project Area One) would not affect the overall historical integrity of the highway. Construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Project Area Two – Potential Direct Effects from Adjacent Construction. Construction of the Preferred Alternative would occur within 90 feet of the FDR Drive (#1, S/NR-eligible) (see **Figure 5.4-17**). (For a more detailed discussion of project construction within 90 feet of this architectural resource, see Chapter 6.0, "Construction Overview.") Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement a CPP to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment to the FDR Drive. The plan would be expected to follow the guidance documents noted above. With the CPP in place, construction would not be expected to result in adverse effects to the FDR Drive (#1, S/NR-eligible). Further, construction adjacent to the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Project Area Two – Potential Contextual Effects. It is not expected that the Preferred Alternative would result in any contextual effects on the FDR Drive (#1, S/NR-eligible), the only architectural resource located within Project Area Two.

400-Foot Portion of the Primary Area of Potential Effect

Potential Direct Effects from Adjacent Construction. Construction of the Preferred Alternative would occur within 90 feet of the Asser Levy Public Baths (#12, S/NR, NYCL) and a small portion of the Jacob Riis Houses (#15, S/NR-eligible) (see **Figures 5.4-16 and 5.4-17**). (For a

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E 3rd St
E 4th St
E 5th St
E 7th St
Avenue A
E 11th St
E 12th St
E 13th St
E 14th St
1st Ave Loop
14th St Loop
20th St Loop
E 20th St
E 23rd St
E 24th St
E 25th St
E 26th St
E 29th St
E 30th St
Avenue B
E 6th St
E 10th St
Avenue C
Avenue C Loop
Avenue D
Szold Pl
E 6th Walk

Asser Levy Recreation Center

Asser Levy Playground

Stuyvesant Cove Park

Murphy Brothers Playground

Captain Patrick J. Brown Walk

East River Park

East River

N

Project Area One
Project Area Two
Primary (400-foot) APE

Individual Architectural Resources
East 10th Street Historic District (NYCL, S/NR-eligible)
Lower East Side Historic District and Extension (S/NR)
Stuyvesant Square Historic District (NYCL, S/NR)
FDR Drive (S/NR)

Preferred Alternative Limits of Work

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Preferred Alternative, Project Area Two
Figure 5.4-17

more detailed discussion of project construction within 90 feet of these architectural resources, see Chapter 6.0, "Construction Overview.") In addition, construction of the drainage management components would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. The CPPS would be expected to follow the guidance documents noted above and, with their implementation, construction would not be expected to result in adverse effects to these resources.

Potential Contextual Effects. It is not expected that the Preferred Alternative would result in any contextual effects on architectural resources in the 400-foot portion of the APE. In general, the Preferred Alternative would not result in a change in scale, visual prominence, or visual context of any building, structure, object, or landscape feature; screening or elimination of publicly accessible views; or introduction of significant new shadows or significant lengthening of the duration of existing shadows on an historic landscape or an historic structure if the features that make the structure significant depend on sunlight. (For a more thorough discussion of visual resources and views, see Chapter 5.5, "Urban Design and Visual Resources.")

The proposed combination of floodwalls, raised park, new bridges at Corlears Hook Park and Delancey and East 10th Streets, and the interceptor gate buildings would not result in a change in scale, visual prominence, or visual context of any of the architectural resources located in the 400-foot portion of the APE. East River Park and Stuyvesant Cove Park would continue to provide a waterfront open space visual context and the floodwalls along Montgomery Street, the FDR Drive, and between East 23rd and East 25th Streets would be new streetscape features in a densely developed urban environment where the FDR Drive runs on elevated segments, the Con Ed East River Generating Facility between East 13th and East 15th Streets is enclosed by walls and fences, and the large residential housing developments along the FDR Drive are set back from the street behind fences. Therefore, the Preferred Alternative would not adversely affect the visual context of any architectural resource in the 400-foot portion of the APE.

The new bridge at Delancey Street would have an access ramp, in the same general location as the existing ramp to the existing bridge, that extends along Delancey Street adjacent to the parking lot of the East River Housing Cooperative (#13, S/NR-eligible) north parcel that is located between Grand and Delancey Streets. In addition, the new span over the FDR Drive would be located approximately 150 feet south of the existing span. However, this new bridge would not cause a change in scale, visual prominence, or visual context of the East River Housing Cooperative, as the existing bridge is located adjacent to the north of the parking lot that is part of the large residential development. The reconstructed bridge would not be a new feature in the immediate context of the architectural resource. Similarly, the new East 10th Street bridge would not cause a change in scale, visual prominence, or visual context of the Jacob Riis Houses (#15, S/NR-eligible). The new bridge would be located approximately 50 feet south of the existing bridge and would, therefore, not change the context or views of the surrounding buildings.

In addition, the proposed floodwalls and raised park would, for the most part, have limited effects on views of architectural resources in the 400-foot portion of the APE. From within East River Park, raising the majority of the park would likely affect the views of the Baruch Houses (#9, S/NR-eligible), Public High School 97 (#10, S/NR-eligible), the Lavanburg Homes (#11, S/NR-eligible), the East River Housing Cooperative (#13, S/NR-eligible), the Rivington Street Baths (#14, S/NR-eligible), and the Jacob Riis Houses (#15, S/NR-eligible), but these resources would still be prominently visible from within the park, and they would continue to be visible from other locations within the APE.

On East 20th Street near Avenue C, an interceptor gate would be constructed as part of the drainage management improvements. The interceptor gate would include an above-grade building located in the median of East 20th Street near the building at the northeast corner of Stuyvesant Town (#16, S/NR-eligible). The interceptor gate building would be approximately 10 feet tall, 50 feet long, and 10 feet wide. Therefore, this relatively small structure in East 20th Street would not affect the visual prominence of the large Stuyvesant Town complex.

At the northern end of the project area, floodwalls and closure structures would be constructed along the east and north sides of the Asser Levy Public Baths (#12, S/NR, NYCL), adjacent to the outdoor swimming pool from the 1960s, which is currently enclosed by a plain brick wall and metal fence. The southern façade and the monumental west façade that fronts onto the former Asser Levy Place would remain visually prominent under this alternative. Further, as will be stipulated in the PA, an effort would be made to design these walls—in terms of proportions and finishes—so that they are compatible with the historic public baths building, and the design would be coordinated with LPC.

Secondary Area of Potential Effect (Protected Area)

The Preferred Alternative would not have any direct or indirect effects on architectural resources located in the Secondary APE. Architectural resources in the Secondary APE are too far from the project area to be affected by this alternative.

Storm Conditions

Primary Area of Potential Effect

Project Area. In a future storm condition, the following two S/NR-eligible architectural resources could experience adverse direct effects from storm surge and flooding: the Williamsburg Bridge (#2) and East River Bulkhead (#3. The Engine Co. 66 Fireboat House (#4, S/NR-eligible) would not be raised with the rest of the park, but measures, such as the construction of raised areas around its perimeter, would serve to avoid or lessen effects to the architectural resource from storm surge and flooding in a future storm condition.

The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be located on the landward side of the flood protection system that would be constructed under the Preferred Alternative. It would, therefore, be protected from damage that could result from storm surge and flooding in a future storm condition.

The portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area Two would not be similarly protected. Due to the physical constraints of Project Area Two, the flood protection system proposed in this area under the Preferred Alternative would be constructed on the western side of the FDR Drive. Therefore, in a future storm condition, the portion of the FDR Drive that runs through Project Area Two could experience adverse direct effects from storm surge and flooding.

400-Foot Portion of the Primary Area of Potential Effect. The architectural resources located within the 400-foot portion of the Primary APE are landward of the flood protection system that would be constructed under the Preferred Alternative. Therefore, unlike with the No Action Alternative, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

Secondary Area of Potential Effect (Protected Area)

All of the architectural resources located within the Secondary APE are landward of the flood protection systems that would be constructed under the Preferred Alternative. Therefore, unlike with the No Action Alternative, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTIONS SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

ARCHAEOLOGICAL RESOURCES

As described above, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA. A scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collection*. See the archaeology discussion above for the Preferred Alternative for more information.

ARCHITECTURAL RESOURCES

Non-Storm Conditions

Primary Area of Potential Effect

Project Area One – Potential Direct Effects through Demolition or Alteration. This alternative, like the Preferred Alternative, would directly affect the portion of the FDR Drive (#1, S/NR-eligible) in Project Area One, but it is not expected that this work would have adverse effects on the FDR Drive. In addition, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of Alternative 2.

Project Area One – Potential Direct Effects from Adjacent Construction. Construction of Alternative 2 would occur within 90 feet of the following three S/NR-eligible architectural resources located within Project Area One: the FDR Drive (#1); Williamsburg Bridge (#2); and Engine Co. 66 Fireboat House (#4) (see **Figure 5.4-18**). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these three architectural resources as under the Preferred Alternative. Further, construction adjacent to the FDR Drive and the Williamsburg Bridge would be coordinated with NYCDOT to ensure that they are protected during construction of this alternative.

Project Area One – Potential Contextual Effects. Like the Preferred Alternative, it is not expected that Alternative 2 would result in any contextual effects on architectural resources from a change in scale, visual prominence, or visual context of any building, structure, object, or landscape feature; screening or elimination of publicly accessible views; or introduction of significant new shadows or significant lengthening of the duration of existing shadows on an

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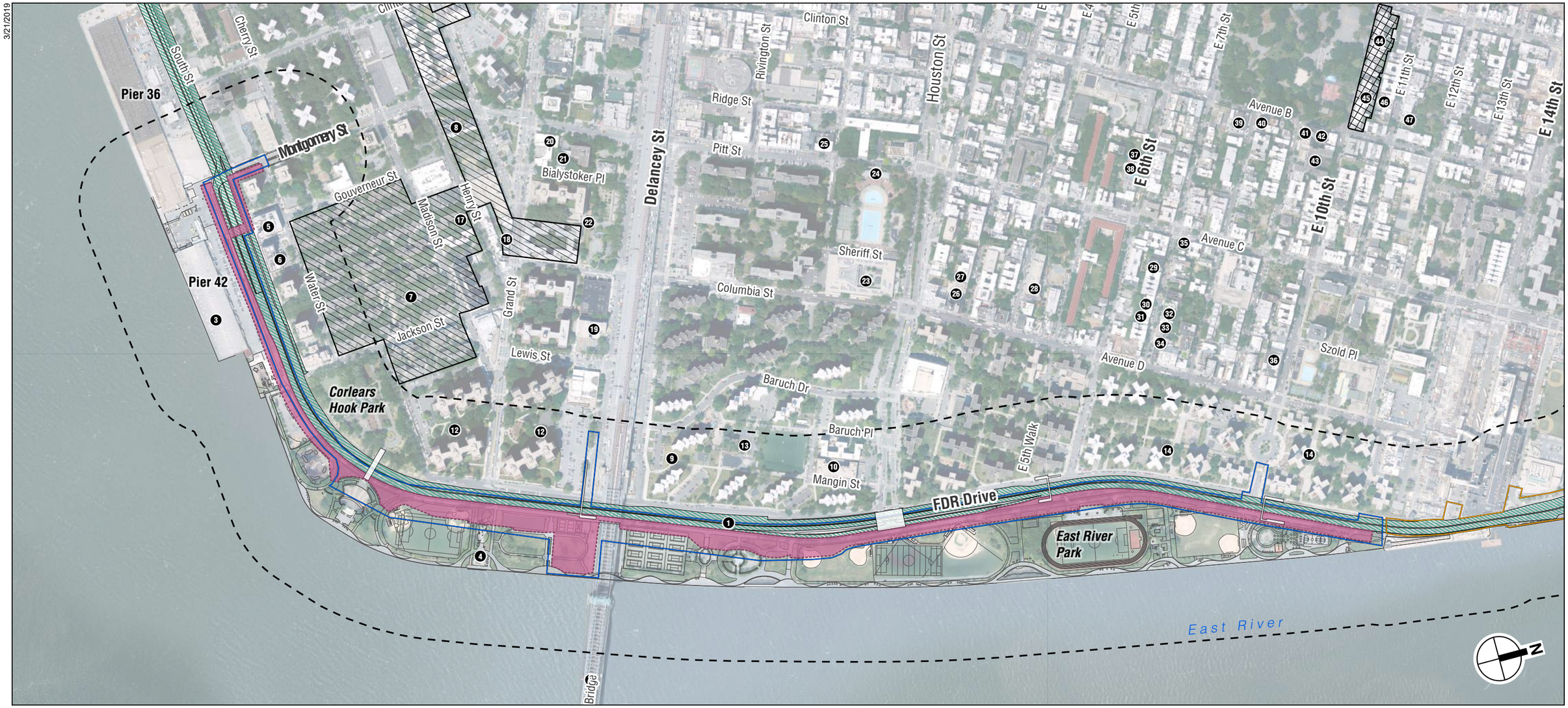

Project Area One
Project Area Two
Primary (400-foot) APE

1 *Individual Architectural Resources*
East 10th Street Historic District (NYCL, S/NR-eligible)
Lower East Side Historic District and Extension (S/NR)
Stuyvesant Square Historic District (NYCL, S/NR)
FDR Drive (S/NR)

Alternative 2 Limits of Work

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Alternative 2, Project Area One
Figure 5.4-18

historic landscape or an historic structure if the features that make the structure significant depend on sunlight.

Project Area Two – Potential Direct Effects through Demolition or Alteration. Like the Preferred Alternative, Alternative 2 would directly affect the portion of the FDR Drive (#1, S/NR-eligible) in Project Area, but it is not expected that construction of these closure structures would have adverse effects on the FDR Drive. Construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of Alternative 3.

Project Area Two – Potential Direct Effects from Adjacent Construction. As under the Preferred Alternative, the City, in consultation with LPC and SHPO, would develop and implement a CPP for the FDR Drive (#1, S/NR-eligible). (For a more detailed discussion of project construction within 90 feet of this architectural resource, see Chapter 6.0, "Construction Overview.") Further, construction adjacent to the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of Alternative 3.

Project Area Two – Potential Contextual Effects. As with the Preferred Alternative, it is not expected that Alternative 2 would result in any contextual effects on the FDR Drive (#1, S/NR-eligible), which is the only architectural resource located in Project Area Two.

400-Foot Portion of the Primary Area of Potential Effect

Potential Direct Effects from Adjacent Construction. Within the 400-foot portion of the Primary APE, construction under Alternative 2—like construction under the Preferred Alternative—would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs and, with these CPPs in place, construction would not be expected to result in adverse effects to these architectural resources (see **Figures 5.4-18 and 5.4-19**).

Potential Contextual Effects. It is not expected that Alternative 2 would result in any contextual effects on architectural resources in the 400-foot portion of the APE. This alternative—like the Preferred Alternative—would not result in a change in scale, visual prominence, or visual context of any building, structure, object, or landscape feature; screening or elimination of publicly accessible views; or introduction of significant new shadows or significant lengthening of the duration of existing shadows on an historic landscape or an historic structure if the features that make the structure significant depend on sunlight.

Secondary Area of Potential Effect (Protected Area)

Alternative 2 (like the Preferred Alternative) would not have any direct or indirect effects on architectural resources located in the Secondary APE. Architectural resources in the Secondary APE are too far from the project area to be affected by this alternative.

Storm Conditions

Primary Area of Potential Effect

Under Alternative 2, like under the Preferred Alternative, the Williamsburg Bridge (#2, S/NR-eligible) and East River Bulkhead (#3, S/NR-eligible) could still experience adverse direct effects from storm surge and flooding. In addition, the Engine Co. 66 Fireboat House (#4, S/NR-

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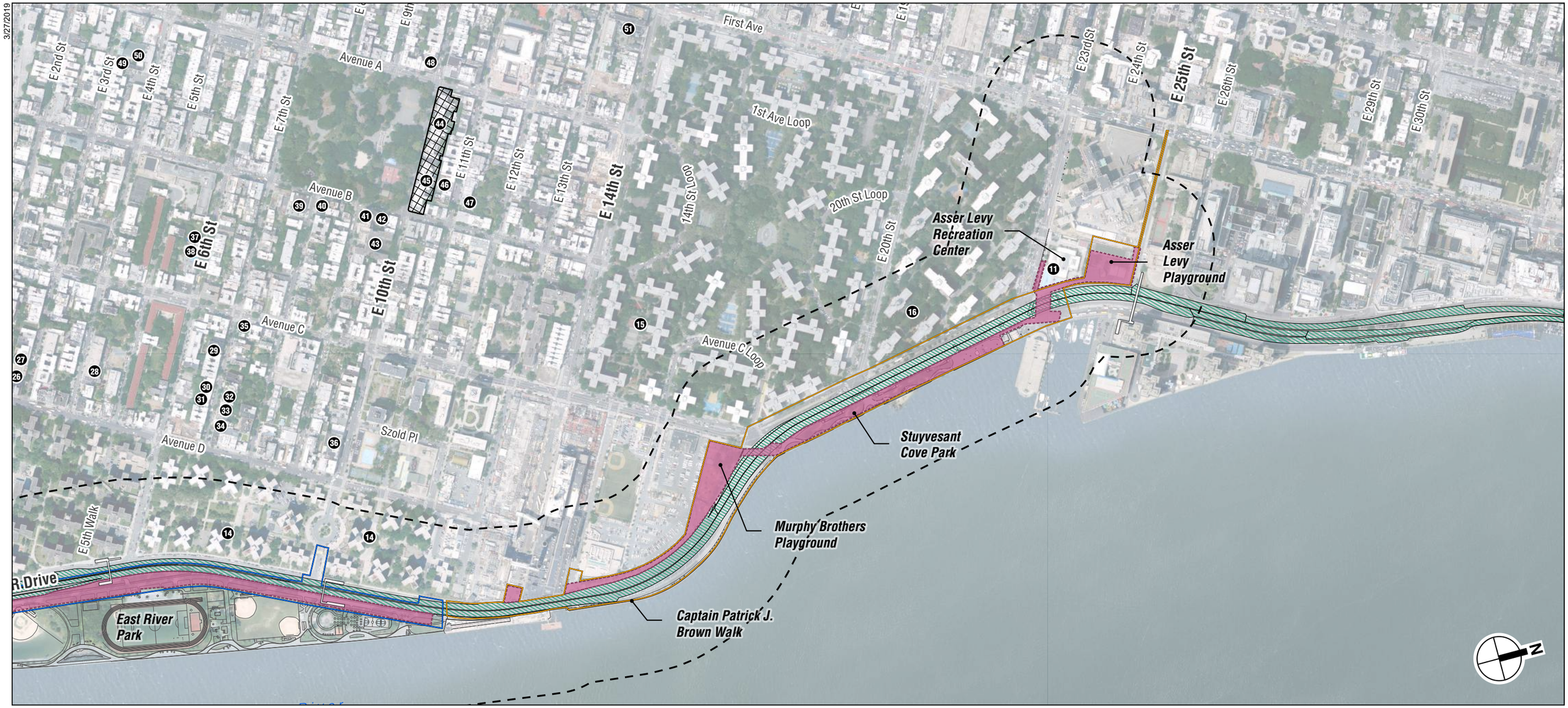


- Project Area One
- Project Area Two
- Primary (400-foot) APE
- Individual Architectural Resources
- East 10th Street Historic District (NYCL, S/NR-eligible)
- Lower East Side Historic District and Extension (S/NR)
- Stuyvesant Square Historic District (NYCL, S/NR)
- FDR Drive (S/NR)
- Alternative 2 Limits of Work

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Alternative 2, Project Area Two
Figure 5.4-19

eligible) would be on the waterside of the flood protection system that would be constructed under Alternative 2 and could also experience adverse direct effects from storm surge and flooding.

As under the Preferred Alternative, the portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be protected from damage that could result from storm surge and flooding in a future storm condition. The portion of the FDR Drive that runs through Project Area Two would not be similarly protected, as under the Preferred Alternative.

400-Foot Portion of the Primary Area of Potential Effect.
The architectural resources located within the 400-foot portion of the Primary APE would be protected under Alternative 2 from damage that could result from storm surge and flooding in a future storm condition.

Secondary Area of Potential Effect (Protected Area)
All of the architectural resources located within the Secondary APE are landward of the flood protection systems that would be constructed under Alternative 2. Therefore, like with the Preferred Alternative, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

ARCHAEOLOGICAL RESOURCES

As described above, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA. A scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collection*. See the archaeology discussion above for the Preferred Alternative for more information.

ARCHITECTURAL RESOURCES

Non-Storm Conditions

Primary Area of Potential Effect
Project Area One – Potential Direct Effects. Like the Preferred Alternative and Alternative 2, Alternative 3 would directly affect the portion of the FDR Drive (#1, S/NR-eligible) in Project Area One through the construction of closure structures. As under Alternative 2, it is not expected that this work would have adverse effects on the FDR Drive. In addition, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of Alternative 3.

The potential direct effects to architectural resources from adjacent construction under Alternative 3 would be similar to what is described under the Preferred Alternative.

Project Area One – Potential Contextual Effects. Like the Preferred Alternative, it is not expected that Alternative 3 would result in any contextual effects on architectural resources.

Project Area Two – Potential Direct Effects. Like the Preferred Alternative, Alternative 3 would directly affect the portion of the FDR Drive (#1, S/NR-eligible) in Project Area Two and could result in the same potential direct effects to architectural resources from adjacent construction.

Project Area Two – Potential Contextual Effects. As with Alternative 2, it is not expected that Alternative 3 would result in any contextual effects on the FDR Drive (#1, S/NR-eligible), which is the only architectural resource located in Project Area Two.

400-Foot Portion of the Primary Area of Potential Effect

Potential Direct Effects from Adjacent Construction. As with construction of the Preferred Alternative, construction of Alternative 3 would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible) (see **Figures 5.4-20 and 5.4-21**).

Potential Contextual Effects. Like the Preferred Alternative, it is not expected that Alternative 3 would result in any contextual effects on architectural resources in the 400-foot portion of the APE.

The proposed floodwalls and levees of Alternative 3 would, for the most part, have limited effects on views of architectural resources in the 400-foot portion of the APE. From within East River Park, the proposed floodwalls and levees would partially obstruct views of the lower floors of the Baruch Houses (#9, S/NR-eligible), Public High School 97 (#10, S/NR-eligible), the Lavanburg Homes (#11, S/NR-eligible), the East River Housing Cooperative (#13, S/NR-eligible), the Rivington Street Baths (#14, S/NR-eligible), and the Jacob Riis Houses (#15, S/NR-eligible), but these resources would still be prominently visible from within the park, and they would continue to be visible from other locations within the APE.

Secondary Area of Potential Effect (Protected Area)

Alternative 3 (like the Preferred Alternative) would not have any direct or indirect effects on architectural resources located in the Secondary APE. Architectural resources in the Secondary APE are too far from the project area to be affected by this alternative.

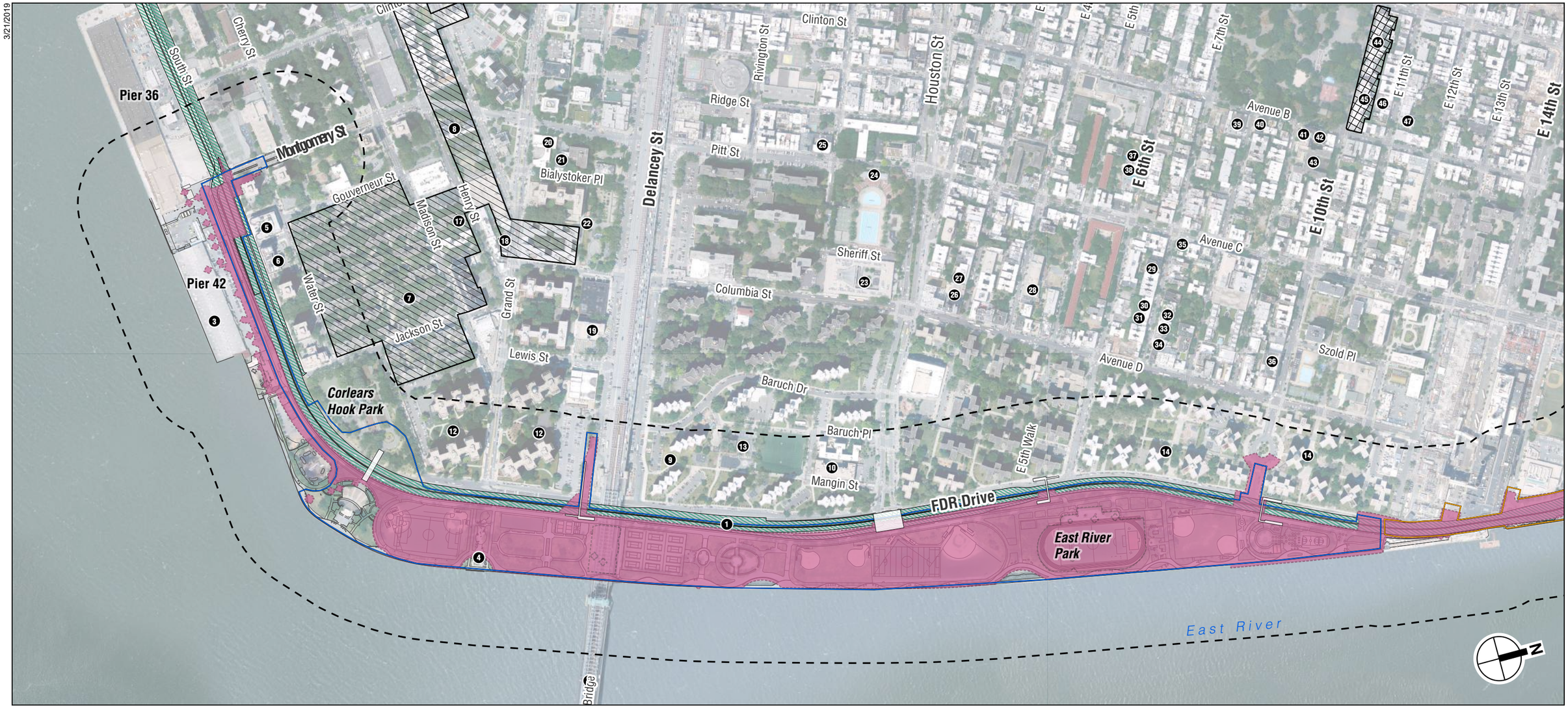
Storm Conditions

Primary Area of Potential Effect

Project Area. In a future storm condition, the following three S/NR-eligible architectural resources could experience adverse direct effects from storm surge and flooding as under Alternative 2: the Williamsburg Bridge (#2); East River Bulkhead (#3); and Engine Co. 66 Fireboat House (#4). Under the Preferred Alternative, design measures would serve to avoid or lessen effects to the Engine Co. 66 Fireboat House (#4, S/NR-eligible) from storm surge and flooding in a future storm condition.

As under the Preferred Alternative, the portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be protected from damage that could result from storm surge and flooding in a future storm condition, but the portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area Two would not be similarly protected and could experience adverse direct effects from storm surge and flooding as under Alternative 2.

3/21/2019



Project Area One
Project Area Two
Primary (400-foot) APE

Individual Architectural Resources
East 10th Street Historic District (NYCL, S/NR-eligible)
Lower East Side Historic District and Extension (S/NR)
Stuyvesant Square Historic District (NYCL, S/NR)
FDR Drive (S/NR)

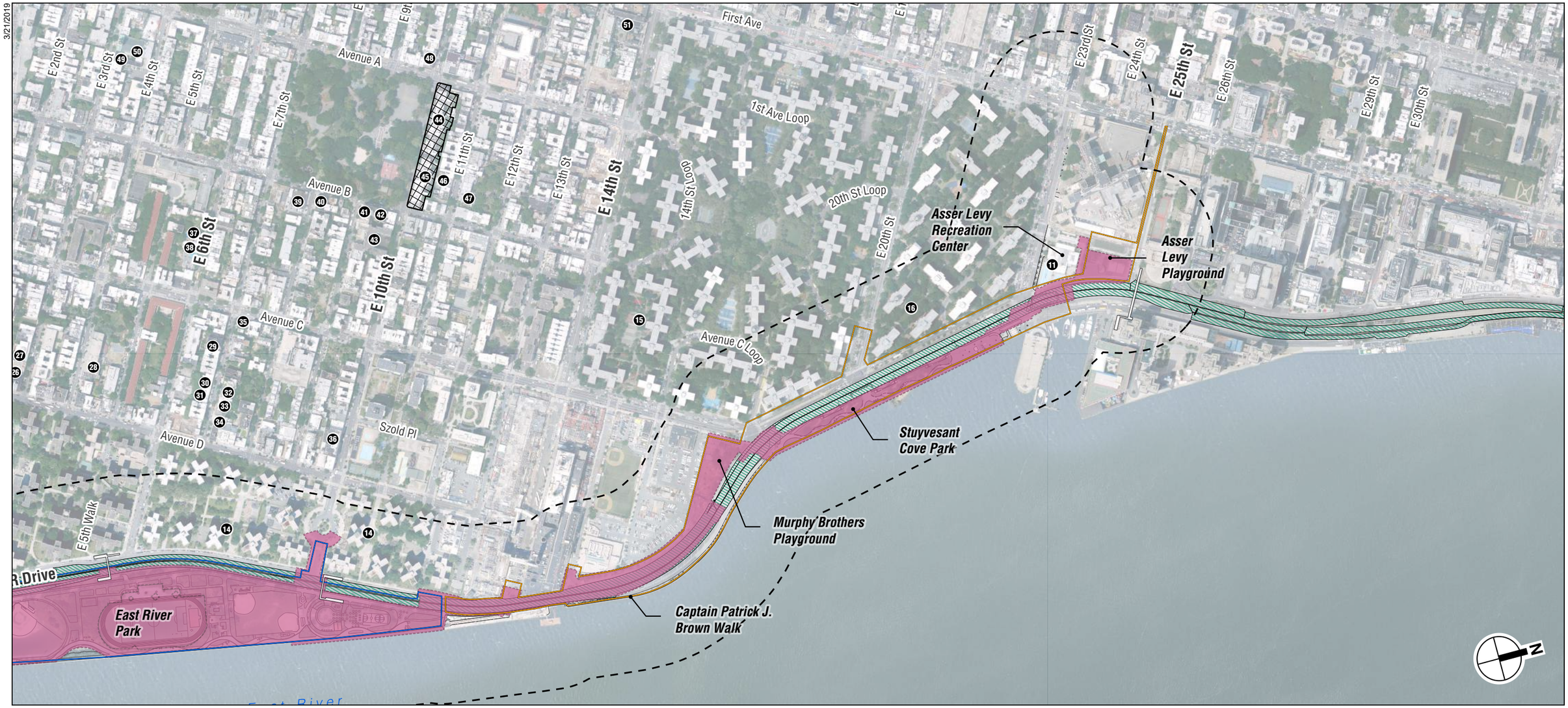
Alternative 3 Limits of Work

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Alternative 3, Project Area One
Figure 5.4-20

3/21/2019



Project Area One
Project Area Two
Primary (400-foot) APE

1 Individual Architectural Resources
East 10th Street Historic District (NYCL, S/NR-eligible)
Lower East Side Historic District and Extension (S/NR)
Stuyvesant Square Historic District (NYCL, S/NR)
FDR Drive (S/NR)

Alternative 3 Limits of Work

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Historic and Cultural Resources:
Construction Limits of Work – Alternative 3, Project Area Two
Figure 5.4-21

400-Foot Portion of the Primary Area of Potential Effect. The architectural resources located within the 400-foot portion of the Primary APE would be protected under Alternative 3 from damage that could result from storm surge and flooding in a future storm condition.

Secondary Area of Potential Effect (Protected Area)

All of the architectural resources located within the Secondary APE are landward of the flood protection system that would be constructed under Alternative 3. Therefore, like with the Preferred Alternative, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

ARCHAEOLOGICAL RESOURCES

As described above, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA. A scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collection*. See the archaeology discussion above for the Preferred Alternative for more information.

ARCHITECTURAL RESOURCES

Non-Storm Conditions

Primary Area of Potential Effect

Project Area One – Potential Direct Effects. This alternative, like the Preferred Alternative and Alternatives 2 and 3, would directly affect the portion of the FDR Drive (#1, S/NR-eligible) in Project Area One. In addition, construction of Alternative 5 would occur within 90 feet of the following three S/NR-eligible architectural resources located within Project Area One: the FDR Drive (#1); Williamsburg Bridge (#2); and Engine Co. 66 Fireboat House (#4).

Project Area One – Potential Contextual Effects. Like the Preferred Alternative and Alternatives 2 and 3, it is not expected that this alternative would result in any contextual effects on architectural resources.

Project Area Two. Unlike the Preferred Alternative, this alternative would reconstruct the section of the FDR Drive (#1, S/NR-eligible) between approximately East 13th and East 18th Streets. However, it is not expected that this work would have adverse effects on the FDR Drive, as only an approximately 5-block section of the 9.44-mile-long FDR Drive would be reconstructed. Further, because the FDR Drive currently has elevated sections, raising the northbound lanes within a portion of Project Area Two would not affect the overall appearance of the highway, and it would still convey its historic significance. Also, the FDR Drive has been altered over time. Construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction Alternative 5.

With a CPP in place for work north of East 18th Street, adjacent construction would not be expected to result in adverse effects to the FDR Drive.

400-Foot Portion of the Primary Area of Potential Effect

Potential Direct Effects from Adjacent Construction. Within the 400-foot portion of the Primary APE, construction under Alternative 5—like under the Preferred Alternative and Alternatives 2 and 3—would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible).

Potential Contextual Effects. Like the Preferred Alternative and Alternatives 2 and 3, it is not expected that Alternative 5 would result in any contextual effects on architectural resources in the 400-foot portion of the APE.

Secondary Area of Potential Effect (Protected Area)

Alternative 5 (like the Preferred Alternative and Alternatives 2 and 3) would not have any direct or indirect effects on architectural resources located in the Secondary APE. Architectural resources in the Secondary APE are too far from the project area to be affected by this alternative.

Storm Conditions

Primary Area of Potential Effect

In a future storm condition, the following three S/NR-eligible architectural resources could experience adverse direct effects from storm surge and flooding under Alternative 5: the Williamsburg Bridge (#2); East River Bulkhead (#3); and Engine Co. 66 Fireboat House (#4). Under the Preferred Alternative, design measures would serve to avoid or lessen effects to the Engine Co. 66 Fireboat House (#4, S/NR-eligible) from storm surge and flooding in a future storm condition.

As under the Preferred Alternative and Alternatives 2 and 3, the portion of the FDR Drive (#1, S/NR-eligible) that runs through Project Area One would be protected from damage that could result from storm surge and flooding in a future storm condition. Unlike those other three alternatives, Alternative 5 would also protect the portion of the FDR Drive that runs through Project Area Two from storm surge and flooding.

400-Foot Portion of the Primary Area of Potential Effect.

The architectural resources located within the 400-foot portion of the Primary APE would be protected under Alternative 5 from damage that could result from storm surge and flooding in a future storm condition.

Secondary Area of Potential Effect (Protected Area)

All of the architectural resources located within the Secondary APE are landward of the flood protection systems that would be constructed Alternative 5. Therefore, like with the Preferred Alternative and Alternatives 2 and 3, they would be protected from damage that could result from storm surge and flooding in a future storm condition.

MITIGATION

ARCHAEOLOGICAL RESOURCES

As will be stipulated in the PA, additional archaeological investigation will be performed prior to or during construction in accordance with Section 106 regulations. A scope of work will be prepared in consultation with LPC and SHPO, and this further phase of archaeological work would include testing and/or monitoring conducted in consultation with LPC and SHPO and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The testing and/or monitoring would not be done during the EIS process but would occur before and/or during project construction. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidance in the *CEQR Technical Manual*. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that worked be halted until the tribe is notified and the artifact can be evaluated by an archaeologist.

ARCHITECTURAL RESOURCES

The City, in consultation with LPC and SHPO, would develop and implement CPPs for the following architectural resources, or portions of multi-building resources, located within 90 feet of project construction: the FDR Drive (#1, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible) to avoid inadvertent construction-period damage to these architectural resources. The development and implementation of the CPPs will be stipulated in the PA. In addition, as will be stipulated in the PA, an effort would be made to design the floodwalls that would be located adjacent to the Asser Levy Public Baths (#12, NYCL, S/NR) under the Preferred Alternative and Alternatives 2, 3, and 5, so that they are compatible with the architectural resource, and the design of the floodwalls would be coordinated with LPC. ✷

Chapter 5.5: Urban Design and Visual Resources

A. INTRODUCTION

This chapter considers the potential of the proposed project to affect urban design and visual resources. It has been prepared in accordance with the 2014 *City Environmental Quality Review (CEQR) Technical Manual* methodologies that define urban design as the totality of components that may affect a pedestrian's experience of public space, and visual resources as the connection from the public realm to significant natural or built features, including views of the waterfront, public parks, landmark structures or districts, or otherwise distinct buildings, and natural resources. This chapter has also been prepared in compliance with the New York State Department of Environmental Conservation (NYSDEC) *Assessing and Mitigating Visual Impacts* policy memorandum (DEP-00-2, issued 7/31/00) on assessing and mitigating effects on visual and aesthetic resources.

B. PRINCIPAL CONCLUSIONS

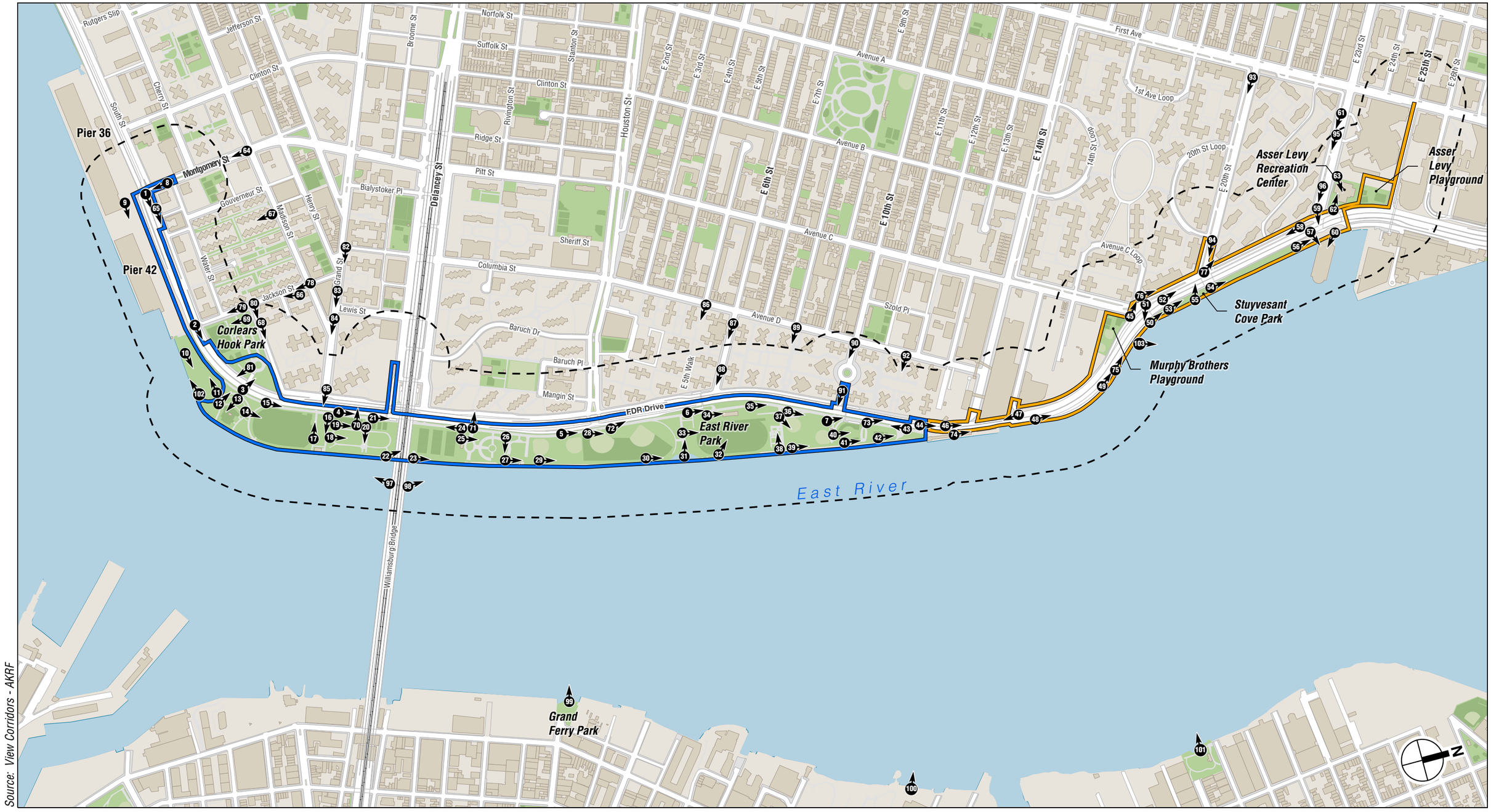
NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, the future condition without the proposed project assumes that no new comprehensive coastal protection system is installed in the project area. However, as described in Chapter 2.0, "Project Alternatives," there are a number of projects planned, projected, or under construction in the project area and 400-foot study area (see **Figure 5.5-1**) that are expected to be complete by 2025. Projects to be built by 2025 within the project area, including the proposed project, aim to enhance recreational resources and access to East River Park, Pier 42, and Stuyvesant Cove Park. Projects within the 400-foot study area include resiliency projects at New York City Housing Authority complexes. The resiliency projects are not likely to change the visual character of the area. Other expected development activity in the No Action condition includes the continuing redevelopment of the Lower East Side with mixed-used development, which is expected to change the visual character of the area by continuing an existing trend of new residential and mixed-use development adding to the area's mix of low and high-rise structures. The full range of planned and potential development projects and proposed actions are provided in **Appendix A1**.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

URBAN DESIGN

It is not expected that the floodwalls and closure structures installed under Alternative 4 would have adverse urban design effects to the southern end of Project Area One, Project Area Two, or the surrounding portions of the 400-foot study area.



Source: View Corridors - AKRF

Project Area One

Project Area Two

Visual Resources Study Area (400-Foot Radius)

Photo View Direction and Reference Number

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

Urban Design and Visual Resources
Analysis Study Area

Figure 5.5-1

In general, the floodwalls, closure structures, and interceptor gate buildings would be new features to the public realm, but they would be installed in locations where there are existing fences and walls and where the Franklin Delano Roosevelt East River Drive (FDR Drive) runs on a viaduct.

Under this alternative, East River Park would be raised and completely reconstructed. While it would have a new design, the park would maintain the visual character of a landscaped, recreational waterfront park with paths, lawns, and athletic fields, and it would add improved entrances to the park from Corlears Hook Park and at Delancey Street, East Houston Street, and East 10th Street.

This alternative would result in a temporary adverse effect from the removal of existing trees in East River Park, and with this alternative 784 of the existing trees in the park would be removed. To lessen that adverse effect, the design of the alternative includes the planting of new trees and the potential transplantation of some existing trees into the raised and reconstructed park. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions.

Although Stuyvesant Cove Park would be reconstructed, which would involve the removal of 45 existing trees, the new design would reference the design of the existing park and would include new trees and multiple planting elements, and there would not be an adverse effect.

While the flyover bridge would be a new urban design feature, it would have beneficial urban design effects by elevating pedestrians and bicyclists above the Con Edison pier and the FDR Drive. In this area, pedestrians and bicyclists would no longer be immediately adjacent to vehicular traffic on the FDR Drive, but would be above it. Further, the flyover bridge would enhance pedestrian and bicyclist safety by bypassing the narrowed walkway.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

The Preferred Alternative would maintain the visual connectivity between the waterfront and the adjacent upland neighborhoods. In Project Area One, the design of East River Park to slope down to the level of the FDR Drive would maintain views of East River Park from the adjacent neighborhoods. However, by raising East River Park, this alternative would potentially block some views of the East River. On Grand Street, views of the East River would be blocked, resulting in a significant adverse impact, but these eastward views would be of East River Park with Brooklyn in the distance. The raised park would block waterfront views in the East 6th Street and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses compared to existing views, but these views would be of a landscaped waterfront park and there would be no potential significant adverse effects to these views. At East 6th and East 10th Streets, views to the waterfront would continue to be of East River Park. From the portions of the FDR Drive and FDR Drive service road that run through Project Area One, views would be of East River Park, similar to existing views, although occasional views of the East River would no longer be available. There are no view corridors to the waterfront between East 13th and East 18th Streets and, therefore, the flyover bridge would not block any views from the study area.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

URBAN DESIGN

As under the Preferred Alternative, it is not expected that the flood protection components of Alternative 2 would have adverse urban design effects to the southern end of Project Area One and the surrounding portion of the 400-foot study area, or in Project Area Two and the surrounding portion of the study area.

Alternative 2 would maintain large portions of East River Park, as would the No Action Alternative, and would install a combination of floodwalls and levees generally along the west edge of the park, creating a hard, visually impermeable edge. However, these resiliency measures would not affect the experience of most users within the park, and it is not expected that this alternative would have overall adverse effects on the visual character of East River Park. Unlike under the Preferred Alternative, the existing Corlears Hook, Delancey Street, and East 10th Street bridges would remain in their existing condition under Alternative 2 and access to the park at those points would not be improved.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

Overall, Alternative 2 would result in a lengthy and monolithic floodwall between the waterfront and the adjacent, upland neighborhoods, reducing the visual connectivity between those neighborhoods and the waterfront and diminishing visual quality. In comparison, the Preferred Alternative would maintain the visual connections between the upland neighborhoods and East River Park. In addition, the levees, floodwalls, and closure structures constructed under this alternative would likely block existing waterfront and East River views in the Cherry Street, Grand Street, East 6th Street, and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, potentially resulting in significant adverse effects. This alternative would also potentially result in significant adverse effects to waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. As with the Preferred Alternative, the flood protection measures constructed in Project Area Two are not expected to result in significant adverse visual effects.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

URBAN DESIGN

Under Alternative 3, the flood protection systems installed at the southern end of Project Area One and in Project Area Two would be similar to those that would be installed under the Preferred Alternative and Alternative 2, and it is not expected that the floodwalls and closure structures would have adverse urban design effects to the southern end of Project Area One, Project Area Two, or the surrounding portions of the 400-foot study area.

With the exception of the removal of 590 trees, it is not expected that Alternative 3 would have overall significant adverse effects on the visual character of East River Park, as the alternative would maintain the park's visual character as a landscaped, waterfront park with paths and recreational facilities, and it would add improved entrances to the park at Delancey, East Houston, and East 10th Streets.

Removal or alteration of certain existing park features would not result in adverse effects to its visual character. Throughout the park, where athletic fields would be moved and, reoriented, they would be replaced, with the exception of Ball Fields Nos. 7 and 8, which will be reoriented and transformed into one multi-use field. At Grand Street, the play area with the multiple seal statues would be replaced with a new water and nature exploration play area. At the northern end of the park, as under the Preferred Alternative, the existing barbecue and picnic area would be removed for the new park-side landing of the reconstructed East 10th Street Bridge and a grassed amphitheater, but a replacement barbecue and picnic area would be located in the immediate vicinity. More trees would be removed throughout East River Park under Alternative 3 than under Alternative 2, and this alternative, like the Preferred Alternative, would result in a temporary adverse effect, but the landscape plan for this alternative includes the planting of new trees to lessen this effect. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions. Views through the park would be altered by this alternative, but the park would retain its overall character of a recreational, waterfront park with paths, lawns, and athletic fields.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

Views to the waterfront would be largely the same with this alternative as with Alternative 2, with reduced visual connectivity between the waterfront and the adjacent, upland neighborhoods, and there would potentially be significant adverse effects from blocked views of the East River on Cherry and Grand Streets; blocked waterfront views in the East 6th Street and East 10th Street view corridors; blocked waterfront views from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses; and blocked waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. On Grand Street, views to the river would be blocked; views would instead be of the redesigned park, which would lessen the impact on this view corridor. As with the Preferred Alternative and Alternative 2, the floodwalls and closure structures constructed in Project Area Two are not expected to result in significant adverse visual effects.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

URBAN DESIGN

The flood protection measures provided in Project Area One under this alternative would be the same as provided under the Preferred Alternative. Therefore, this alternative would result in the same adverse urban design effects to East River Park as the Preferred Alternative and Alternative 3 from the removal of existing trees. Over time, the new tree canopy, comprised of diverse and resilient species, would fill in and would represent an improved habitat over the existing conditions.

In general, it is not expected that Alternative 5 would have adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area. The section of the northbound FDR that would be elevated is a short 6-block-long section primarily adjacent to the Consolidated Edison Company of New York (Con Edison) East River Generating Facility, a portion of the study area where pedestrians are confined to the existing walkway along the Con Edison pier and to Captain Patrick J. Brown Walk. The raised FDR Drive would not adversely affect the pedestrian experience of those users, because they would be elevated above it on the new flyover bridge between East River Park and East 16th Street. Between East 16th and East 18th Streets where users of Captain Patrick J. Brown walk would be adjacent to the elevated

northbound FDR Drive, the raised platform and floodwall would create a buffer between vehicular traffic on the FDR Drive and users of Captain Patrick J. Brown Walk, resulting in beneficial effects to the pedestrian experience. North of the proposed raised platform, the floodwalls and closure structures would be installed in locations where there are existing fences and walls, and where the FDR Drive is elevated on a viaduct.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

In Project Area One, views to the waterfront would be the same with this alternative as with the Preferred Alternative. In Project Area Two, the proposed floodwall along the east side of the raised portion of the FDR Drive would obscure views of the waterfront as seen from the FDR Drive.

MITIGATION

As described above, the Preferred Alternative and Alternatives 2, 3, and 5 could potentially result in significant adverse visual effects by blocking views to the waterfront and East River from multiple locations within the study area. These potential significant adverse effects would not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls, levees and/or vegetated slopes under Alternatives 2 and 3 or not raising East River Park under the Preferred Alternative and Alternative 5 to allow continued views to the waterfront and East River would impair the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, floodwalls are expected to be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls.

C. REGULATORY CONTEXT

The National Environmental Policy Act (NEPA) requires the consideration of visual resources when analyzing the potential effects of a proposed project. In response to NEPA, several Federal agencies have created guidelines for assessing visual resources specific to their projects. However, the U.S. Department of Housing and Urban Development (HUD) has not created specific visual assessment guidelines. Therefore, the NYSDEC guidelines, as detailed below, are being followed for this analysis of visual and aesthetic resources. In addition, the *CEQR Technical Manual* methodology for urban design and visual resources was followed. Therefore, this analysis has been prepared in accordance with NEPA and the State Environmental Quality Review Act (SEQRA), and in consideration of CEQR guidance.

CEQR TECHNICAL MANUAL GUIDELINES

As defined in the *CEQR Technical Manual*, urban design is the totality of components that may affect a pedestrian's experience of public space. These components include the following:

- Streets—the arrangement and orientation of streets define location, flow of activity, street views, and create blocks on which buildings and open spaces are arranged. Other elements, including sidewalks, plantings, street lights, curb cuts, and street furniture, also contribute to an area's streetscape.
- Buildings—a building's size, shape, setbacks, pedestrian and vehicular entrances, lot coverage, and orientation to the street are important urban design components that define the appearance of the built environment.
- Visual Resources—visual resources include significant natural or built features, including important views corridors, public parks, landmarks structures or districts, or otherwise distinct buildings.
- Open Space—open space includes public and private areas that do not include structures, including parks and other landscaped areas, cemeteries, and parking lots.
- Natural Features—natural features include vegetation, and geologic and aquatic features that are natural to the area.

Wind conditions also affect the pedestrian experience of a given area. According to the *CEQR Technical Manual*, the construction of large buildings at locations that experience high wind conditions, such as along the waterfront, may result in an exacerbation of wind conditions due to "channelization" or "downwash" effects that may affect pedestrian safety. Although the proposed project would be constructed along the East River waterfront, it would not involve the construction of tall buildings; therefore, an analysis of pedestrian wind conditions is not warranted.

The *CEQR Technical Manual* suggests that a preliminary assessment of urban design is needed when a project may have an effect on one or more of the elements that contribute to the pedestrian experience described above.

NYSDEC GUIDELINES

NYSDEC has developed a methodology for assessing and mitigating visual effects (DEP-00-2).[1] This policy was developed for NYSDEC review of actions and defines visual and aesthetic effects, describes when a visual assessment is necessary and how to review a visual effect assessment, differentiates state and local concerns, and defines avoidance, mitigation and offset measures that eliminate, reduce or compensate for negative visual effects. The methodology and effect assessment criteria established by the policy are comprehensive and can be used by other state and local agencies to assess potential effects.

According to DEP-00-2, certain variables can affect a viewer's perception of an object or project and the visibility of that object or project in the overall viewshed; these variables include the character of the landscape (existing vegetation, buildings, and topography), size perspective (reduction of apparent size of objects as distance increases), and atmospheric perspective.[2]

[1] DEP-00-2, "Assessing and Mitigating Visual Impacts," July 31, 2000. Accessible at www.dec.ny.gov/docs/permits_ej_operations_pdf/visual2000.pdf.

[2] DEP-00-2 describes atmospheric perspective as the "reduction in intensity of colors and the contrast between light and dark as the distance of the objects from the observer increases." This phenomenon is a

Consequently, according to the NYSDEC guidance, an "impact" would occur when there is a detrimental effect on an aesthetic resource that interferes with or reduces the public's enjoyment of a resource and when the mitigating[3] effects of perspective, such as vegetation, distance, and atmospheric perspective or other designed mitigation, do not reduce the visibility of a project to insignificant levels. However, it is also noted that visibility of a project, even startling visibility, would not necessarily result in a visual impact.

Therefore, while the construction of the proposed project may be visible, that alone is not a threshold of significance. A determination of significance depends on several factors: presence of designated historic or scenic resources within the viewshed of the project, distance, general characteristics of the surrounding landscape, and the extent to which the visibility of the project interferes with the public's enjoyment or appreciation of the resource. A significant adverse visual effect would only occur when the effects of design, distance, and intervening topography and vegetation do not minimize the visibility of an object and the visibility significantly detracts from the public's enjoyment of a resource (e.g., a cooling tower plume blocks a view from a State Park overlook, resulting in a diminishment of the public enjoyment and appreciation of the State Park or an impairment of the character or quality of such a place).[4]

AESTHETIC AND VISUAL RESOURCE INVENTORY

The NYSDEC guidance provides a list of 15 categories of state aesthetic and visual resources that should be evaluated. In addition, the guidance discusses evaluation of local resources. Following the NYSDEC guidance, an inventory of sensitive aesthetic and visual resources was prepared, and the following aesthetic and visual resources have been identified and analyzed to determine the potential effects of the proposed project:

State/National Register of Historic Places

Four properties listed on the State and/or National Register of Historic Places[5] and 13 properties determined eligible for such listing were identified in the study area. Chapter 5.4, "Historic and Cultural Resources," provides a description of these resources:

- FDR Drive, Battery Park underpass to East 125th Street;
- Williamsburg Bridge, across East River Park at Delancey Street;
- East River Bulkhead, Whitehall to Jackson Streets;
- Engine Co. 66 Fireboat House;
- Gouverneur Hospital, 621 Water Street;
- Gouverneur Hospital Dispensary, 2 Gouverneur Slip East;

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product of the natural particles within the atmosphere that scatter light and minimize the significance of the project in the overall viewshed as one moves further away from the project.

[3] DEP-00-2 uses the term "mitigating" or "mitigation" to refer to design parameters that avoid or reduce potential visibility of a project. This should not be confused with the use of the term "mitigation" with respect to mitigation of significant adverse environmental impacts as required by NEPA, SEQRA, and CEQR.

[4] DEP-00-2, "Assessing and Mitigating Visual Impacts," July 31, 2000, page 9. Accessible at http://www.dec.ny.gov/docs/permits_ej_operations_pdf/visual2000.pdf

[5] (S/NR)(16 USC § 470a et seq., Parks, Recreation and Historic Preservation Law § 14.07)

- Lower East Side Historic District, bounded by East Houston, Essex, Allen, and Division Streets, with blocks on East Broadway and Henry and Madison Streets;
- Henry Street Settlement, 263-267 Henry Street and 281 East Broadway;
- Baruch Houses, bounded by FDR Drive and East Houston, Delancey and Columbia Streets;
- Public School 97 (Bard High School Early College), 525 East Houston Street;
- Lavanburg Homes, 126 Baruch Place;
- East River Housing Cooperative, bounded by FDR Drive, and Delancey, Lewis, Jackson and Cherry Streets;
- Rivington Street Baths, located within the Baruch Houses;
- Jacob Riis Houses, bounded FDR Drive, Avenue D, and East 6th and East 14th Streets;
- Stuyvesant Town, bounded by First Avenue, East 14th and East 20th Streets, Avenue C, and FDR Drive;
- Peter Cooper Village, bounded by First Avenue, East 20th and East 23rd Streets, and FDR Drive; and
- Asser Levy Recreation Center (Asser Levy Public Baths), 384 Asser Levy Place.

Of these resources, the proposed project would have the potential to affect the viewshed of the FDR Drive, Fireboat House, Williamsburg Bridge, Gouverneur Hospital, Gouverneur Hospital Dispensary, Public School 97, East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, Peter Cooper Village, and Asser Levy Recreation Center. There are no views of the State and National Register-eligible portion of the East River Bulkhead from within the study area, and it is not assessed as an aesthetic and visual resource.

New York State Parks

There are no State Parks as defined by New York State Parks, Recreation and Historic Preservation Law § 3.09 identified within the study area.

Heritage Areas

No Heritage Areas, as defined by Article 35, New York State Parks, Recreation and Historic Preservation Law, are located within the study area.

New York State Forest Preserve

All lands within the State Forest Preserve (New York State Constitution Article XIV) are located within the boundaries of the Adirondack and Catskill Parks. Thus, there are no State Forest Preserve lands within the study area.

National Wildlife Refuges

National Wildlife Refuges are defined by the National Wildlife Refuge System Administration Act 16 USC 668dd-668ee and amended by P.L. 105-57. There are no National Wildlife Refuges located within the study area.

State Game Refuges and State Wildlife Management Areas

State Game Refuges and State Wildlife Management Areas are defined by Environmental Conservation Law (ECL) § 11-2105. There are no State Game Refuges or Wildlife Management Areas within the study area.

National Natural Landmarks

There are no National Natural Landmarks (defined by 36 CFR Part 62) located within the study area.

National Park System Recreation Areas, Seashores, Forests

No National Parks (as defined by 16 USC § 1c) are located within the study area.

Rivers Designated as National or State Wild, Scenic, or Recreational

There are no National Wild, Scenic, or Recreational (16 USC Chapter 28) rivers within the study area. Rivers designated by New York State as Wild, Scenic, or Recreational are listed in ECL §§ 15-2713 through 15-2715. There are no State-designated Wild, Scenic, or Recreational rivers within the study area.

Sites, Areas, Lakes, Reservoirs, or Highways Designated or Eligible for Designation as Scenic

Resources identified in Article 49 of the ECL include Scenic Byways (under the purview of New York State Department of Transportation), parkways (designated by the New York Office of Parks, Recreation, and Historic Preservation), and other areas designated by NYSDEC. No designated scenic roads are location within the study area.

Scenic Areas of Statewide Significance

In July 1993, the New York State Department of State designated six Scenic Areas of Statewide Significance in the Hudson River Valley as part of its implementation of the State's Coastal Management Program. There are no Scenic Areas of Statewide Significance in the study area.

State or Federally Designated Trails

There are no state or federally designated trails (as defined by 16 USC Chapter 27) located within the study area.

State Nature and Historic Preservation Areas

There are no State Nature or Historic Preservation Areas (as designated by Section 4 of Article XIV of the New York State Constitution) located within the study area.

Palisades Park

Palisades Park in New Jersey is not located within the study area.

Bond Act Properties Purchased Under Exceptional Scenic Beauty or Open Space Category

No Bond Act properties purchased under the exceptional scenic beauty or open space category were identified in the study area.

Locally Significant Resources

The following resources within the study area have been identified as locally significant:

New York City Landmarks and New York City Landmark-Eligible Properties

- Henry Street Settlement, 263-267 Henry Street and 281 East Broadway
- Gouverneur Hospital Dispensary, 2 Gouverneur Slip East
- Asser Levy Recreation Center, 384 Asser Levy Place

Public Parks

- East River Park
- Stuyvesant Cove Park

D. METHODOLOGY

Based on *CEQR Technical Manual* guidance, the following analysis considers a 400-foot study area around the project area where the proposed project would be most likely to be visible and affect the pedestrian experience and the viewsheds of aesthetic and visual resources (see **Figure 5.5-1**). Due to the dense urban environment, the project area is generally not visible from longer distances. However, this analysis does consider longer views to the project area from within the surrounding inland neighborhoods, the Williamsburg Bridge, and three waterfront parks in Brooklyn—Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park. This analysis addresses the urban design and visual resources of the study area for existing conditions, the future without the proposed project, and the future with the proposed project for the 2025 analysis year, when the proposed project is expected to be completed. To prepare this analysis, information was collected through field visits, visually sensitive locations and viewer groups were identified, and duration of views assessed to determine any potential effects.

In compliance with NYSDEC guidelines, aesthetic resources were identified and a visual assessment conducted. Utilizing visual modeling techniques, the conditions that would be present for the proposed project were assessed as to their relative visual effects from specific viewpoints and distances. This modeling was conducted to provide some indication as to whether any specific viewpoint might be associated with obvious positive or negative visual effects.

Viewer groups are defined as viewers from the project area (e.g., users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park and motorists on the FDR Drive) or viewers of the project area (e.g., residents, pedestrians and bicyclists on local streets, motorists on local streets, and boaters on the East River). Viewers are considered in terms of their sensitivity and view duration, with residents considered among the most sensitive viewers, because they may view the proposed visual change from a stationary viewpoint for the most prolonged periods of time. Motorists on the FDR Drive and local streets, on the other hand, could be less sensitive because they may only experience the proposed visual change for a short duration. Also considered in the analysis is the distance of the observer from the visual change; as the distance increases, the ability of the viewer to see the details of an object decreases. This analysis provides the following:

- A description of the visual character of the project area and study area;
- Identification of key views for the visual assessment;
- Identification of aesthetic/visual resources and viewer groups;
- Evaluation of the visibility of the project area in the study area;
- A description of visible components of the proposed project; and
- Assessment of the visual effects of the proposed project.

Following the methodology of the *CEQR Technical Manual*, urban design impacts are determined "by considering the degree to which a project would result in a change to a built environment's arrangement, appearance, or functionality such that the change would negatively affect a pedestrian's experience of the area." In assessing the significance of a visual resource

impact, key considerations include "whether the project obstructs important visual resources and whether such obstruction would be permanent, seasonal, or temporary; how many viewers would be affected; whether the view is unique or do similar views exist; or whether it can be seen from many other locations."

E. AFFECTED ENVIRONMENT

URBAN DESIGN

The urban design of the project area and study area is described in detail below.

PROJECT AREA

As described in further detail in Chapter 2.0, "Project Alternatives," the proposed project area was divided into two project areas and 16 design reaches (see Figure 2.0-1). Project Area One comprises 10 design reaches and extends from Montgomery Street on the south to the north end of East River Park (or about East 13th Street). The southerly reaches include City streets such as Montgomery and South Streets, as well as a segment under the elevated FDR Drive; however, the majority of Project Area One is within East River Park. Project Area One also includes four existing pedestrian bridges across the FDR Drive to East River Park (the Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges) and the East Houston Street overpass. Project Area Two comprises seven design reaches (Reach J spans both Project Areas One and Two) and extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Con Edison East 13th Street Substation and the East River Generating Station. Murphy Brothers Playground, Stuyvesant Cove Park, street segments along and under the FDR Drive, Asser Levy Playground, Captain Patrick J. Brown Walk, and in-street segments along East 25th Street (see **Figure 5.5-1** for the urban design analysis study area that extends 400 feet from the project area).

RESOURCES WITHIN PROJECT AREA ONE

FDR Drive

The FDR Drive, a multi-lane highway, traverses the full extent of Project Area One through its western edge. South of the project area, the FDR Drive runs on an elevated viaduct. The structure's footings extend down as two rows of regularly spaced columns, and its underside is characterized by steel beams and columns with heavily riveted joints. There is vehicle storage beneath the viaduct. Within Project Area One, the FDR Drive crosses above Montgomery Street, (this provides access to Pier 42 and the southern end of East River Park), and then returns to grade at approximately Gouverneur Slip East. The FDR Drive is then at grade from Gouverneur Slip East through the remainder of Project Area One. Cobrahead lampposts illuminate the roadway, concrete walls and jersey barriers enclose the roadway, and a concrete median with a steel railing divides the north- and south-bound lanes (see **Figure 5.5-2** for photographs of the FDR Drive).

Within Project Area One, there is an overpass and four pedestrian bridges over the FDR Drive, all of which provide access to East River Park from the inland neighborhoods. At Cherry Street, a wide bridge designed to accommodate vehicles connects Corlears Hook Park to East River Park. This bridge does not use any stairs for access; it instead connects to the two parks as a

FDR Drive. View east adjacent to Pier 42 **1**

FDR Drive. View northeast to Corlears Hook Park bridge **2**

ramp over the FDR Drive. Three concrete columns support the bridge from the center median in the FDR Drive, and there are brick piers and abutments within the two parks (see view 2 of **Figure 5.5-2** and view 3 of **Figure 5.5-3** for photographs of the Corlears Hook Park pedestrian bridge). Moving northward, the next pedestrian crossing is at Delancey Street. This narrow, concrete and steel bridge connects to the Delancey Street sidewalk on the west side of the FDR Drive with a long ramp and to East River Park with a ramp that doubles back on itself, as well as with a steep stairway (see view 4 of **Figure 5.5-3**). At East Houston Street, there is a vehicular overpass and interchange between the FDR Drive entrance and exit ramps and East Houston Street. Columns in the FDR median support the wide overpass; inclined, concrete retaining walls frame the entrance and exit ramps. Pedestrians access East River Park via crosswalks on the overpass and ramps down to East River Park (see view 5 of **Figure 5.5-4**). Concrete bulb-outs and a traffic island are located on the overpass. The remaining two pedestrian access points to East River Park are bridges over the FDR Drive at East 6th Street and East 10th Street. These two bridges are similar to the one at Delancey Street. They are narrow, concrete and steel bridges with long ramps to sidewalk grade (see view 6 of **Figure 5.5-4** and view 7 of **Figure 5.5-5**).

Montgomery Street and Pier 42

The section of Montgomery Street between Cherry Street and Pier 42 is located within Project Area One. Montgomery Street runs north-south between Henry Street and South Street. South Street runs east-west parallel to and underneath the FDR Drive from the Battery (beyond the project area) to around Gouverneur Slip East. Montgomery Street has wide sidewalks and a central, landscaped median, and it passes under the FDR Drive to intersect with South Street, entrance and exit ramps to the FDR Drive, and the entrance to Pier 42 (see view 8 of **Figure 5.5-5**). At this location, there are pedestrian crosswalks to Pier 42 and the East River Park service road. Adjacent to Project Area One, two 21-story towers of the Gouverneur Gardens residential complex are located on the east side of Montgomery Street. These brick towers have square footprints and are set back from the street within landscaped grounds. They are ornamented, but some façades have recessed areas that contain balconies. The four-story brick, modernist P.S. 184M Shuang Wen school is located on the west side of Montgomery Street at Cherry Street. The school's paved playground and recreation area lies between the school and South Street. The large outdoor area is enclosed with a tall chain-link fence set on a low concrete wall.

Pier 42 is a former industrial pier abutting the southern end of East River Park that formerly contained a pier shed over the water (see view 9 of **Figure 5.5-6**). The paved upland area north of the former pier shed site is currently under construction for the build-out of Phase One of Pier 42 park. The site is currently surrounded by a chain-link fence.

Also in this portion of Project Area One is the East River Bikeway, which runs along the waterfront between Pier 42 and the FDR Drive. Adjacent to Pier 42, the bikeway is a paved road that continues as a service road into East River Park. South of Project Area One, the bikeway is a striped path beneath the FDR Drive.

East River Park

East River Park is a 45.88-acre park on the east side of the FDR Drive between Jackson Street and East 13th Street. Beginning alongside Pier 42, a service road (that is also the East River Bikeway) runs the full length of East River Park along its western edge adjacent to the FDR Drive. The road is paved and varies in width between 18 and 22 feet. It is edged with concrete

Corlears Hook Park bridge. View northwest to Corlears Hook Park **3**

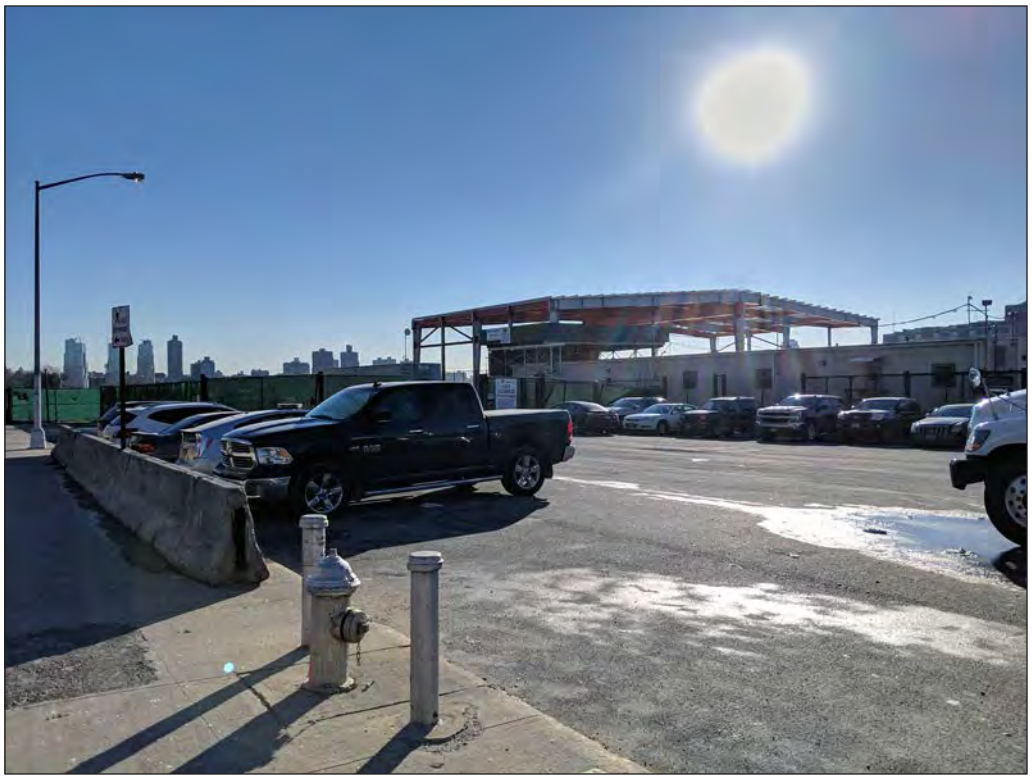
Delancey Street pedestrian bridge, view north **4**

East Houston Street overpass, view north **5**

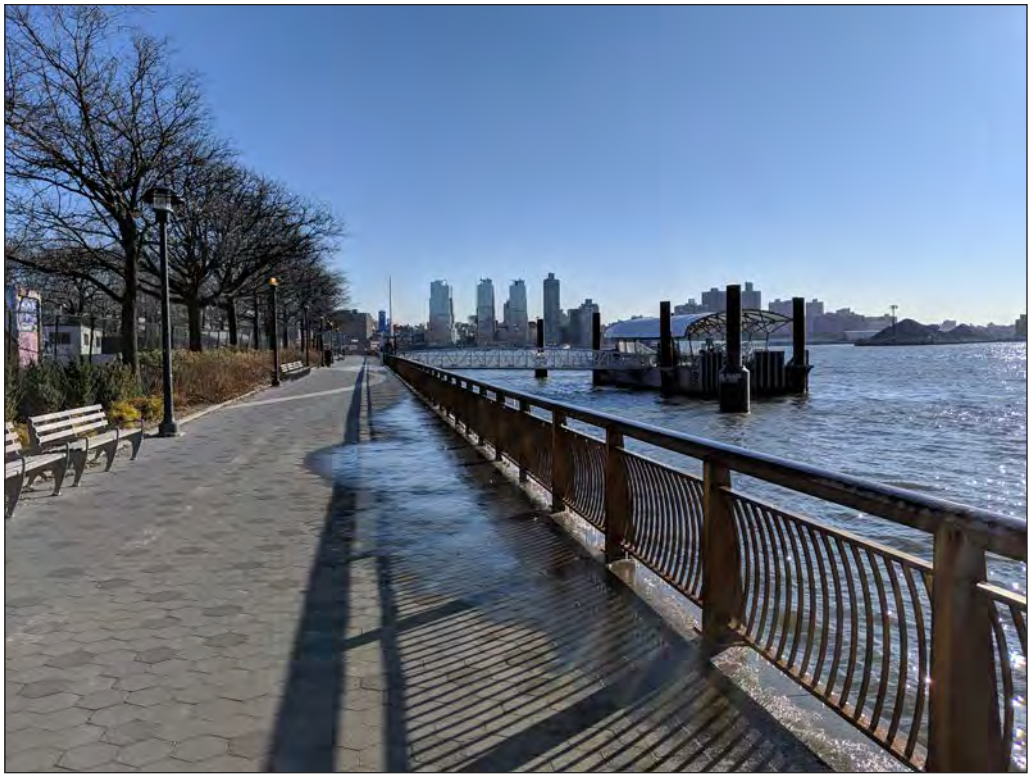
East 6th Street pedestrian bridge, view north **6**

East 10th Street pedestrian bridge, view north **7**

View south on Montgomery Street to Pier 42 **8**



Pier 42, view east **9**



View northeast along esplanade from east of Pier 42 **10**

curbs, and a mix of paved and grassy areas—some containing trees—line the west side of the service road creating a buffer against the FDR Drive. A low concrete wall capped with a decorative metal fence ornamented with the silhouettes of marine animals encloses East River Park along its frontage with the FDR Drive (for photographs of the service road, see view 4 of **Figures 5.5-3 and 5.5-4**).

A wide esplanade with decorative pavers, benches, and fixed tables and chairs runs along the eastern edge of East River Park for its full extent (see view 10 of **Figure 5.5-6** for a photograph of the esplanade at the southernmost end of East River Park). At approximately Rivington Street and at approximately East 5th Street, the esplanade runs inland around small embayments, which are crossed by bridges with grated surfaces. Throughout East River Park, the esplanade provides expansive views north and south on the East River and across to the Brooklyn and Queens waterfronts.

Between the service road and the esplanade, East River Park is laid out with athletic fields and tennis courts, paths with hard and soft surfaces, ornamental lampposts, water fountains, play areas, lawns and flower beds, and picnic areas. Though some trees damaged by Hurricane Sandy have been removed, the park retains extensive tree coverage and mature canopy. Additional built features in the park include an amphitheater and bandshell in the vicinity of Cherry Street, a former Fireboat House at Grand Street (now a comfort station and space occupied by the Lower East Side Ecology Center), comfort stations, and the landings for the pedestrian bridges over the FDR Drive.

The southernmost end of East River Park adjacent to the Pier 42 site is largely paved and currently used for New York City Department of Parks and Recreation (NYC Parks) vehicle storage and staging for park maintenance. It is surrounded by a chain-link fence. The area adjacent to the north is largely surfaced in dirt and used as a composting facility by the Lower East Side Ecology Center; this area contains compost bins and large dirt piles. It is also surrounded by a chain-link fence (see view 11 of **Figure 5.5-7**). On the East River Park esplanade adjacent to the site of the composting facility is a new Citywide Ferry Service ferry landing. The landing design features a barge, barge mooring piles, shelter structure, and gangway. The landing includes a canopy that rises approximately 12 to 15 feet above the barge platform to provide shelter for ferry riders waiting on the barge. The ferry landing infrastructure obstructs the views from East River Park of the Manhattan and Brooklyn Bridges and the Statue of Liberty that are only obtainable within the park from the immediate vicinity of the proposed ferry landing—the portion of the esplanade south of the amphitheater and just north of Pier 42.

Immediately to the north is the East River Park amphitheater. A pedestrian bridge connects the amphitheater to Corlears Hook Park on the west side of the FDR Drive. The amphitheater is built into a slope and is designed with concrete risers and walls and wooden benches (see view 12 of **Figure 5.5-7**). At the performance level, there is a raised stage and concrete bandshell (see view 13 of **Figure 5.5-8**). Paths and grassy lawns with mature trees surround the amphitheater.

A large soccer field and two baseball fields are located between the amphitheater and Grand Street to the north. These athletic fields are enclosed with tall chain-link fences and surrounded by planted areas (see view 14 of **Figure 5.5-8**). Trees border the athletic fields along the service road (see view 15 of **Figure 5.5-9**). At Grand Street, on the north side of the athletic fields, is a water play area and the former Fireboat House occupied by the Lower East Side ecology center (see view 16 of **Figure 5.5-9**). Paved promenades with benches flank the play area and connect the service road with the esplanade. Located on the waterfront in the alignment of Grand Street, the former Fireboat House is a two-story brick Moderne-style building. A metal fence encloses

Lower East Side Ecology Center site, view southwest **11**

Amphitheater, view north **12**

Amphitheater bandshell **13**

Athletic fields north of amphitheater, view north **14**

View north on service road adjacent to athletic fields **15**

Former fireboat house, view east **16**

the Fireboat House, and the grounds contain planted areas and picnic tables at the water's edge. The wide, paved play area contains multiple sprinkler jets set in the ground, rocks that create pool areas, and multiple bronze sculptures of seals at play, crabs, and turtles. The benches have the form of nautical cleats. The westernmost seal, which is freestanding in a small lawn, is visible from Grand Street, as is the water spray from the sprinklers in season (see view 17 of **Figure 5.5-10**). There are also landscaped areas and trees in this location.

Immediately to the north of the water play area are a large lawn encircled with soft-surfaced paths (see view 18 of **Figure 5.5-10**) and a soccer field with artificial turf. Enclosed with a tall chain-link fence, the soccer field is located along the service road (see view 19 of **Figure 5.5-11**). In the vicinity of the Delancey Street pedestrian bridge, an east-west promenade on the north side of the lawn and soccer field connects the service road with the esplanade. There is a decorative metal gate at the entrance to the promenade, which is surfaced with decorative pavers and lined with picnic benches and flower beds (see view 20 of **Figure 5.5-11**). Hurricane Sandy damaged and killed numerous trees in this location that were subsequently removed. Paved basketball courts enclosed with a tall chain-link fence and additional lawns are located between the promenade and the Williamsburg Bridge (see view 21 of **Figure 5.5-12**).

The Williamsburg Bridge is a steel suspension bridge that traverses East River Park at Delancey Street and spans the East River, connecting Delancey Street on the Lower East Side of Manhattan to Marcy Avenue in Williamsburg, Brooklyn. The bridge is designed with two towers located within the East River close to the Manhattan and Brooklyn shorelines, and the span is suspended from four steel cables. On land, metal piers and granite abutments further support the span. Three metal, arched piers are located within Project Area One. The two legs of each arched pier have an open framing system and sit on tall granite-faced footings capped by concrete. A perimeter ring of security bollards encloses the piers within East River Park. The piers of the Manhattan-side tower sit on granite-faced footings within the river. On the west side of the FDR Drive, a granite abutment supports the span as it transitions to a viaduct that meets grade at Clinton Street to the west (for photographs of the Williamsburg Bridge see **Figure 5.5-12**, view 4 of **Figure 5.5-3**, and view 14 of **Figure 5.5-8**).

A tennis center with 12 tennis courts enclosed with a tall chain-link fence is on the north side of the Williamsburg Bride (see **Figure 5.5-13**). Benches and fixed tables are located on the esplanade (east) side of the tennis center, and a one-story Moderne-style comfort station is located on the north side. Two lawns flank the comfort station, and two circular, paved plazas are located to the north (see **Figure 5.5-14**). Benches and trees are found around the plazas. The larger of the two plazas is sunken and painted with a labyrinth, and there is a lawn and rose garden on the plaza's north side. One of the two embayments discussed above is located on the east side of the larger plaza (see view 27 of **Figure 5.5-15**).

Between the embayment located in the vicinity of Rivington Street and the embayment located in the vicinity of East 5th Street are four baseball fields and a soccer field (see view 28 of **Figure 5.5-15** and view 29 of **Figure 5.5-16**). A tall chain-link fence encloses the athletic fields. The East Houston Street overpass connects to East River Park adjacent to this complex. Trees border the athletic fields along the service road. Located to the northeast, the embayment in the vicinity of East 5th Street is similar to the southern one (see view 30 of **Figure 5.5-16**), and it is linked to the service road by a paved promenade (see view 31 of **Figure 5.5-17**). This promenade contains benches and lawns and has dense tree coverage. A small adult fitness yard with fixed equipment is on the north side at the service road.

Grand Street water play area, view west **17**

Lawn adjacent to water play area, view north **18**

Soccer field on south side of promenade, view north **19**

Promenade and picnic area near Delancey Street, view east **20**

Basketball court at Delancey Street, view north **21**

Williamsburg Bridge footings, view northwest from esplanade **22**

Tennis courts, view northwest from esplanade **23**

Tennis courts, view south on park service road **24**

Lawn north of tennis courts, view north on park service road **25**

Labyrinth plaza, view east from park service road **26**

Cove and bridge adjacent to labyrinth plaza, view north **27**

Baseball field at East Houston Street, view northeast from park service road **28**

Ballfield south of East Houston Street, view northwest from esplanade **29**

Cove and bridge in vicinity of East 6th Street pedestrian bridge, view north **30**

Promenade, seating areas, and exercise yard near East 6th Street bridge, view west **31**

Athletic fields at East 6th Street, view west from esplanade **32**

A soccer field and running track enclosed by a tall chain-link fence is to the north between approximately East 5th and East 8th Streets (see view 32 of **Figure 5.5-17**). There is a grove of trees on the south side of the soccer field (see view 33 of **Figure 5.5-18**), and a Moderne-style maintenance building and comfort station fronts on the service road near the landing of the East 6th Street pedestrian bridge over the FDR Drive (see view 34 of **Figure 5.5-18**). In this area, there are numerous trees along the service road, continuing to the East 10th Street pedestrian bridge (see view 35 of **Figure 5.5-19**).

In the vicinity of the East 10th Street pedestrian bridge, there are two baseball fields, lawns, and a paved promenade between the service road and the esplanade. Tall chain-link fences enclose the baseball fields; concrete bleachers site outside the fences (see view 36 of **Figure 5.5-19** and view 37 of **Figure 5.5-20**). The promenade and lawns have dense tree coverage and contain benches and fixed tables (see view 38 of **Figure 5.5-20**). In contrast, the esplanade adjacent to the baseball fields has little vegetation (see view 39 of **Figure 5.5-21**).

The northernmost end of East River Park between approximately East 10th and East 13th Streets contains a comfort station, playground, a barbecue and picnic area, a basketball court, and a seating area. Metal fences enclose the paved playground, which contains play equipment, a sprinkler, and benches (see view 40 of **Figure 5.5-21**). The area immediately to the north contains fixed barbecues, picnic tables, landscaped beds and trees, and a basketball court (see view 41 of **Figure 5.5-22**). At the northern end of the park, where the esplanade transitions to a narrow path alongside the Con Edison East River Generating Facility, there are trees and a grassy area with benches and fixed tables (see view 42 of **Figure 5.5-22 and Figure 5.5-23**).

RESOURCES WITHIN PROJECT AREA TWO

The FDR Drive continues through Project Area Two. It runs at grade to east of Avenue C where it rises to run on a viaduct (see **Figure 5.5-24**). It then declines to East 25th Street where it runs at grade to the north. Entrance and exit ramps to the FDR Drive are located at Avenue C and at East 23rd Street. Both the at-grade and elevated portions of the FDR Drive are similar to the at-grade and elevated portions in Project Area One described above. East of Avenue C, a tall chain-link fence with solid netting encloses the space beneath the FDR Drive viaduct. Between approximately East 13th and East 15th Streets, Project Area Two also contains a Con Edison pier that is part of the East River Generating Facility located on the west side of the FDR Drive and a narrow walkway and combined East River Bikeway sandwiched between the Con Edison pier and the FDR Drive. The walkway is widest at its southern end but is bordered on the east by a tall metal fence that encloses the Con Edison pier (see view 44 of **Figure 5.5-24**). As the walkway runs northward past Con Edison buildings and equipment, it narrows substantially (see **Figure 5.5-25**).

To the north of the Con Edison pier, the walkway opens up to become the Captain Patrick J. Brown Walk (see view 48 of **Figure 5.5-26**). This esplanade along the shoreline, which also serves as the East River Bikeway, has a surface of decorative pavers and contains benches and an ornamental fence along the FDR Drive (see view 49 of **Figure 5.5-26**). The concrete wall supporting the fence is decorated with a band of colorful tiles. The Captain Patrick J. Brown Walk provides expansive river views that include the Queens waterfront, Roosevelt Island and the Ed Koch Queensboro Bridge, and Midtown Manhattan, including views of the United Nations Secretariat and the Empire State Building. The Captain Patrick J. Brown Walk ends around East 20th Street at Stuyvesant Cove Park (see view 50 of **Figure 5.5-27**).

Athletic fields at East 6th Street, view north from adjacent promenade **33**

View north on park service road at East 6th Street pedestrian bridge **34**

View north on park service road to East 10th Street pedestrian bridge **35**

Ballfields south of East 10th Street, view north **36**

Ballfields south of East 10th Street, view northeast **37**

Seating area adjacent to the south of the ballfields, view west from esplanade **38**

View north on esplanade adjacent to ballfields south of East 10th Street **39**

Playground at East 10th Street, view north **40**

Grill and picnic area at East 10th Street, view north on esplanade **41**

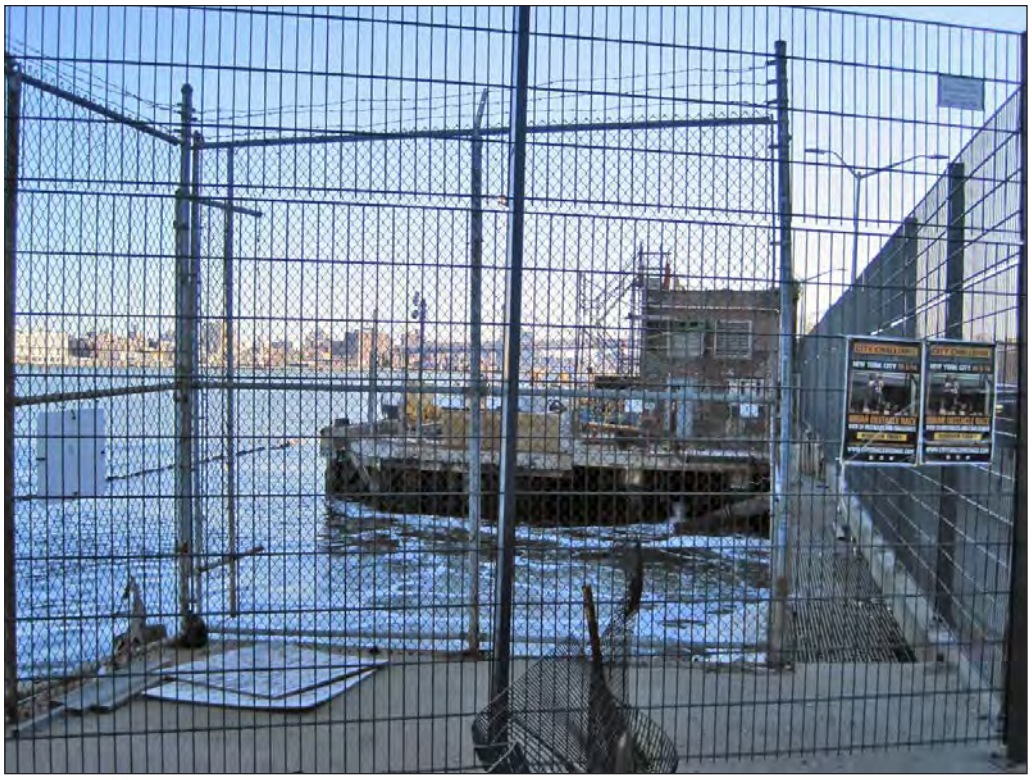
Northern end of East River Park, view north on esplanade **42**

Northern end of East River Park, view south on park service road **43**

Walkway adjacent to Con Ed facility, view north **44**

FDR Drive, view north at Avenue C **45**

Walkway adjacent to Con Ed facility and pier, view north **46**



Con Ed pier near East 14th Street **47**

Captain Patrick J. Brown walk, view north near East 15th Street **48**

Captain Patrick J. Brown walk, view northwest **49**

Southern end of Stuyvesant Cove Park, view north **50**

Entrance to southern end of Stuyvesant Cove Park at Avenue C **51**

Stuyvesant Cove Park is a small and narrow waterfront park located on the east side of the elevated FDR Drive between East 20th and East 23rd Streets. Pedestrian entrances to the park from inland are via crosswalks at East 20th and East 23rd Streets across Avenue C and underneath the elevated FDR Drive (see view 51 of **Figure 5.5-27**). There is public vehicular parking under the viaduct (see view 52 of **Figure 5.5-28**). The East River Bikeway runs along the western side of Stuyvesant Cove Park, where it becomes a dedicated, striped path (see view 53 of **Figure 5.5-28**). Stuyvesant Cove Park is designed with a waterfront esplanade and a landscaped interior section with winding, soft-surfaced paths (see view 50 of **Figure 5.5-27 and Figure 5.5-29**). The park contains benches and fixed tables, vegetation, trees, and pergolas adjacent to the bikeway. The northern end of the park consists of a large paved area with a small building used by Solar One (an environmental education group) for performances and educational programs (see view 56 of **Figure 5.5-30**). Stuyvesant Cove Park includes a recently constructed Citywide Ferry Service landing that features a barge, barge mooring piles, shelter structure with canopy, gangway, and a docked boat. From the immediate vicinity on the esplanade, the ferry landing obscures some views across the East River.

The northern end of Project Area Two also includes the segment of East 23rd Street between the FDR Drive and First Avenue. At the waterfront, a gas station is located adjacent to the north of Stuyvesant Cove Park (see view 57 of **Figure 5.5-30**). On the west side of the FDR Drive at East 23rd Street, there is a Greenstreets median landscaped with boulders, shrubs, and trees (see view 58 of **Figure 5.5-31**). Beneath the FDR Drive viaduct, there is public vehicular parking (see view 59 of **Figure 5.5-31**).

At the foot of East 23rd Street, adjacent to Project Area Two, is the Marine and Aviation Building. This concrete and metal-clad pier structure contains a four-level parking garage, a landing base for seaplanes, and berthing spots for pleasure boats (see view 60 of **Figure 5.5-32**). On the west façade, "Department of Marine and Aviation City of New York" is written in neon signage. Large boulders are set in the paved area in front of the building and the adjacent gas station.

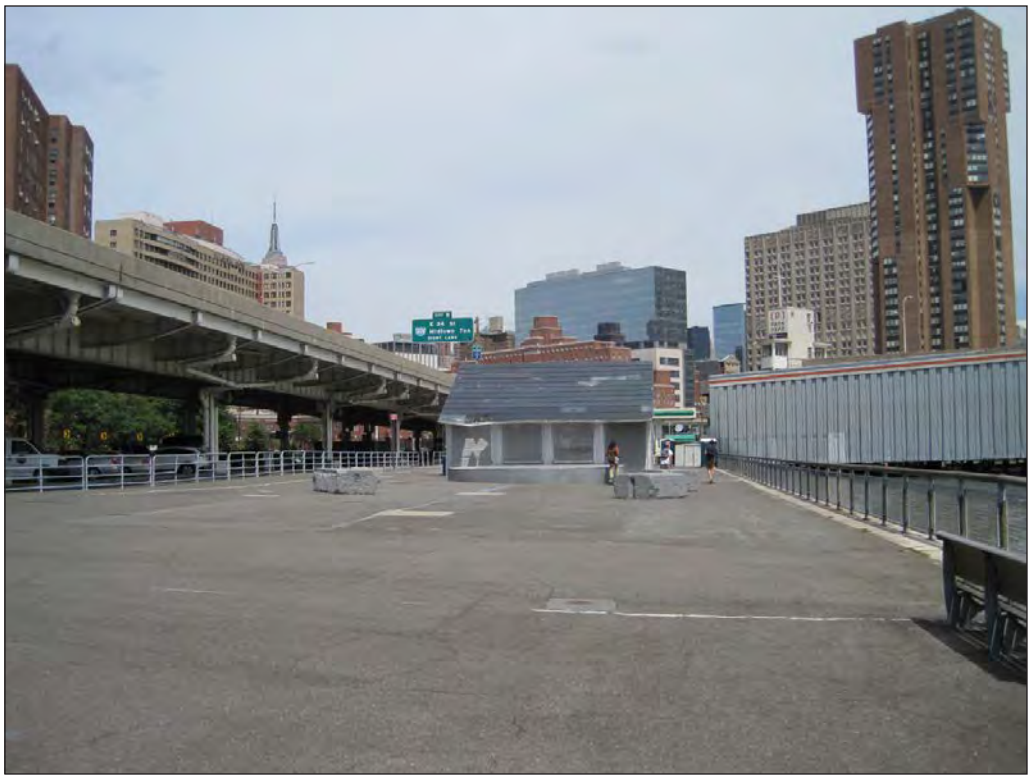
Between the FDR Drive and First Avenue, East 23rd Street is lined on the north by the Asser Levy Playground and the VA Medical Center New York and on the south by the Peter Cooper Village residential complex (see view 61 of **Figure 5.5-32**). Asser Levy Playground contains the Asser Levy Recreation Center (the Asser Levy Public Baths), an outdoor intermediate pool, an outdoor wading pool, and a playground. Although it is a small one-story building with a cruciform footprint, the main (west) façade of the Asser Levy Recreation Center has the monumental façade of a Roman Bath—raised above the street with two flights of stairs, the façade has three arched openings, paired stone columns supporting a heavy stone entablature and cornice, and a balustraded parapet with massive stone urns. The south façade on East 23rd Street is primarily faced in brick with stone trim. There is a tall brick stack above the building's eastern end. The building is set back from East 23rd Street behind a planted area enclosed by a metal fence. The outdoor swimming pool is located at the southeast corner of the building. An approximately 5- to 6-foot-tall plain brick wall capped with a metal fence encloses the pool (see **Figure 5.5-33** for photographs of the Asser Levy Recreation Center). The wall and fence have a total height of approximately 8 feet. The former Asser Levy Place portion of the park includes trees, a concrete ping-pong table, a water fountain, benches and picnic tables, a track, and a playing field at the north end. The playground is located on the north side of the recreation building. It contains play equipment, benches, and trees, and it is enclosed by a tall metal fence. The FDR Drive viaduct, which declines on a ramp between East 23rd and East 25th Streets, blocks views to the waterfront from within the playground. From the outdoor pool, there are

View north under FDR Drive adjacent to Stuyvesant Cove Park **52**

Stuyvesant Cove Park bikeway. View north **53**

Stuyvesant Cove Park esplanade, view north **54**

Stuyvesant Core Park landscaped path, view north **55**



Northern end of Stuyvesant Cove Park, view north **56**

Northern end of Stuyvesant Cove Park and adjacent gas station, view north **57**

Greenstreets adjacent to northern end of Stuyvesant Cove Park, view south **58**

FDR Drive at East 23rd Street, view east **59**

Department of Marine and Aviation Pier, view east **60**

View east on East 23rd Street from First Avenue **61**

Asser Levy Public Baths, view west at FDR Drive and East 23rd Street **62**

Asser Levy Public Baths, view northeast at Asser Levy Place **63**

limited views to the waterfront beyond the gas station at East 23rd Street and the paved northern end of Stuyvesant Cove Park.

The VA Medical Center New York occupies a large site between the former Asser Levy Place, First Avenue, East 23rd Street, and East 25th Street. Set back from the street behind a series of fences and walls, the medical center consists of several freestanding and connected buildings that range in height from 2 to 19 stories. The medical center is faced in brick and terra cotta. The central portion of the medical center has a V-shaped footprint and is set back from and above the street behind a raised sloping lawn and a vehicular drop-off. The bordering wall in this location is a tall brick floodwall with concrete coping. The tall floodwall continues along the medical center's eastern perimeter. The openings in the floodwall are protected by crest gates.

As described in more detail below, Peter Cooper Village consists of 21 buildings ranging in height from 12 to 15 stories on a superblock bounded by East 20th and East 23rd Streets, the FDR Drive, and First Avenue. Along East 23rd Street, the buildings are set back from, and angled to, the street, affording views into the complex. Lining the wide sidewalk along East 23rd Street are narrow strips paved with stone blocks and planted with trees. Metal fences border the Peter Cooper Village complex.

RESOURCES WITHIN 400-FOOT STUDY AREA

In general, the 400-foot study area is defined by the East River, a natural feature that forms the project area's eastern boundary, and by large mid-20th century residential developments. These residential developments create a wall of tall brick, modernist buildings along the FDR Drive between Cherry and East 13th Streets. The FDR Drive, which runs throughout the project area, creates a physical, and in some cases visual, barrier between the waterfront and the bordering residential developments and surrounding inland neighborhoods. The Williamsburg Bridge and the Con Edison East River Generating Facility are also defining features of the study area. Due to the residential developments and the Con Edison facility, many of east-west streets do not run through the study area. The topography of the study area is relatively flat, although the southern portion of the study area is at a higher elevation than the FDR Drive and East River waterfront; both Grand and Jackson Streets slope down to the FDR Drive. The study area is described below in detail from south to north.

The southernmost portion of the study area includes Montgomery Street north to Henry Street. Like the segment within Project Area One, this segment of Montgomery Street has wide sidewalks and a central, planted median (see view 64 of **Figure 5.5-34**). Between Cherry Street and Henry Street are two more towers of Gouverneur Gardens. They, like the two towers to the south on Montgomery Street, are 21-story brick towers with square footprints, little ornamentation, and recessed balconies on some façades. To the east of Gouverneur Gardens is University Neighborhood High School, located at the southwest corner of Monroe and Gouverneur Streets. It is five stories in height, rectangular in form, and designed in a Renaissance Revival style. On the west side of Montgomery Street between Cherry and Madison Streets is the eastern portion of the LaGuardia Houses. Only the eastern block, which contains 4 of 10 buildings, is located within the study area. Laid out in a "tower-in-a-park" plan common to mid-20th century public housing developments, the freestanding brick buildings have unornamented façades and X-shaped footprints surrounded by landscaped grounds. The four buildings on the eastern block are 20 stories. The four-story, brick-clad New York City Center for Space Science Education is located on the west side of Montgomery Street between Madison

View south on Montgomery Street from Madison Street **64**

View east on South Street from Gouverneur Slip East **65**

and Henry Streets. A paved outdoor recreation area enclosed by a tall chain-link fence is located on the south side of the school.

Within the study area, South Street between Clinton and Jackson Streets is lined on the north by two more Gouverneur Gardens towers and three community facility buildings. Of those buildings, two are architecturally notable—the former Gouverneur Hospital and Gouverneur Hospital Dispensary (see view 65 of **Figure 5.5-34**). The former Gouverneur Hospital is a brick, five-story Renaissance Revival-style structure occupying the full block between Water and South Streets and Gouverneur Slips East and West. Its U-shaped design is composed of a central section on Water Street and two projecting wings that terminate in curved ends with bracketed metal balconies on South Street. The former Gouverneur Hospital Dispensary is located at the northeast corner of Gouverneur Slips East and South Street. The seven-story building is rectangular in form and clad in brick with stone ornamentation. The two Gouverneur Gardens towers are located to the east of the former hospital and dispensary and are identical to the Gouverneur Gardens towers described above; they are set back from South Street behind grassy strips, and a paved plaza with benches and playground equipment is located between the two buildings. Chain-link fencing surrounds the Gouverneur Gardens property. At the northwest corner of South Street and Jackson Street is the six-story St. Rose's Home nursing facility. This modernist building is clad in brick and terra cotta and has a painting of St. Rose on its south façade. A tall brick wall and a chain-link fence enclose a parking lot and rear yard between St. Rose's Home and the easternmost of the two Gouverneur Gardens towers.

North of Water Street, which runs parallel to South Street between Montgomery and Jackson Streets, is a portion of the Vladeck Houses. Occupying an approximately 15-acre site bounded by Henry, Madison, Jackson, Cherry, Water, and Gouverneur Streets, the Vladeck Houses consist of 24 six-story buildings arranged in a zig-zag pattern set at 45 degree angles to the street. Linear parks and playgrounds occupy more than half of the grounds (see **Figure 5.5-35**). Numerous trees are located throughout the Vladeck Houses.

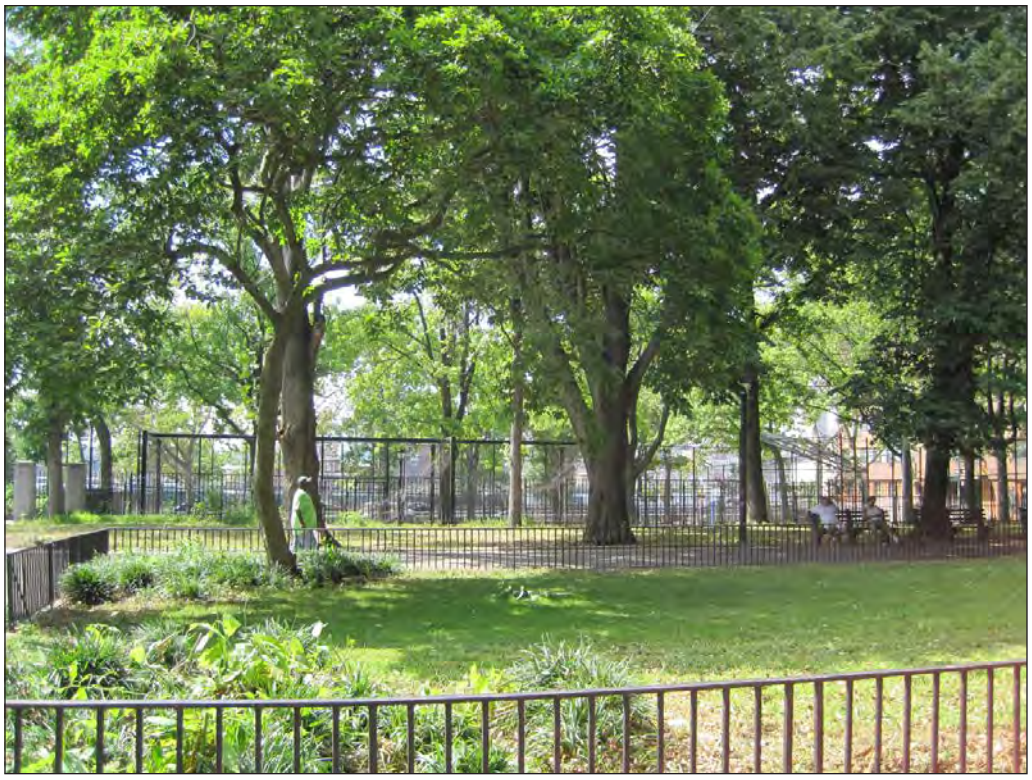
East of Jackson Street and across the FDR Drive from the East River Park amphitheater is Corlears Hook Park. Cherry Street forms the park's northern boundary. As described above, a wide pedestrian bridge connects the two parks. Corlears Hook Park is wedge shaped, and its topography slopes upward from the FDR Drive. Along the FDR Drive frontage are a path lined by trees, athletic fields enclosed by a tall metal fence, a paved playground enclosed by a lower chain-link fence, and sloping lawns. The portion of the park at grade with Cherry Street contains two wide promenades lined by trees and benches, lawns, a small comfort station, a dog run, and a circular flower bed with a tall flagpole (see **Figure 5.5-36**). Low metal fences surround the park along Jackson and Cherry Streets. Although Corlears Hook Park contains many mature trees, it lost a number of trees from Hurricane Sandy. The sidewalk along the south side of Cherry Street is lined by tall trees.

Between Corlears Hook Park and the Williamsburg Bridge at Delancey Street is the East River Housing Cooperative. This residential development consists of four tall residential buildings and one low-rise commercial building on a 12-acre site bounded by Delancey Street, the FDR Drive, and Cherry, Lewis, and Jackson Streets (see view 70 of **Figure 5.5-37**). Grand Street—a wide two-way street with striped bicycle paths and wide sidewalks—bisects the complex. At the eastern end of Grand Street, there are bus shelters on both the north and south sides of Grand Street. The two-story commercial building of the East River Housing Cooperative occupies a triangular parcel occupied by Grand, Madison, and Jackson Streets. The complex also includes two parking lots (one on Delancey Street and one on Cherry Street) and a power plant at the

Vladeck Houses, view southwest on Jackson Street **66**

View south from within Vladeck Houses **67**

View east along Cherry Street adjacent to Corlears Hook Park **68**



View south from within Corlears Hook Park **69**

East River Housing Cooperative, view southwest from East River Park **70**

Baruch Houses, view west from East River Park near tennis courts **71**

corner of Lewis and Delancey Streets. The four residential buildings are nearly identical in footprint and massing, although two are 20 stories and two are 21 stories. Each brick building is arranged into three parallel apartment blocks connected by a central, perpendicular core that contains apartments and the elevators for each section; this massing creates eight bays and four large light courts. The corner apartments of each bay have recessed balconies, and there are larger balconies on the top three floors. Landscaped lawns with mature trees and playgrounds surround the residential buildings. Each parcel of two buildings has a front lawn facing the FDR Drive. Bordered by low metal fences and hedgerows, these lawns contain flower beds and mature trees. The building entrances are set well back behind the lawns and the FDR Drive service road that borders the complex.

The southbound FDR Drive service road runs along the west side of the FDR Drive between Cherry and East 10th Streets. At East Houston Street and at Grand Street, it provides access to and from the FDR Drive. A concrete wall of Jersey barriers separates the service road from the FDR Drive proper, and the service road has a sidewalk along its western edge. On the north side of the East River Park Housing Cooperative is the Delancey Street pedestrian bridge to East River Park. The western landing is in the sidewalk adjacent to the housing complex's Delancey Street parking lot, which is surrounded by a tall chain-link fence.

As described above, the Williamsburg Bridge connects Delancey Street to Brooklyn. Delancey Street is divided into a one-way eastbound section on the south side of the bridge and a one-way westbound section on the north side of the bridge. Sidewalks line both sections. At the base of the massive, granite bridge abutment on the west side of the FDR Drive, there is some street parking and a small remnant of Mangin Street, which used to run north-south through the study area. To the west of the abutment, the bridge roadway is supported by groups of tall columns, the outermost of which are located in the sidewalk on the north side of the section of Delancey Street that runs on the south side of the bridge and in the sidewalk on the south side of the section of Delancey Street that runs on the north side of the bridge. Beneath the bridge between the two sections of Delancey Street are municipal parking and storage areas. Tall chain-link fences capped by barbed wire enclose these large parking lots.

North of the Williamsburg Bridge, there are three large public housing complexes between Delancey Street and East 13th Street. Immediately to the north, the Bernard Baruch Houses are bounded by Delancey Street, the FDR Drive, East Houston Street, and Columbia Street. Baruch Drive runs north-south through the complex, and the eastern end of Rivington Street extends partially into the complex. The Bernard Baruch Houses occupy 27 acres and consist of 17 residential towers of heights between 7 and 14 stories set within landscaped grounds (see view 71 of **Figure 5.5-37**). The free-standing brick buildings have unornamented zig-zagged façades, and they are set back from the surrounding streets and at varying angles to each other. The complex also includes a 23-story senior center and a modernist church at the northeast corner of Columbia and Rivington Streets. In addition, there is an athletic field complex, a vacant former public bath building, and Bard High School Early College, a five-story brick, Collegiate Gothic building, located within the grounds of the Bernard Baruch Houses. The high school and the vacant Renaissance Revival-style public bath building are visible from the FDR Drive service road. Along the complex's FDR Drive service road frontage, there are landscaped lawns surrounded by low metal fences, a playground, and a vehicular drive and pedestrian paths that lead into the complex.

Continuing the wall of tall residential buildings along the FDR Drive between Cherry and East 13th Streets are the Lillian Wald Houses. This development consists of sixteen 14-story

residential buildings on a site bounded by East Houston Street, the FDR Drive, East 6th Street, and Avenue D. The brick buildings have irregular footprints of five bays, and the façades rise without setbacks and with unornamented façades (see view 72 of **Figure 5.5-38**). The freestanding buildings are set within landscaped grounds. Along the FDR Drive service road frontage, there are landscaped lawns surrounded by low metal fences and pedestrian paths, and the easternmost buildings of the complex are located relatively close to the road, more so than the buildings of the Bernard Baruch Houses. The East 6th Street pedestrian bridge to East River Park is located adjacent to the northeast corner of the Lillian Wald Houses. This bridge is accessed by a long ramp within the sidewalk of the FDR Drive service road.

Located across East 6th Street—a narrow, two-way street lined by wide sidewalks—from the Lillian Wald Houses, the Jacob Riis Houses consist of nineteen buildings, ranging in height from six to 14 stories, on a site bounded by East 6th Street, the FDR Drive, East 14th Street, and Avenue D. The brick buildings have either modified H-plans or X-plans, and the façades rise without setbacks and with unornamented façades (see view 73 of **Figure 5.5-38**). The freestanding buildings are set within landscaped grounds. These buildings are set close to the FDR Drive service road, and along that frontage there are landscaped lawns surrounded by low metal fences and pedestrian paths and paved plazas. East 10th Street bisects the complex; a landscaped traffic circle is located in the middle of the street. The East 10th Street pedestrian bridge is located on the north side of the street, and it is accessed by a ramp within the sidewalk of the FDR Drive service road. The north and south sections of the Jacob Riis Houses each have a landscaped mall oriented north-south. The Avenue D Pump Station (a New York City Department of Environmental Protection facility) is located is adjacent to the Jacob Riis Houses at the southeast corner of Avenue D and East 13th Street. It is a large, brick-clad building with a sloping roofline; a concrete silo-shaped structure is located at the building's southeast corner.

The Con Edison East River Generating facility is a large complex on a site bounded by East 13th and East 16th Streets, the FDR Drive, and Avenue C. As described above, the facility also includes a pier on the east side of the FDR Drive. Facing the FDR Drive on East 14th Street are two approximately seven-story brick buildings connected by skybridges (see view 74 of **Figure 5.5-39**). Three tall stacks rise above the northern building. A tall brick wall lines the facility along the FDR Drive between East 13th and East 14th Streets, but the building north of East 14th Street directly abuts the FDR Drive. The eastern end of East 14th Street is enclosed by a chain-link fence capped by razor wire. In the vicinity of East 15th Street at the FDR Drive are a parking lot enclosed by chain-link fence capped by razor wire and a curved glass office building set back from the FDR Drive behind Jersey barriers and fencing. A large, paved parking lot enclosed by tall fencing occupies the northern portion of the facility site between the FDR Drive and Avenue C. Additional buildings and parking lots and equipment sealed off with tall brick walls and fences line Avenue C between East 13th and East 15th Streets. The western end of East 14th Street is enclosed by a tall fence and gate. Con Ed recently implemented resiliency measures at the East River Generating facility that included walls along East 13th and East 14th Streets, raised critical electrical equipment, and increased storm surge and drainage capacities.

Where Avenue C intersects with the FDR Drive, there is a park on the north side of the Con Edison East River Generating facility—Murphy Brothers Playground. Enclosed by a tall, metal fence, this park contains paved areas with seating and playground equipment, trees, and a small athletic field surfaced in grass. The FDR Drive again becomes elevated adjacent to this park. In addition, there is an access ramp to the southbound FDR Drive from Avenue C. Running along the north side of Murphy Brothers Playground, it has solid concrete walls that border the north

Lillian Wald Houses, view northwest from East River Park **72**

Jacob Riis Houses, view northwest from East River Park **73**

Con Ed facility, view north from East River Park **74**

Stuyvesant Town, view west from Captain Patrick J. Brown walk **75**

side of the park. There are no views to the waterfront from within Murphy Brothers Playground, because of the ramp and the fenced area beneath the FDR Drive viaduct at Avenue C.

Stuyvesant Town and Peter Cooper Village dominate the northernmost portion of the study area (see view 75 of **Figure 5.5-39**). Stuyvesant Town occupies a superblock bounded by East 14th and East 20th Streets, the FDR Drive, Avenue C, and First Avenue. The development consists of 35 freestanding, brick buildings of 13 and 14 stories arranged around a central oval. The residential buildings have rectilinear footprints of multiple bays and unornamented façades. Playgrounds and lawns are interspersed throughout the development. On the perimeter, the buildings are set to the street grid, and commercial spaces are located along portions of the First Avenue and East 14th and East 20th Street frontages. On Avenue C, which runs along the west side of the FDR Drive between approximately East 18th and East 23rd Streets, Stuyvesant Town presents a mostly continuous brick wall to the street, except at East 16th and East 18th Streets where there is a U-shaped street with sidewalks that loops through the complex. At the intersections of this street with Avenue C, there are fenced, corner grassy areas with trees and guard kiosks at East 14th and East 18th Streets. Along most of Stuyvesant Town's frontage on Avenue C, there are loading docks and entrances to below-grade parking garages (see view 76 of **Figure 5.5-40**). At this location, Avenue C has a central paved median and a sidewalk with street trees along the frontage with Stuyvesant Town and Peter Cooper Village. Peter Cooper Village consists of 21 buildings ranging in height from 12 to 15 stories on a superblock bounded by East 20th and East 23rd Streets, the FDR Drive, and First Avenue. The buildings of Peter Cooper Village have slab forms and are set at an angle to the street grid, with some buildings set at opposing diagonals to each other. Lawns and recreation areas are located throughout the grounds (see view 77 of **Figure 5.5-40**).

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

The section below first describes views to the waterfront and project area from within the study area and then discusses the study area's aesthetic and visual resources and viewer groups.

VIEWS TO THE WATERFRONT

Following CEQR criteria, views to the waterfront are considered visual resources. In the study area, views to the waterfront and East River Park are variable due to distance and to intervening buildings, the elevated portions of the FDR Drive, and the pedestrian bridges over the FDR Drive to East River Park that screen views. In the southern portion of the study area, views toward the waterfront from Montgomery Street, South Street, Gouverneur Slips East and West, and through the linear parks of the Vladeck Houses are screened by the FDR Drive. In the remainder of the study area, there are no waterfront views on Delancey Street, East Houston Street, East 14th Street, and Avenue C from south of East 18th Street. Views east on Delancey Street are primarily of the Williamsburg Bridge abutment and piers and the Delancey Street pedestrian bridge. East Houston Street does not provide waterfront views, because it slopes upward toward the waterfront to form an overpass and interchange with the at-grade FDR Drive. The Con Edison East River Generating Facility blocks eastward views on East 14th Street, and the elevated FDR Drive blocks northward views on Avenue C from south of approximately East 18th Street, although the Queensboro Bridge is visible in the distance beyond the elevated FDR Drive. The locations within the study area that provide waterfront views are described below.

The best views of the East River and the waterfront are found in the southeastern portion of the study area around Corlears Hook Park and on Grand Street, because this area is slightly elevated

Stuyvesant Town, view northwest on Avenue C **76**

Peter Cooper Village, view northwest at FDR Drive and East 20th Street **77**

compared with the FDR Drive and the waterfront. In the Jackson Street view corridor, there are clear views of the East River and of Brooklyn in the distance (see **Figure 5.5-41**). Cherry Street, adjacent to Corlears Hook Park, provides views across East River Park to the river, Brooklyn, and the Williamsburg Bridge (see view 80 of **Figure 5.5-42** and view 68 of **Figure 5.5-36**). The East River is visible in multiple directions from Corlears Hook Park, a large part of which has a higher elevation than East River Park (see view 81 of **Figure 5.5-42** and view 69 of **Figure 5.5-36**).

From as far west as Henry Street, the wide Grand Street view corridor provides views to the East River. From Henry Street, these views are predominantly of East River Park and Brooklyn, but they also include glimpses of water (see view 82 of **Figure 5.5-43**). Views of the river expand as the viewer moves east along Grand Street and closer to the waterfront (see view 83 of **Figure 5.5-43** and view 84 of **Figure 5.5-44**). At the FDR Drive, views from the foot of Grand Street are expansive, taking in the fireboat house in East River Park, the river, Brooklyn, and the Williamsburg Bridge (see view 85 of **Figure 5.5-44**).

There are some limited ground-level views to the waterfront through and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses. From Columbia Street, there are no views to the waterfront through the Bernard Baruch Houses, but the segment of Mangin Street that connects to East Houston Street (on which Bard High School Early College is located) provides views of East River Park and the Williamsburg Bridge. From Avenue D, East 6th Street and the approximate alignments of East 5th and East 8th Streets provide view corridors to the waterfront through the Lillian Wald and Jacob Riis Houses. The narrow alignment of East 5th Street, which follows a paved drive and parking lot through the Lillian Wald Houses, provides limited views of East River Park (see view 86 of **Figure 5.5-45**). East 6th Street, which runs between the Lillian Wald and Jacob Riis Houses as a mapped street, provides better views that include the river, and the foot of East 6th Street where the pedestrian bridge is located provides more expansive views of East River Park and of Brooklyn (see view 87 of **Figure 5.5-45** and view 88 of **Figure 5.5-46**). The alignment of East 8th Street follows a wide paved path through the Jacob Riis Houses and provides limited East River Park and river views (see view 89 of **Figure 5.5-46**).

East 10th Street, which runs through the Jacob Riis Houses as a mapped street, provides waterfront and Brooklyn views from Avenue D (see view 90 of **Figure 5.5-47**). These views become more expansive closer to the FDR Drive where the pedestrian bridge is located (see view 91 of **Figure 5.5-47**). Views of the river itself, however, are limited in the East 10th Street view corridor. From Avenue D, the alignment of East 12th Street provides narrow, limited views of East River Park (see view 92 of **Figure 5.5-48**).

At the northern end of the study area, the wide view corridors along East 20th and East 23rd Streets provide views of Stuyvesant Cove Park and Brooklyn, but these views are partially obscured by the elevated FDR Drive and only East 20th Street provides limited views of the East River (see view 93 of **Figure 5.5-48, Figure 5.5-49**, and view 96 of **Figure 5.5-50**). Further, the view east on East 23rd Street is of the paved northern end of Stuyvesant Cove Park and includes the adjacent gas station. The FDR Drive and Avenue C between East 18th and East 23rd Streets provide views of Stuyvesant Cove Park. There are no views to the waterfront from Murphy Brothers Playground. From Asser Levy Playground, there are only limited views to the waterfront from the outdoor pool.

The FDR Drive provides expansive views of East River Park, the East River, the Williamsburg Bridge, and the Brooklyn and Queens waterfronts, but these views are limited to motorists, whose views are passing and of short duration. As it runs alongside the at-grade portion of the

View south on Jackson Street from Madison Street **78**

View south on Jackson Street from Cherry Street **79**

View east on Cherry Street from Jackson Street **80**

View southeast from Corlears Hook Park near pedestrian bridge **81**

View east on Grand Street from Henry Street **82**

View east on Grand Street from Jackson Street **83**

View east on Grand Street from Lewis Street **84**

View east at Grand Street and FDR Drive **85**

View east on East 5th Street from Avenue D **86**

View east on East 6th Street from east of Avenue D **87**

View east on East 6th Street near FDR Drive **88**

View east on East 8th Street from Avenue D **89**

View east on East 10th Street from Avenue D **90**

View east on East 10th Street near FDR Drive **91**

View east on East 12th Street from Avenue D **92**

View east on East 20th Street from First Avenue **93**

View east on East 20th Street from near FDR Drive **94**

View east on East 23rd Street adjacent to VA Medical Center **95**

View east on East 23rd Street from near FDR Drive **96**

View south from Williamsburg Bridge **97**

FDR Drive, the FDR Drive service road between Cherry Street and East 10th Street provides expansive views to pedestrians of East River Park, the East River, the Williamsburg Bridge, and the Brooklyn and Queens waterfronts. Avenue C between East 18th and East 23rd Streets, which also runs alongside the FDR Drive, provides views to pedestrians of the East River, but these views are partially obscured by the elevated FDR Drive viaduct.

Additional Views of the Project Area

The Williamsburg Bridge and three waterfront parks in Brooklyn provide public views to the project area. Views of East River Park are expansive from the Williamsburg Bridge, which traverses the park as described above, but they are from a high vantage point (see view 97 of **Figure 5.5-50**, and view 98 of **Figure 5.5-51**). Motorists and bicyclists on the bridge would have brief, passing views; pedestrians would have more focused and prolonged views from the bridge.

Grand Ferry Park and Bushwick Inlet Park in Williamsburg, Brooklyn provide long views to East River Park. Due to distance, the park appears as a ribbon of trees in the foreground of all of the tall, brick residential developments on the west side of the FDR Drive (see view 99 of **Figure 5.5-51**, and view 100 of **Figure 5.5-52**). Individual features of the park are not clearly visible. WNYC Transmitter Park in Greenpoint, Brooklyn provides long views of Project Area Two—Captain Patrick J. Brown Walk and Stuyvesant Cove Park (see view 101 of **Figure 5.5-52**). However, these urban design features are not clearly distinguishable due to distance and only appear as the edge of Manhattan in the foreground of Stuyvesant Town and Peter Cooper Village.

AESTHETIC AND VISUAL RESOURCES

Following the regulatory guidance above, the primary aesthetic and visual resource in the study area is the East River and the East River vista as seen from within the project area. As described above, views of the waterfront and East River are limited from within the study area due to distance and intervening structures. From within East River Park, along Captain Patrick J. Brown Walk, and within Stuyvesant Cove Park, views north and south and across the East River are expansive. From most locations within East River Park, views are of the Brooklyn and Queens waterfronts (see view 10 of **Figure 5.5-6**, view 13 of **Figure 5.5-8**, view 26 of **Figure 5.5-14**, view 27 of **Figure 5.5-15**, and view 30 of **Figure 5.5-16**). East River Park also affords views of the United Nations Secretariat in Midtown Manhattan, the Ed Koch Queensboro Bridge, and Roosevelt Island (see view 39 of **Figure 5.5-21** and view 42 of **Figure 5.5-22**). At the southern end of East River Park in the vicinity of the amphitheater, the curve in the shoreline provides expansive views south into the harbor that include the Brooklyn and Manhattan Bridges, the Lower Manhattan skyline, and the Statue of Liberty (see view 102 of **Figure 5.5-53**). The new ferry landing partially obscures these views. In Project Area Two, there are expansive northward views from Captain Patrick J. Brown Walk of the Queens waterfront, the Ed Koch Queensboro Bridge and Roosevelt Island, and the Midtown Manhattan skyline that includes the United Nations Secretariat and the Empire State Building (see view 103 of **Figure 5.5-53 and Figure 5.5-26**). Stuyvesant Cove Park provides similar views (see view 54 of **Figure 5.5-29**). As described above, the FDR Drive, FDR Drive service road, and a small segment of Avenue C provide similar views of the East River vista.

In accordance with DEP-00-2, the following architectural resources are considered aesthetic and visual resources: the FDR Drive, Williamsburg Bridge, Fireboat House, Gouverneur Hospital, Gouverneur Hospital Dispensary, Lower East Side Historic District, Henry Street Settlement, Public School 97 (Bard High School Early College), Lavanburg Homes, East River Housing

View north from Williamsburg Bridge **98**

View from Grand Ferry Park in Williamsburg, Brooklyn **99**

View from Bushwick Inlet Park in Williamsburg, Brooklyn **100**

View from WNYC Transmitter Park in Greenpoint, Brooklyn **101**

View south from East River Park from south of amphitheater **102**

View north from Captain Patrick J. Brown Walk **103**

Cooperative, Baruch Houses, Jacob Riis Houses, Rivington Street Baths, Stuyvesant Town, Peter Cooper Village, and Asser Levy Recreation Center. The East River Housing Cooperative, Baruch Houses, and Jacob Riis Houses are visible from within the nearby sections of East River Park, but some of these views are screened by trees within the park. The East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, and Peter Cooper Village are also visible from the adjacent segments of the FDR Drive and FDR Drive service road. The primary architectural resource in the study area of which there are clear views from multiple locations is the Williamsburg Bridge. The bridge is prominently visible for long distances from within the project area and along the FDR Drive and FDR Drive service road. It is also visible from additional locations, such as from Cherry Street and from within the Bernard Baruch Houses. Other architectural resources, like the Asser Levy Recreation Center and the Gouverneur Hospital and Dispensary, are only visible from within their immediate vicinities due to intervening buildings.

In accordance with DEP-00-2, East River Park and Stuyvesant Cove Park are considered aesthetic and visual resources. Views of these resources, which are described above, are variable throughout the study area due to intervening buildings and structures and to distance.

VIEWER GROUPS

Viewers from the Project Area

Within the project area, viewer groups include motorists on the FDR Drive and users of East River Park, Captain Patrick J. Brown Walk, Stuyvesant Cove Park, and Asser Levy Playground.

Motorists on the FDR Drive have views of East River Park, Stuyvesant Cove Park, the East River and East River vista, the Williamsburg Bridge, Fireboat House, Gouverneur Hospital, Gouverneur Hospital Dispensary, East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, and Peter Cooper Village. Views of these aesthetic and visual resources are passing and of short duration.

Users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park include pedestrians, bicyclists, fishermen, people engaged in active recreation on the athletic fields and tennis courts, and people engaged in passive recreation like sitting, sunbathing, and picnicking. These viewer groups have expansive views of the East River and East River vista and of the Williamsburg Bridge. They also have views of the FDR Drive, East River Housing Cooperative, Stuyvesant Town, and Peter Cooper Village. From Asser Levy Playground, only users of the outdoor pool have views of the waterfront, but those views are limited and include the FDR Drive viaduct and the gas station at East 23rd Street. Further, views from the outdoor pool are only available during the summer pool season.

Viewers of the Project Area

Viewers of the project area include residents, pedestrians, motorists, bicyclists, and boaters.

In general, residents within view of the project area have stationary, prolonged views of the project area. However, residential viewers would be limited to those living in the large multi-building developments bordering the FDR Drive with apartments facing the waterfront. Residents on the lower floors of buildings facing the waterfront would have close views of the project area and likely of the East River. Residents on higher floors would have more expansive views of the project area and East River vista.

Within the study area, pedestrians on the local streets have variable views of the project area, as described in detail above. In summary, the best views of the waterfront are from the southern portion of the study area. At the northern end of the study area, pedestrians do have views of Stuyvesant Cove Park and Brooklyn, but these views tend to be screened by the elevated FDR Drive and do not include the East River. Users of Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park on the Brooklyn waterfront have views of the project area, but these views are from far away with the result that East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park are not seen in great detail.

Motorists on the local streets have similar views to pedestrians but they are passing views of shorter duration. Boaters on the East River have clear views of the project area, but these views can be from a distance, depending on the location of the viewer on the wide East River. In addition, like motorists, boaters would have passing views of short duration.

F. ENVIRONMENTAL EFFECTS

The alternatives described below and analyzed in this chapter are described in greater detail in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). Planned projects that may affect urban design, views, aesthetic and visual resources, and viewer groups are described below.

URBAN DESIGN, VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

Project Area

Project Area One

At the southern end of Project Area One, NYC Parks is proposing to construct Pier 42 as a public waterfront open space. Under the proposed design, some remaining steel frames from the former pier shed will be reinforced with bracings and painted in red; the pier deck will be fenced off and inaccessible to the public. An upland park area will be constructed with a series of programming elements crisscrossed by walkways. An entry plaza will occupy the western section of the open space on the east part of the Pier 36 apron. Moving eastward through the park, the plaza will be followed by a comfort station, playground, and seating areas nestled within native plantings. The eastern portion of the new open space within East River Park will feature lawns with approximately 7 feet of fill to create a grassy knoll. Solar powered lighting is proposed throughout the park. Access will be provided from the shared-use pathway along the FDR Drive or from Montgomery Street under the elevated FDR Drive on the west and from East River Park on the east. The western entrance at Montgomery Street will be reconfigured to be more accessible and inviting to park users. This project will enhance the pedestrian experience by activating the site with new, public uses, and reestablishing public access to the waterfront at this location. It will have beneficial urban design effects by having removed a derelict pier shed that blocked river views and by removing a surface parking lot and a maintenance yard and replacing them with a landscaped public open space from where there will be new viewpoints for the East River and New York Harbor vistas. Linking East River Park to the East River Esplanade, which is in construction to the south, the Pier 42 project will provide an important

connection for all the communities along this stretch of the East River, and creating a landscaped open space in the place of parked vehicles and a wide expanse of pavement will represent a substantial improvement to the visual character of this portion of Project Area One. The removal of most of the Pier 42 pier shed has opened up views from the study area to surrounding visual resources—the East River, portions of the Esplanade along the river, the Brooklyn and Manhattan Bridges, and the Lower Manhattan skyline.

At the southern end of East River Park adjacent to Pier 42, NYC Parks plans to reconstruct the East River Park composting facility on the approximately one-acre site immediately south of the amphitheater. In conjunction with the Pier 42 project, it is expected that this project will further improve the urban design and pedestrian experience of the southern portion of East River Park by formalizing and containing existing composting components and provide educational and public access opportunities.

The East Houston Street overpass over the FDR Drive is a heavily used bridge that provides pedestrian and bicycle access to East River Park, as described above. It also provides vehicular access between the FDR Drive and East Houston Street. The New York City Department of Transportation recently replaced the bridge deck over the FDR Drive with an improved more pedestrian friendly design.

Project Area Two

At the northern end of Stuyvesant Cove Park, Solar One plans to replace their small facility with an arts and energy education center, referred to as the Solar One Environmental Education Center. By replacing a small, non-descript building set in a large, paved area with a new, green building that incorporates vegetation, the Solar One Environmental Education Center project will have beneficial effects on urban design and the pedestrian experience.

400-Foot Study Area

Pier 35, located at the southwestern boundary of the 400-foot-study area, is currently being reconstructed as a public waterfront open space. The reconstruction is being undertaken as part of NYCEDC's broader East River Waterfront Esplanade Project, which has been enhancing the East River waterfront from Pier 35 to Wall Street. (The first phase—Pier 15—opened in 2011.) A portion of Pier 35 opened in the fall of 2018, and the full Pier 35 project will include picnic tables, outdoor barbecues, an eco-habitat restoration, and possibly a boat launch. Like the Pier 42 project, the Pier 35 project will improve the visual character of its site and immediate area and will enhance the pedestrian experience by activating the site with new, public uses and reestablishing public access to the waterfront at this location.

Hurricane Sandy damaged the three New York City Housing Authority (NYCHA) complexes that border Project Area One—the Bernard Baruch, Lillian Wald, and Jacob Riis Houses as well as Campos Plaza II. To prevent any further damages to these complexes from flooding, NYCHA is proposing resiliency measures for them. At the Bernard Baruch Houses, NYCHA proposes to install a floodwall along the west side of Baruch Drive, individually floodproof the buildings east of Baruch Drive, construct an electrical annex to each building east of Baruch Drive, and construct a new boiler plant in the center of the housing complex. At the Lillian Wald and Jacob Riis Houses, NYCHA is finalizing the floodproofing of each building and constructing an electrical annex to each building. At Campos Plaza II, NYCHA is floodproofing the building and installing stand-by generators. Site restoration is also being undertaken at each housing complex. These projects are undergoing environmental review pursuant to NEPA, and NYCHA is consulting with the New York State Historic Preservation Office (SHPO) regarding the

potential for these resiliency projects to result in adverse effects to the Bernard Baruch, Lillian Wald, and Jacob Riis Houses. Designed as a bench, the 3.5-foot-high floodwall within the Bernard Baruch houses will have beneficial effects on the visual character and pedestrian experience of the housing complex, but will have no effects on the area's urban design and visual resources. The boiler plant will be a new built feature of the Bernard Baruch Houses, but will not have effects on the urban design and visual features of the study area. Likewise, the electrical annexes in each housing complex will have no effects on the area's urban design and visual resources, although they will alter the site plans of the Bernard Baruch, Lillian Wald, and Jacob Riis Houses.

The City of New York proposes to redevelop the block generally bounded by First Avenue, East 25th Street, the FDR Drive, and a private drive (formerly East 26th Street). The Brookdale Campus of Hunter College of the City University of New York is currently vacating the property, and the New York City Department of Sanitation (DSNY) proposes to use the central portion of the block to construct a 4-story garage complex to store equipment and provide personnel support services and operational space. The remainder of the block would be redeveloped pursuant to a request for proposals managed by NYCEDC. This project is undergoing City environmental review, and two development scenarios are proposed for a reasonable worst-case development scenario analysis: a commercial scenario consisting of 82,980 square feet of retail, 82,980 square feet of community facility space, 1,175,640 square feet of office, and 450,000 square feet of manufacturing space; and a mixed-use scenario consisting of 1,176 dwelling units, 82,980 square feet of retail, 82,980 square feet of community facility space, and 450,000 square feet of manufacturing space. This project will transform this block by replacing several, older low- and mid-rise brick buildings arranged around a central open area with a new DSNY garage and operations building in the center of the block and commercial, community facility, manufacturing, and/or residential development at the First Avenue and FDR Drive ends of the block. It will also increase the density of the surrounding neighborhood and add to its mix of uses.

There are a number of projects outside the 400-foot study that will affect the visual character of the larger, surrounding area. NYC Parks is planning improvements to multiple small parks and playgrounds that will have beneficial effects on urban design, views, aesthetic and visual resources, and viewer groups. There are numerous, small residential with ground-retail developments planned or projected in the East Village. Many of these projects are projected developments identified in the 2008 *East Village/Lower East Side Rezoning Final Environmental Impact Statement,* as described in Chapter 2.0, "Project Alternatives," and **Appendix A1**. Finally, there are two large projects that together will add 2,000 new residential units to the area. The One Manhattan Square project currently under construction at 250 South Street, on the east side of the Manhattan Bridge, will consist of two buildings currently under construction—an 80-story building with 800 market-rate apartments and a 13-story building with approximately 200 affordable apartments. Also currently under construction, the proposed Essex Crossing project will introduce an approximately 1.98 million-square-foot mixed-use development on nine sites located along Essex, Grand, and Delancey Streets. Uses will include residential, retail, public market, office, gym, a bowling alley, a movie theater, and community facility. The nine buildings will range in height (to the roof) from 80 feet to 285 feet. There will also be a 15,000-sf publicly accessible open space on Broome Street between Suffolk and Clinton Streets. Overall, these development projects will change the visual character of the area by continuing an existing trend of new residential and mixed-use development and adding to the

area's mix of low-rise and high-rise structures, making the neighborhood more densely developed.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

URBAN DESIGN

Illustrative visual simulations of the Preferred Alternative are shown on **Figures 5.5-55 through 5.5-97** (see **Figure 5.5-54** for a key map to these visual simulations). See **Appendix C1** for the preliminary plans of this alternative.

Project Area One

Illustrative visual renderings of this alternative in Project Area One comparing it to Alternatives 2 and 3 are shown on **Figures 5.5-55 through 5.5-81** (see **Figure 5.5-54** for a key map to these simulations). Additional illustrative renderings of this alternative are shown on **Figures 5.5-98 through 5.5-106**.

FDR Drive, Montgomery Street, and Pier 42

A system of floodwalls and closure structures would be constructed at the southern end of Project Area One. On the north side of Montgomery Street, a floodwall would be located in the sidewalk along the property line of the Gouverneur Gardens residential building at 605 Water Street. This floodwall would be a low, concrete capped I-wall. Toward Water Street, the floodwall would start at grade and would then rise in height to approximately 5 feet above grade at the intersection of Montgomery and South Streets where it would turn the corner onto South Street. On South Street, the floodwall would only be located in front of the southwest corner of the Gouverneur Gardens residential building; it would run in front of less than half of the building's southern façade. To lessen the effect of this floodwall on Gouverneur Gardens and the pedestrian experience, this floodwall could have a curved corner and a planter incorporated into the sidewalk. In addition, the adjacent area within the Gouverneur Gardens property could be graded upward to lessen the height of the floodwall in relation to the ground level. After turning the corner onto South Street, the floodwall would connect to a closure structure across South Street and underneath the FDR Drive viaduct. A floodwall would then run beneath the FDR Drive viaduct along the south side of a paved parking area that is currently enclosed by a chain-link fence. This floodwall would be between approximately 5 and 8 feet tall above grade. Between Gouverneur Slips East and West, a closure structure would be located across the entrance ramp to the FDR Drive, near to where the FDR Drive transitions to grade; from this closure structure, a low concrete capped I-wall would run north along Pier 42 to East River Park. The floodwall along the Pier 42 frontage would be approximately 6 to 8.5 feet above grade. In this area, the existing bikeway/walkway would be reconstructed, and the area between the floodwall and bikeway/walkway would be landscaped with grasses.

It is not expected that the floodwalls and closure structures would have adverse urban design effects to the southern end of Project Area One or the surrounding portion of the 400-foot study area. In general, the floodwalls would be new features to the public realm, but would be located in an area where surrounding residential and institutional properties (including Gouverneur Gardens, the former Gouverneur Hospital, and St. Rose's Home) are enclosed by fences or walls and where the FDR Drive runs on a viaduct. While chain-link fences permit views through them (in contrast to walls), they are enclosures and can be unsightly elements of the streetscape. Therefore, the floodwalls would not have adverse effects on the pedestrian experience. Although

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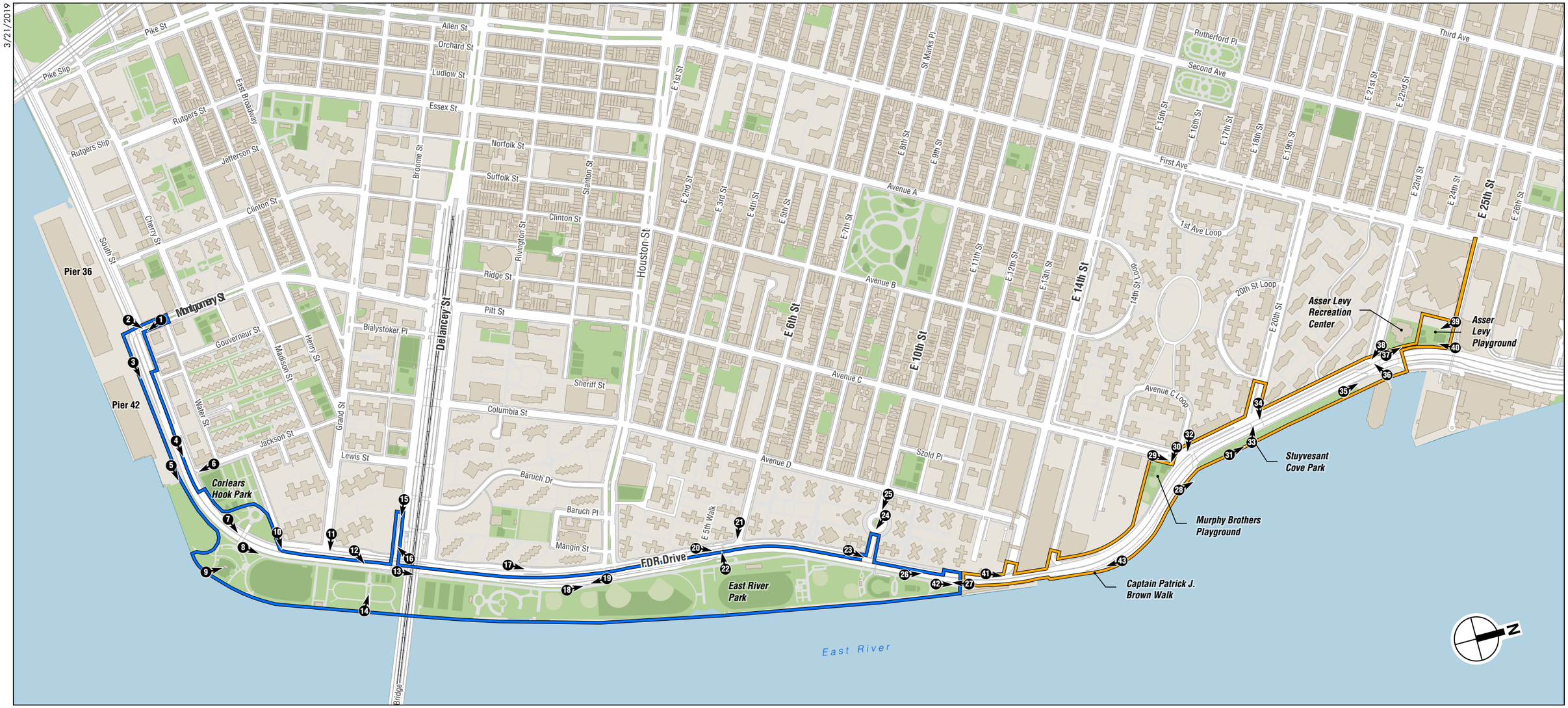


Project Area One

Project Area Two

Photograph View Direction and Reference Number

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

Visual Simulations Key Map

Figure 5.5-54

3.26.19

View 1 — No Action Alternative

View 1 — Alternative 2

View 1 — Alternative 3

View 1 — Preferred Alternative

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

View south on Montgomery Street from Water Street
Figure 5.5-55

View 2 — No Action Alternative

View 2 — Alternative 2

View 2 — Alternative 3

View 2 — Preferred Alternative

View northeast at Montgomery and South Streets

Figure 5.5-56

View 3 — No Action Alternative

View 3 — Alternative 2

View 3 — Alternative 3

View 3 — Preferred Alternative

View east within East River Park from Gouverneur Slip West

Figure 5.5-57

View 4 — No Action Alternative

View 4 — Alternative 2

View 4 — Alternative 3

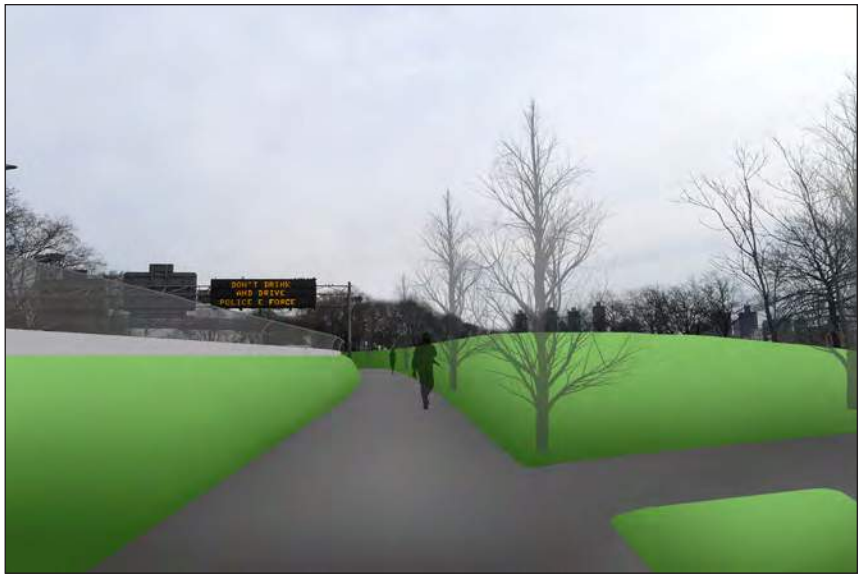
View 4 — Preferred Alternative

View east on FDR Drive west of Jackson Street

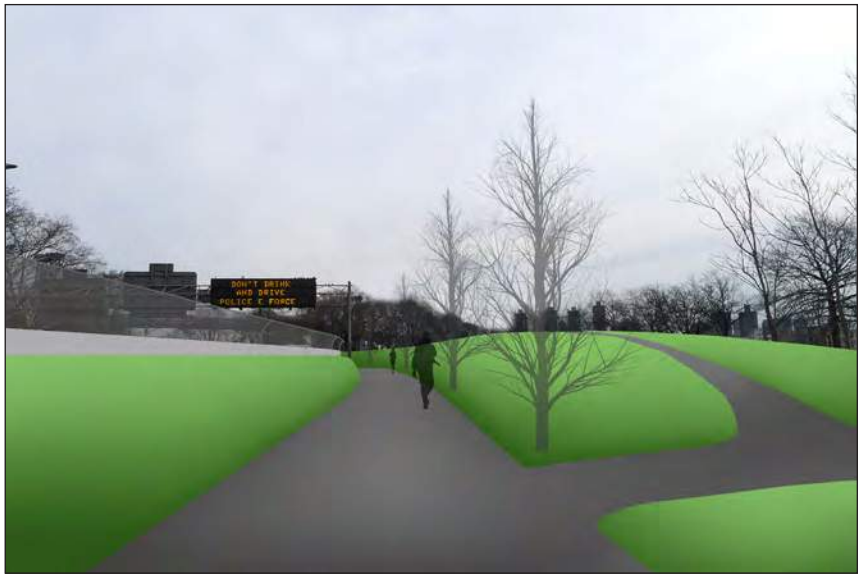
Figure 5.5-58

3.26.19

View 5 — No Action Alternative



View 5 — Alternative 2



View 5 — Alternative 3

View 5 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View east within East River Park near Jackson Street

Figure 5.5-59

3.26.19

View 6 — No Action Alternative

View 6 — Alternative 2

View 6 — Alternative 3

View 6 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View south on Jackson Street from Water Street

Figure 5.5-60

3.26.19

View 7 — No Action Alternative

View 7 — Alternative 2

View 7 — Alternative 3

View 7 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View north on FDR Drive to Corlears Hook Park pedestrian bridge

Figure 5.5-61

View 8 — No Action Alternative

View 8 — Alternative 2

View 8 — Alternative 3

View 8 — Preferred Alternative

View north within East River Park from Corlears Hook Park pedestrian bridge park-side landing

Figure 5.5-62

View 9 — No Action Alternative

View 9 — Alternative 2

View 9 — Alternative 3

View 9 — Preferred Alternative

View north toward amphitheater from East River Park esplanade

Figure 5.5-63

View 10 — No Action Alternative

View 10 — Alternative 2

View 10 — Alternative 3

View 10 — Preferred Alternative

View east on Cherry Street near FDR Drive service road

Figure 5.5-64

View 11 — No Action Alternative

View 11 — Alternative 2

View 11 — Alternative 3

View 11 — Preferred Alternative

View east on Grand Street near FDR Drive service road

Figure 5.5-65

3.26.19

View 12 — No Action Alternative

View 12 — Alternative 2

View 12 — Alternative 3

View 12 — Preferred Alternative

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

View north on FDR Drive to Delancey Street pedestrian bridge
Figure 5.5-66

View 13 — No Action Alternative

View 13 — Alternative 2

View 13 — Alternative 3

View 13 — Preferred Alternative

View north within East River Park at Delancey Street pedestrian bridge park-side landing

Figure 5.5-67

3.26.19

View 14 — No Action Alternative

View 14 — Alternative 2

View 14 — Alternative 3

View 14 — Preferred Alternative

View west from East River Park esplanade to Delancey Street pedestrian bridge

Figure 5.5-68

View 15 — No Action Alternative

View 15 — Alternative 2

View 15 — Alternative 3

View 15 — Preferred Alternative

View east on Delancey Street to new pedestrian bridge street landing

Figure 5.5-69

View 16 — No Action Alternative

View 16 — Alternative 2

View 16 — Alternative 3

View 16 — Preferred Alternative

View southwest on Delancey Street of new pedestrian bridge stair landing

Figure 5.5-70

3.26.19

View 17 — No Action Alternative

View 17 — Alternative 2

View 17 — Alternative 3

View 17 — Preferred Alternative

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

View north on FDR Drive between Rivington and Stanton Streets
Figure 5.5-71

View 18 — No Action Alternative

View 18 — Alternative 2

View 18 — Alternative 3

View 18 — Preferred Alternative

View north to East Houston Street within East River Park near Stanton Street

Figure 5.5-72

3.26.19

View 19 — No Action Alternative

View 19 — Alternative 2

View 19 — Alternative 3

View 19 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View south within East River Park at East Houston Street

Figure 5.5-73

View 20 — No Action Alternative

View 20 — Alternative 2

View 20 — Alternative 3

View 20 — Preferred Alternative

View north on FDR Drive to East 6th Street pedestrian bridge

Figure 5.5-74

View 21 — No Action Alternative

View 21 — Alternative 2

View 21 — Alternative 3

View 21 — Preferred Alternative

View east on East 6th Street near FDR Drive
Figure 5.5-75

View 22 — No Action Alternative

View 22 — Alternative 2

View 22 — Alternative 3

View 22 — Preferred Alternative

View west within East River Park to East 6th Street pedestrian bridge

Figure 5.5-76

View 23 — No Action Alternative

View 23 — Alternative 2

View 23 — Alternative 3

View 23 — Preferred Alternative

View north on FDR Drive to East 10th Street pedestrian bridge

Figure 5.5-77

3.26.19

View 24 — No Action Alternative

View 24 — Alternative 2

View 24 — Alternative 3

View 24 — Preferred Alternative

Capital Project SANDRESM1

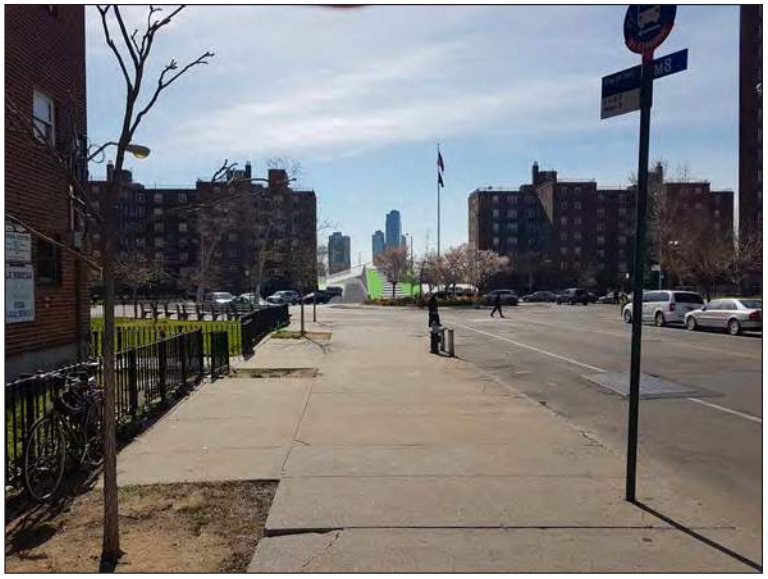
EAST SIDE COASTAL RESILIENCY

View southeast on East 10th Street at traffic circle

Figure 5.5-78

View 25 — No Action Alternative

View 25 — Alternative 2



View 25 — Alternative 3

View 25 — Preferred Alternative

View east on East 10th Street to new pedestrian bridge

Figure 5.5-79

View 26 — No Action Alternative

View 26 — Alternative 2

View 26 — Alternative 3

View 26 — Preferred Alternative

View north within East River Park from East 10th Street pedestrian bridge park-side landing

View 27 — No Action Alternative

View 27 — Alternative 2

View 27 — Alternative 3

View 27 — Preferred Alternative

View south at entrance to East River Park near East 13th Street

Figure 5.5-81

3.26.19

View 28 — No Action Alternative

View 28 — Alternative 2

View 28 — Alternative 3

View 28 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View north on Captain Patrick J. Brown Walk to Stuyvesant Cove Park

Figure 5.5-82

View 29 — No Action Alternative

View 29 — Alternative 2

View 29 — Alternative 3

View 29 — Preferred Alternative

View north on Avenue C at Murphy Brothers Playground
Figure 5.5-83

3.26.19

View 30 — No Action Alternative

View 30 — Alternative 2

View 30 — Alternative 3

View 30 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View east on Avenue C of Murphy Brothers Playground

Figure 5.5-84

3.26.19

View 31 — No Action Alternative

View 31 — Alternative 2

View 31 — Alternative 3

View 31 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View north on Captain Patrick J. Brown Walk East of Avenue C

Figure 5.5-85

View 32 — No Action Alternative

View 32 — Alternative 2

View 32 — Alternative 3

View 32 — Preferred Alternative

View east on Avenue C Loop
Figure 5.5-86

3.26.19

View 33 — No Action Alternative

View 33 — Alternative 2

View 33 — Alternative 3

View 33 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View west in Stuyvesant Cove Park at East 20th Street

Figure 5.5-87

View 34 — No Action Alternative

View 34 — Alternative 2

View 34 — Alternative 3

View 34 — Preferred Alternative

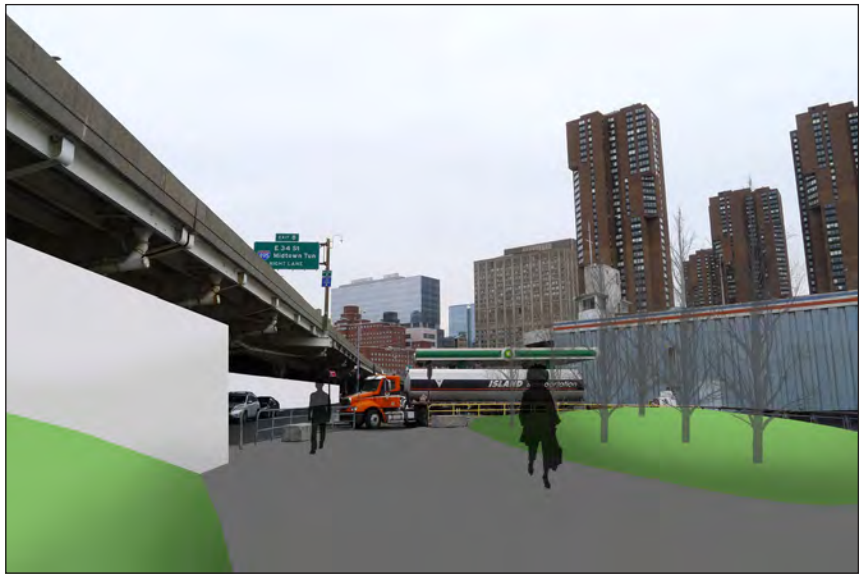
View east on East 20th Street near FDR Drive

Figure 5.5-88

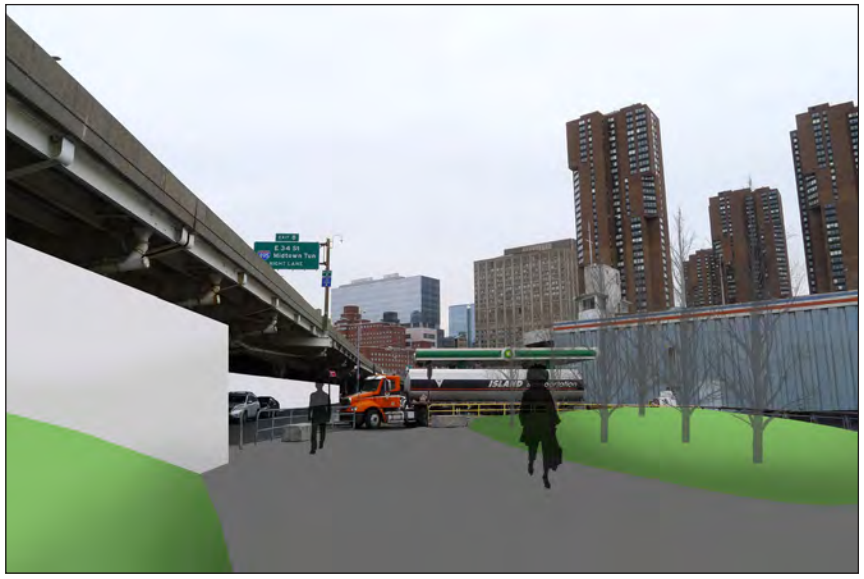
3.26.19

View 35 — No Action Alternative

View 35 — Alternative 2



View 35 — Alternative 3



View 35 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View north in Stuyvesant Cove Park from south of East 23rd Street

Figure 5.5-89

View 36 — No Action Alternative

View 36 — Alternative 2

View 36 — Alternative 3

View 36 — Preferred Alternative

View southwest in Stuyvesant Cove Park at East 23rd Street

Figure 5.5-90

3.26.19

View 37 — No Action Alternative

View 37 — Alternative 2

View 37 — Alternative 3

View 37 — Preferred Alternative

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

View north on Avenue C at East 23rd Street

Figure 5.5-91

View 38 — No Action Alternative

View 38 — Alternative 2

View 38 — Alternative 3

View 38 — Preferred Alternative

View east on East 23rd Street adjacent to Asser Levy Recreation Center

Figure 5.5-92

View 39 — No Action Alternative

View 39 — Alternative 2

View 39 — Alternative 3

View 39 — Preferred Alternative

View south from East 25th Street at Asser Levy Place

Figure 5.5-93

View 40 — No Action Alternative

View 40 — Alternative 2

View 40 — Alternative 3

View 40 — Preferred Alternative

View south on FDR Drive at East 25th Street

Figure 5.5-94

View 41 — No Action Alternative

View 41 — Preferred Alternative

View 41 — Alternative 5

View north on FDR Drive at East 13th Street
Figure 5.5-95

View 42 — No Action Alternative

View 42 — Preferred Alternative

View 42 — Alternative 5

View north within East River Park at East 13th Street

Figure 5.5-96

View 43 — No Action Alternative

View 43 — Preferred Alternative

View 43 — Alternative 5

View south on Captain Patrick J. Brown Walk at East 16th Street

Figure 5.5-97

3.26.19

For Illustrative Purposes Only

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Preferred Alternative:
Proposed Delancey Street Pedestrian Bridge
Figure 5.5-98

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
Reach E at Delancey Street
Conceptual Design
Figure 5.5-99

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
Delancey Street Bridge Landing View South
Conceptual Design
Figure 5.5-100

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
East River Park Bikeway/Walkway Conceptual Design
View North to Grand Street
Figure 5.5-101

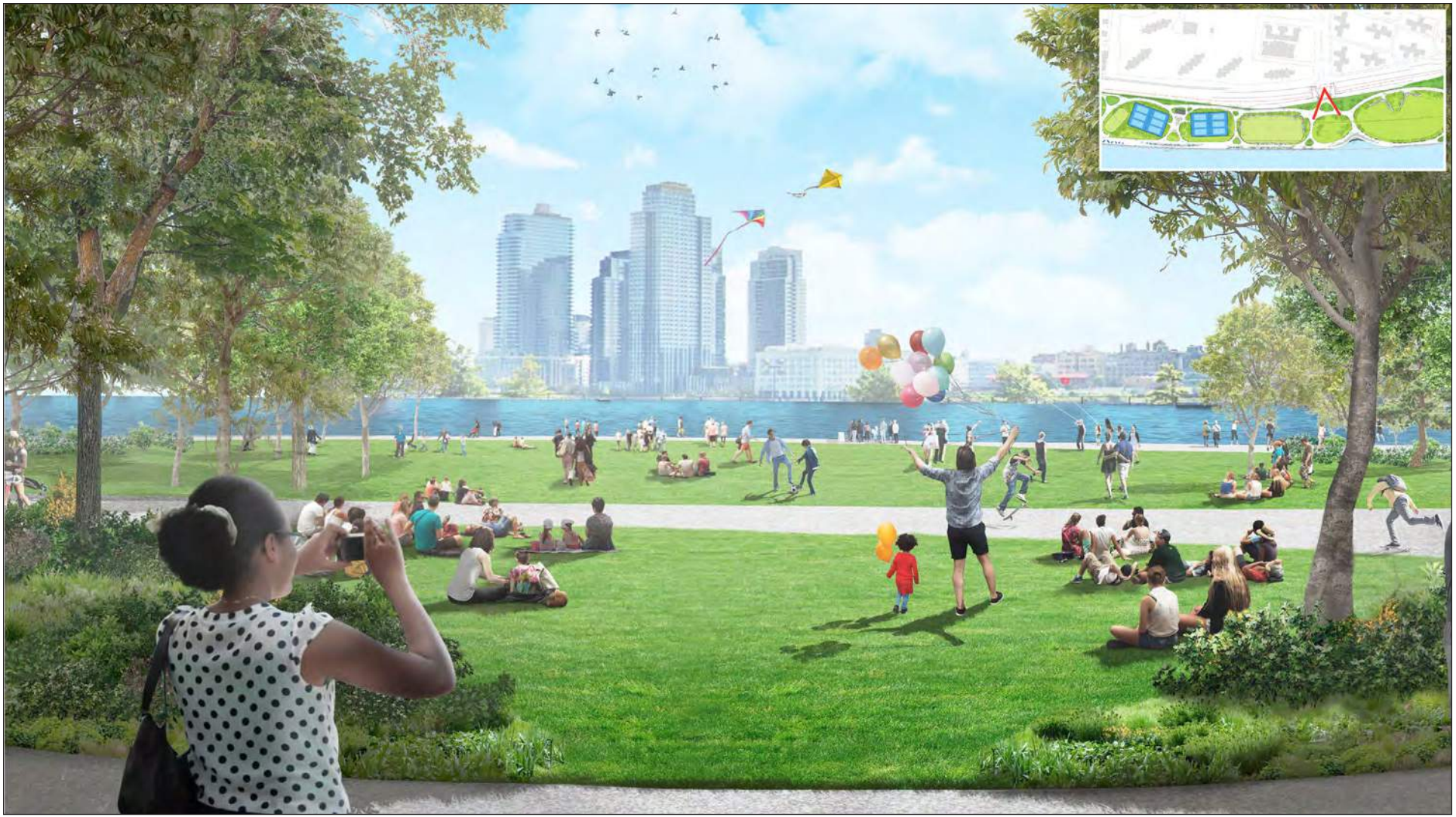
Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
Reach G at East Houston Street
Conceptual Design
Figure 5.5-102

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY



For Illustrative Purposes Only

Preferred Alternative:
East Houston Street Entry
Conceptual Design
Figure 5.5-103

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
Reach H near East 8th Street
Conceptual Design

Figure 5.5-104

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

3.26.19

For Illustrative Purposes Only

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Preferred Alternative:
Proposed East 10th Street Pedestrian Bridge
Figure 5.5-105

3.26.19

For Illustrative Purposes Only

Preferred Alternative:
Reaches I and J near East 12th Street
Conceptual Design

Figure 5.5-106

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

the floodwall adjacent to the Gouverneur Gardens building would create a solid barrier along the adjacent building's Montgomery Street frontage and a short portion of its South Street frontage (replacing an existing chain-link fence), this floodwall would be low in height, rising from grade to approximately 5 feet at its tallest point. The floodwall would not create a visual obstruction or walled off spaces. In addition, the Gouverneur Gardens building is currently surrounded by a chain-link fence of similar height, and the floodwall would not be located in front of the main building entrance, which is on Water Street. It would also not be located in front of the secondary building entrance on South Street. The floodwall under the FDR Drive viaduct would be taller, but there is an existing chain-link fence in this location that secures the paved parking area under the FDR Drive. The floodwall along the Pier 42 frontage would be a low wall that would create a barrier between the new park and the FDR Drive. Landscaping and the reconstructed bikeway/walkway would soften the relationship between the park and the new floodwall. Further, the eastern portion of Pier 42 will be a grassy knoll that rises about 7 feet.

As part of the drainage management improvements, an interceptor gate would be constructed on the southern edge of Corlears Hook Park, adjacent to ballfields and the FDR Drive. The interceptor gate would include an above-grade building, which would be approximately 10 feet tall, 50 feet long, and 10 feet wide and would be located adjacent to the park's little-used perimeter path that fronts the FDR Drive. In addition, the building would be built into the existing slope along the park's southern edge, which would minimize its visibility from within Corlears Hook Park. Therefore, this relatively small structure would not have adverse effects on the uses of the park or on the pedestrian experience.

East River Park

The Preferred Alternative would raise and completely reconstruct East River Park. The bulkhead and esplanade would be raised and the park would slope down to the FDR Drive. The bikeway/walkway would continue to be located along the park's western edge fronting the FDR Drive, although the alignment would be less linear than that of the existing bikeway/walkway. The design of this alternative would create a soft, green edge to the park, and the existing decorative fence along the park's western frontage would remain or be replaced with a similar type fence to maintain a visually porous edge to the park. While having a completely new design, East River Park would maintain the character of a landscaped, recreational waterfront park with paths, lawns, and athletic fields. New tennis courts, fields, a track, and lawns would be located in the approximate locations of those existing facilities. The proposed design would also include embayments like the existing park. The Preferred Alternative would replace the existing fixed-seating amphitheater and bandshell with a multi-use amphitheater lawn with stepped seating and stage (see **Figure 5.5-63**). This multi-use lawn would continue to provide a facility for performances, while adding greenery to the park. The existing water play area in front of the fireboat house would be replaced with a new water play area and nature play area. The fireboat house would be retained, and low raised landscape features would be constructed around its west frontage. Along the esplanade, there would be stepped seating areas to provide additional locations for passive recreation and waterfront views, and the new comfort station for the tennis courts would be designed with amphitheater-style seating facing the East River.

At East Houston Street, there would be the creation of a park-side plaza landing at the East Houston Street overpass, where the raised park would meet the elevation of the overpass. Pedestrians and bicyclists would have improved access to the park, as they would no longer have to go down ramps, but would simply walk or bike into the park. This new park feature would create a welcoming, green entrance to the park where there are currently fenced ballfields.

To further improve access to the park, the Preferred Alternative would replace the Corlears Hook, Delancey Street, and East 10th Street bridges. All three bridges would have simple structures with arched top chords and integrated fencing. The Corlears Hook Bridge would be located in the same location as the existing bridge, but it would have a more gentle and curved access approach within Corlears Hook Park. At Delancey Street, the new pedestrian bridge span over the FDR Drive would be located approximately 150 feet south of the existing span, and the park-side landing would gently connect to the raised park and transition to the pathways that lead to the reconstructed bikeway/walkway. On the west side of the FDR Drive, the reconstructed Delancey Street pedestrian bridge would have, like the existing bridge, a ramp along Delancey Street, but it would be wider, have a more gentle slope, and would run further down Delancey Street (see **Figure 5.5-69**). In addition, there would be a separate set of stairs down to the FDR Drive service road on the south side of Delancey Street (see **Figure 5.5-70**).

The new pedestrian bridge at East 10th Street would be located approximately 50 feet south of the existing span, and it would be wider. On East 10th Street, the bridge landing would be a switchback ramp (see **Figures 5.5-78 and 5.5-79**). The ramp and stairs down to East 10th Street at the existing traffic circle would be planted, and there would be stepped seating. The park would be raised to meet the elevation of the bridge, which would be approximately 18 feet above grade. At the park-side landing, the raised park would be designed with a lawn, and to accommodate the new bridge landing, lawn, and paths into the park, the existing comfort station and barbecue and picnic area would be removed, but they would be replaced. The existing basketball court would be removed, and a new playground would be constructed. There would also be new lawns in this area. North of the new East 10th Street pedestrian bridge, a combination of floodwall and raised park would transition to a floodwall (see **Figures 5.5-80 and 5.5-81**).

Overall, the Preferred Alternative would not result in a significant adverse impact to East River Park. However, the Preferred Alternative would result in a temporary adverse impact from the removal of existing trees throughout the entirety of East River Park (see Table 5.6-13 in Chapter 5.6, "Natural Resources," for a summary of tree effects under the Preferred Alternative). To lessen that adverse effect, the design of the alternative includes the planting of new trees and the potential transplantation of some existing trees into the raised and reconstructed park.

Project Area Two

At the southern end of Project Area Two, closure structures would be placed across the FDR Drive to connect the floodwall at the northern end of East River Park to a new floodwall on the west side of the FDR Drive between approximately East 12th and East 13th Streets. This floodwall would be a concrete capped I-wall in the sidewalk adjacent to the northeast corner of the Jacob Riis Houses. It would be approximately 8-feet-tall above grade and would connect to the floodwalls that will be constructed independently around the East River Generating Facility. Further, closure structures would be installed across the eastern end of East 14th Street as a connection between the floodwalls that will be constructed independently to protect the East River Generating Facility. The Preferred alternative includes a bikeway and pedestrian flyover bridge over the existing narrowed walkway adjacent to the Con Edison pier (see **Figures 5.5-95 through 5.5-97**). The flyover bridge would connect East River Park to Captain Patrick J. Brown Walk. As currently contemplated, the proposed flyover bridge would be a steel thru-truss superstructure supported on footings placed adjacent to the eastern edge of the northbound FDR Drive lanes, within the limits of the existing East River Bikeway. The proposed flyover bridge would be cantilevered over the northbound FDR Drive. The thru truss bridge would be

approximately 1,000 feet long and 15 feet wide and approximately 19 feet tall from the surface of the bridge deck to the top of the truss. The bridge would have a 16-foot minimum clearance above the elevated roadway between East 13th and East 15th Streets adjacent to the Con Edison pier. The total height of the flyover bridge would be approximately 40 feet above grade. The flyover bridge would slope down to connect to East River Park on the south and to Captain Patrick J. Brown Walk around East 16th Street on the north.

From the East River Generating Facility to Avenue C, including alongside Murphy Brothers Playground, a floodwall would be installed along the west side of the FDR Drive. This floodwall would be a concrete capped I-wall, approximately 8-feet-tall above grade. At Avenue C, a floodwall and closure structures would be constructed under the FDR Drive, which becomes elevated adjacent to Murphy Brothers Playground, to Stuyvesant Cove Park. The floodwall underneath the FDR Drive would have a height of 10 feet above grade. The Preferred Alternative also includes the redesign of Murphy Brothers Playground to provide more greenery and to lessen the impact of the adjacent floodwall as experienced within the park.

Stuyvesant Cove Park would be reconstructed as a raised landscape. The bikeway along the western side of the park beneath the FDR Drive viaduct would remain, as would the esplanade along the bulkhead. The crest of the raised landscape would be 8.5 feet above grade and 12 feet wide. From the crest, the raised landscape would slope down to the bikeway and to the esplanade. The raised landscape would be designed to reference the existing park plan with a winding path along the crest, seating areas, a plaza area, and varied landscaping. Numerous existing trees would be removed, but the landscaping plan includes the planting of new trees (see Table 5.6-6 in Chapter 5.6, "Natural Resources," for additional detail on tree effects in Project Area Two). The design of Stuyvesant Cove Park accommodates the Solar One Environmental Education Center project; the raised landscape would taper off around the west side of that new facility, which would front directly on the esplanade.

At the northern end of Stuyvesant Cove Park, there would be a combination of closure structures and floodwalls in front of the adjacent gas station and Marine and Aviation Building. There would continue to be vehicular access to these facilities. Floodwalls and closure structures would be installed underneath the FDR Drive to the Asser Levy Playground. A floodwall would then be installed along the east side of the Asser Levy Playground, turning inland just north of Asser Levy Recreation Center where a closure structure would span the former Asser Levy Place, tying into the VA Medical Center. The floodwalls would be adjacent to the outdoor swimming pools, which is currently enclosed by a plain brick wall and metal fence, and the playground, which is enclosed by a tall metal fence.

On East 20th Street near Avenue C, an interceptor gate would be constructed as part of the drainage management improvements. The interceptor gate would include an above-grade building located in the median of East 20th Street near the building at the northeast corner of Stuyvesant Town. The interceptor gate building would be approximately 10 feet tall, 50 feet long, and 10 feet wide.

In general, it is not expected that the Preferred Alternative would have adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area. The floodwalls and closure structures alongside, across, and under the FDR Drive would be installed in locations where there are existing fences, railings, jersey barriers, or walls and where the FDR Drive is elevated on a viaduct. Further, the floodwalls would not create enclosed, completely walled off areas, corners, or other dead-end areas. The floodwalls would block views, but only in one direction, e.g., park users on the east side of the floodwall at the northern end of Stuyvesant

Cove Park would have blocked views west to the FDR Drive and Peter Cooper Village, but they would have unobstructed views to the north, east, and south. Therefore, they would not have adverse effects on the pedestrian experience. The floodwall adjacent to the northeast corner of the Jacob Riis Houses would be located in front of the residential building at 152 Avenue D, but would not block an entrance into the complex and the sidewalk in this location ends at the Con Edison East River Generating Station. While the flyover bridge would be a new urban design feature, it would have beneficial urban design effects by elevating pedestrians and bicyclists above the Con Edison pier and the FDR Drive. In this area, pedestrians and bicyclists would no longer be immediately adjacent to vehicular traffic on the FDR Drive, but would be above it. Further, the flyover bridge would enhance pedestrian and bicyclist safety by bypassing the narrowed walkway. Between the East River Generating Station and Avenue C, there is no sidewalk on the west side of the FDR Drive, where there would be a long stretch of floodwall. Although a floodwall would be located along the north side of Murphy Brothers Playground, the park is currently enclosed by tall, metal post and chain-link fences on its eastern edge, and there is an existing FDR Drive entrance ramp with solid walls that abuts this park frontage, blocking most views to the east from within the park. Further, Murphy Brothers Playground would be redesigned, and views into and out of the park along Avenue C would be unaffected. At Avenue C and East 23rd Street, the floodwalls and closure structures would be located under the FDR Drive viaduct where there are paved parking areas. As described above, the parking area under the FDR Drive at Avenue C is enclosed with a tall chain-link fence and solid netting that prevents views into or through the space. In addition, the floodwall along the east side of Asser Levy Playground would replace a section of the brick wall and fence (which have a total height of approximately 8 feet) that encloses the outdoor swimming pool of the Asser Levy Recreation Center. As the proposed floodwall would start north of the main pool and would only be approximately 1 to 2 feet taller than the existing wall and fence that encloses the pool, views into and out of the pool area would be similar, although more obstructed. The small interceptor gate building located in the median of East 20th Street near the large Stuyvesant Town complex would not result in adverse effects to the pedestrian experience. Although Stuyvesant Cove Park would be reconstructed, which would involve the removal of numerous existing trees, the new design would reference the design of the existing park and would include new trees and multiple planting elements.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

Views to the Waterfront

The Preferred Alternative would maintain the visual connectivity between the waterfront and the adjacent upland neighborhoods. In Project Area One, the design of East River Park to slope down to the level of the FDR Drive would maintain views of East River Park from the adjacent neighborhoods. However, by raising East River Park, this alternative would potentially block some views of the East River. On Grand Street, views of the East River would be blocked, resulting in a significant adverse impact in accordance with CEQR criteria, but these eastward views would be of East River Park with Brooklyn in the distance (see **Figure 5.5-65**). The maintenance facility near Grand Street would, however, somewhat detract from waterfront views in this area. The raised park would alter waterfront views in the East 6th Street and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses compared to existing views, but these views would continue to be of a landscaped waterfront park and there would be no potential significant adverse effects to these views. At East 6th and East 10th Streets, views to the waterfront would continue to be of East River Park (see **Figures**

5.5-75 and 5.5-77). From the portions of the FDR Drive and FDR Drive service road that run through Project Area One, views would be of East River Park, similar to existing views, although occasional views of the East River would no longer be available.

The floodwalls, raised landscape, and flyover bridge constructed in Project Area Two would not result in significant adverse visual effects. There are no view corridors to the waterfront between East 13th and East 18th Streets and, therefore, the flyover bridge would not block any views from the study area. The elevated FDR Drive viaduct would continue to dominate views to the waterfront on Avenue C, East 20th Street, and East 23rd Street. With the Preferred Alternative, views on Avenue C and East 20th Street would continue to be of Stuyvesant Cove Park in the background of the FDR Drive viaduct but with sections of visible floodwalls. On East 23rd Street and from the outdoor pool at Asser Levy Playground, the proposed floodwalls would obscure views of the existing gas station and the northernmost tip of Stuyvesant Cove Park.

Additional Views of the Project Area

From the Williamsburg Bridge, which provides expansive views of East River Park, the reconstructed park would not be particularly distinguishable to pedestrians, bicyclists, and motorists compared to the existing park. Overall views of the park from the height of the bridge would not be affected. From Grand Ferry Park and Bushwick Inlet Park in Williamsburg, Brooklyn and from WNYC Transmitter Park in Greenpoint, Brooklyn, distance would diminish the visibility of the Preferred Alternative components to park users. While the flyover bridge would be visible, it would not be prominent due to distance and would be seen in the foreground of the large Con Edison East River Generating Facility. The existing views shown on **Figures 5.5-51 and 5.5-52** illustrate how distance diminishes the visibility of the project area from these locations.

Aesthetic and Visual Resources

The primary aesthetic and visual resource in the study area is the East River vista. While the Preferred Alternative would block some views of the East River itself from within the 400-foot study area, this alternative would preserve views of the East River vista and views from the study area would continue to be of East River Park.

From within East River Park, along Captain Patrick J. Brown Walk, and within Stuyvesant Cove Park, the expansive views north and south across the East River would not be affected. From within the raised East River Park, views would be the same or similar. Along Captain Patrick J. Brown Walk, the floodwalls would be located on the west side of the FDR Drive and views would be unaffected. In addition, the proposed flyover bridge would provide new elevated vantage points for viewing the East River vista. In Stuyvesant Cove Park, views from the esplanade would be unaffected, and the raised landscape would provide new, elevated vantage points for viewing the East River vista.

The Preferred Alternative would also not result in adverse visual effects to any architectural resources, as more fully described in Chapter 5.4, “Historic and Cultural Resources.” There would be no visual relationship between components of the Preferred Alternative and the following aesthetic and visual resources, defined in accordance with DEP-00-2: the Lower East Side Historic District and Henry Street Settlement.

The Preferred Alternative would, for the most part, have limited visual effects on views of the East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, Peter Cooper Village, and Public School 97. From within East River Park, these aesthetic and visual resources would still be prominently visible from within the park, and they would continue to be

visible from other locations within the study area. The Preferred Alternative would have no visual effects on the Williamsburg Bridge.

At the northern end of the Project Area, floodwalls and closure structures would be constructed adjacent to the Asser Levy Recreation Center, which is an aesthetic and visual resource. The floodwalls would be adjacent to the outdoor swimming pool from the 1960s and the playground, which are currently enclosed by plain brick walls and metal fences. Closure structures would be located adjacent to the historic Asser Levy Recreation Center. Therefore, primary views of the Asser Levy Recreation Center from East 23rd Street and Asser Levy Place would not be affected.

As described above, the Preferred Alternative would result in a temporary adverse effect to the visual character of East River Park (which is considered an aesthetic and visual resource) from the removal of existing trees, although this effect would be lessened by the planting of new trees and the potential transplantation of some existing trees into the raised and reconstructed park. However, East River Park would be reconstructed as a landscaped, waterfront park to maintain the visual character of an aesthetic and visual resource. In addition, views of East River Park from within the study area would be maintained. The Preferred Alternative would not result in significant adverse effects on Stuyvesant Cove Park, which is also considered an aesthetic and visual resource.

Viewer Groups

Viewers from the Project Area

Within the project area, viewer groups include motorists on the FDR Drive and users of East River Park, Captain Patrick J. Brown Walk, Stuyvesant Cove Park, and Asser Levy Playground.

Motorists on the FDR Drive have views of East River Park, Stuyvesant Cove Park, the East River and East River vista, the Williamsburg Bridge, Fireboat House, Gouverneur Hospital, Gouverneur Hospital Dispensary, East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, and Peter Cooper Village. Passing motorists' views of East River Park and the East River vista would be similar to those views under existing conditions, although occasional views of the water would no longer be available. Views of the other aesthetic and visual resources from the FDR Drive would be unaffected.

Users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park include pedestrians, bicyclists, fishermen, people engaged in active recreation on the athletic fields and tennis courts, and people engaged in passive recreation like sitting, sunbathing, and picnicking. These viewer groups have expansive views of the East River and East River vista and of the Williamsburg Bridge, views that would be unaffected by the Preferred Alternative. In addition, the proposed flyover bridge would provide new, elevated vantage points for viewing the East River and East River vista. From Asser Levy Playground, only users of the outdoor pool have views toward the waterfront; while those views from within the pool would be more obscured, those views are limited and seasonal and largely of the FDR Drive viaduct.

Viewers of the Project Area

Viewers of the project area include residents, pedestrians, motorists, bicyclists, and boaters.

In general, residents within view of the project area have stationary, prolonged views of the project area. However, residential viewers would be limited to those living in the large multi-building developments bordering the FDR Drive with apartments facing the waterfront. Residents above the first floor of buildings facing the waterfront would mostly have unaffected

views of the waterfront and East River, and residents on higher floors would have more expansive views of the East River vista that would be unaffected by the Preferred Alternative. Residents on the ground floors of buildings facing the waterfront in the Bernard Baruch, Lillian Wald, and Jacob Riis Houses would continue to have waterfront views of East River Park. There are no ground floor apartments in the East River Housing Cooperative.

Within the study area, pedestrians on the local streets have variable views of the waterfront and, pedestrians would continue to have views of the waterfront, although there would be no occasional views of the East River itself. Motorists on the local streets have similar views to pedestrians, but they are passing views of shorter duration. Boaters on the East River have clear views of the project area, but these views can be from a distance, depending on the location of the viewer on the wide East River. In addition, like motorists, boaters would have passing views of short duration. As seen from the river, the raised East River Park and the reconstructed Stuyvesant Cove Park would appear much the same as in existing conditions.

Users of Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park on the Brooklyn waterfront have views of the project area, but these views are from far away (from over 2,000 feet), and it is not expected that the elements of the Preferred Alternative would be clearly visible. The flyover bridge would be visible, but it would not be prominent due to distance and would be seen in the foreground of the large Con Edison East River Generating Facility.

STORM CONDITIONS

In a storm condition, all of the closure structures would be in operation. These closure structures would not block any significant views, and their use would be temporary.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

URBAN DESIGN

Illustrative visual simulations of Alternative 2 are shown on **Figures 5.5-55 through 5.5-94** (see **Figure 5.5-54** for a key map to these visual simulations). See **Appendix C2** for the conceptual plans of this alternative.

Project Area One

FDR Drive, Montgomery Street, and Pier 42

As with the Preferred Alternative, it is not expected that the floodwalls and closure structures installed under Alternative 2 would have adverse urban design effects to the southern end of Project Area One or the surrounding portion of the 400-foot study area.

East River Park

Alternative 2 would maintain large portions of East River Park and would install a combination of floodwalls and levees generally along the west edge of the park, creating a hard, visually impermeable edge. Unlike under the Preferred Alternative, the existing Corlears Hook, Delancey Street, and East 10th Street bridges would remain under Alternative 2 and access to the park at those points would not be improved. The concrete capped I-wall that would border Pier 42 would run along the western edge of East River Park from the southern end at Jackson Street to the amphitheater. This floodwall would have a height of 6 feet above grade and would replace the existing decorative fence between the park and the FDR Drive. That fence would be removed from the park's entire boundary. The bikeway/walkway would be reconstructed in this

portion of the park, and the existing pathway that runs around the southern side of the amphitheater between the Corlears Hook Park pedestrian bridge and the esplanade would be reconstructed with new paving. A sheet pile wall would be installed below the walkway. Some existing trees along the bikeway/walkway would be removed in this portion of the park, but new trees would be planted and there would be new landscaping on the south side of the amphitheater and the east side of the bikeway/walkway.

On the north side of the existing amphitheater, which would be retained, a floodwall would curve around the southwest side of the closest ballfield and the east side of the reconstructed bikeway/walkway. It would be a 7.5-foot-tall concrete I-wall. The reconstructed bikeway/walkway would be elevated in this area and shifted eastward to accommodate a levee. Landscaped as a lawn, the levee would be located along the park's western edge between the southernmost ballfield and the Delancey Street pedestrian bridge. This levee would be approximately 8.5 feet above grade at its crest, which would be 10 feet wide. From the crest, the levee would slope down to the FDR Drive and down into the park. Adjacent to the ballfield closest to the amphitheater, the reconstructed bikeway/walkway would be elevated above the southern end of the levee. In the vicinity of Grand and Delancey Streets, the bikeway/walkway would be a lower elevation than the crest of the levee. Existing trees would be removed to construct the levee, but new trees would be planted along the east side of the bikeway/walkway (see Table 5.6-5 in Chapter 5.6, "Natural Resources," for additional detail on tree effects in Project Area One). Creation of the levee and realignment of the bikeway/walkway would alter and remove several features of East River Park between Grand and Delancey Streets. The northern ballfield would be shifted eastward to accommodate the realigned bikeway/walkway. At Grand Street, the western portion of the water play area would be removed, but the main portion of the water play area would remain. At Delancey Street, the entrance to the promenade—including the decorative gate and picnic area—would be removed, as would the adjacent soccer field and basketball courts. However, the basketball courts would be relocated eastward, replacing part of an existing lawn.

The levee would end on the north side of the Delancey Street pedestrian bridge, where the bikeway/walkway would resume its existing alignment adjacent to the FDR Drive. From where the levee ends to the north side of the tennis courts, flood protection would be provided by a floodwall along the edge of the park. This floodwall would be an approximately 7.5-foot-tall concrete L-wall. Underneath the Williamsburg Bridge, there would be no new landscaping, but adjacent to the tennis courts there would be landscaping at the base of the floodwall and on the east side of the bikeway/walkway. Existing trees would be removed, but new trees would be planted adjacent to the tennis courts.

In the vicinity of the plazas located at Rivington and Stanton Streets, there would be a levee adjacent to the FDR Drive. Like the levee to the south, this levee would have an elevation of approximately 8.5 feet above grade at its crest, which would be 10 feet wide. Landscaped as a lawn, the levee would slope down from the crest to the FDR Drive and down to the reconstructed bikeway/walkway, which would be realigned to the east and located at or close to grade. The bikeway/walkway would abut the large sunken plaza and adjacent lawn and rose garden. The ballfield located closest to the rose garden would be shifted eastward. Numerous trees would be removed from this portion of the park and some lawn areas around the plazas would be lost. However, the levee would be landscaped.

From the northern end of the levee to just south of the East 6th Street pedestrian bridge, the flood protection system would consist of a floodwall along the edge of the park. This floodwall

would be an approximately 7.5-foot-tall concrete L-wall. At East Houston Street, the existing concrete wall and pedestrian ramps at the overpass would remain.

At East 6th Street, there would be a combination floodwall and levee. Located along the FDR Drive, the floodwall would be an approximately 7.5-foot-tall concrete L-wall. The levee would be narrow and would slope down from the floodwall to the reconstructed bikeway/walkway. Some trees would be removed in the location of the levee, but the large grove of trees in this area would remain. From this levee to the northern end of East River Park, flood protection would be provided by a floodwall along the park's edge. This floodwall would be a concrete capped I-wall, with a height of 8 feet above grade. There would be some landscaping at the base.

In general, it is not expected that this alternative would have adverse effects on the visual character of East River Park as much of the existing park would remain unaltered as the flood protection measures would be located along the park's western edge bordering the FDR Drive. To soften the presence of the floodwalls, landscaping would be located at the base in most locations. Users of the reconstructed bikeway/walkway may have blocked upland views, but the floodwalls would act as a visual and acoustical buffer between park users and vehicles on the FDR Drive. Adjacent to the segments of levee, the buffers would be more naturalistic. Whether adjacent to floodwalls, levees, levee, or closure structures, users on the reconstructed bikeway/walkway would continue to have open views through the park and to the river. The new levee would provide landscaping and areas for passive recreation along the park's western edge, which is primarily occupied by the existing bikeway/walkway. At Grand Street, a portion of the existing water play area would be removed. At Delancey Street, a picnic area, soccer field with artificial turf, and basketball courts would be removed. In place of these features, the levee in this location would provide a place for passive recreation, such as picnicking, and the basketball courts would be relocated to an existing lawn area. With the exception of views west into Manhattan, views within the park would be largely unaltered by this alternative for park users.

Project Area Two

Illustrative visual renderings of this alternative in Project Area Two are shown on **Figures 5.5-82 through 5.5-94** (see **Figure 5.5-54** for a key map to these simulations). The flood protection measures provided in Project Area Two under this alternative would be largely the same as provided under the Preferred Alternative. Therefore, this alternative would also not result in any adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

While Alternative 2 would not result in adverse urban design effects, it could potentially result in some significant adverse visual effects. By constructing levees and floodwalls along the entire western edge of East River Park that would range in height from 6 feet to 8.5 feet above grade, this alternative would block or obscure existing views to the East River from within the surrounding 400-foot study area.

Views to the Waterfront

Overall, Alternative 2 would result in a lengthy and monolithic floodwall between the waterfront and the adjacent, upland neighborhoods, reducing the visual connectivity between those neighborhoods and the waterfront and diminishing visual quality. In comparison, the Preferred

Alternative would maintain the visual connections between the upland neighborhoods and East River Park. As described above, the best views of the waterfront are found in the southeast portion of the study area around Corlears Hook Park and on Grand Street, because this area is slightly elevated compared with the FDR Drive and the waterfront. In the Jackson Street view corridor, Pier 42 will likely remove or obscure views of the East River, because the elevated picnic knoll will be located in the vicinity of Jackson Street. Therefore, the floodwall constructed under Alternative 2 would not block or obscure views of the East River, although it would be in the foreground of views to the new Pier 42 open space. From within Corlears Hook Park and on Cherry Street, the approximately 6-foot-tall floodwall would obscure views to the East River; however, because the park and adjacent section of Cherry Street are at a higher elevation than East River Park, the East River and Brooklyn in the distance could still be somewhat visible from these locations. Closer to the FDR Drive, views on Cherry Street would be blocked. In the Grand Street view corridor, the approximately 8.5-foot-tall levee would likely block views of the East River from points close to the FDR Drive, thereby potentially resulting in a significant adverse effect. However, from farther west on Grand Street, which has a higher elevation relative to the FDR Drive and East River Park, there would likely continue to be partial views of the East River over the levee. Although the view on Grand Street would be of a levee, this would not mitigate the loss of East River views.

Similarly, levees and floodwalls would likely block existing waterfront views in the East 6th Street and East 10th Street view corridors, potentially resulting in significant adverse effects. Views on East 10th Street would be of a floodwall, and views would be blocked. Views on East 6th Street would be of a combination floodwall and levee, but views of the East River would be blocked, and there would be a significant adverse effect. From within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, limited views of East River Park would also likely be blocked, potentially resulting in significant adverse effects.

Alternative 2 would also potentially result in significant adverse effects to waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. This street and highway currently provide expansive views of East River Park, the East River, the Williamsburg Bridge, and the Brooklyn and Queens waterfronts, views that would be completely blocked by the floodwalls and levees that would border the east side of the FDR Drive.

As with the Preferred Alternative, the floodwalls and raised landscape constructed in Project Area Two would not result in significant adverse visual effects.

Additional Views of the Project Area

From the Williamsburg Bridge, which provides expansive views of East River Park, the levees and floodwalls of Alternative 2 would not be particularly distinguishable to pedestrians, bicyclists, and motorists. Overall views of the park from the height of the bridge would not be affected. From Grand Ferry Park and Bushwick Inlet Park in Williamsburg, Brooklyn and from WNYC Transmitter Park in Greenpoint, Brooklyn, distance would diminish the visibility of the Alternative 2 components to park users. The existing views shown on **Figures 5.5-51 and 5.5-52** illustrate how distance diminishes the visibility of the project area from these locations.

Aesthetic and Visual Resources

The primary aesthetic and visual resource in the study area is the East River vista. and, as described above Alternative 2 would likely block views of this vista from multiple locations within the 400-foot study area, potentially resulting in significant adverse effects.

From within East River Park, along Captain Patrick J. Brown Walk, and within Stuyvesant Cove Park, the expansive views north and south across the East River would not be affected. In East River Park, the levees and floodwalls would be located along the park's FDR Drive frontage away from the esplanade. In addition, the levees would provide new, elevated vantage points for viewing the East River vista. Along Captain Patrick J. Brown Walk, the floodwalls would be located on the west side of the FDR Drive and views would be unaffected. In addition, the proposed flyover bridge would provide new elevated vantage points for viewing the East River vista. In Stuyvesant Cove Park, views from the esplanade would be unaffected, and the raised landscape would provide new, elevated vantage points for viewing the East River vista.

Alternative 2 would also not result in adverse visual effects to any architectural resources, as more fully described in Chapter 5.4, "Historic and Cultural Resources." There would be no visual relationship between Alternative 2 components and the following aesthetic and visual resources, defined in accordance with DEP-00-2: the Lower East Side Historic District and Henry Street Settlement.

Alternative 2 would, for the most part, have limited visual effects on views of the East River Housing Cooperative, Baruch Houses, Jacob Riis Houses, Stuyvesant Town, Peter Cooper Village, and Public School 97. From within East River Park, the proposed floodwalls and levees would partially obstruct views of the lower floors of these aesthetic and visual resources, but they would still be prominently visible from within the park, and they would continue to be visible from other locations within the study area. Alternative 2 would have no visual effects on the Williamsburg Bridge.

At the northern end of the Project Area, floodwalls and closure structures would be constructed adjacent to the Asser Levy Recreation Center, which is an aesthetic and visual resource. The floodwalls would be adjacent to the outdoor swimming pool from the 1960s and the playground, which are currently enclosed by plain brick walls and metal fences. Closure structures would be located adjacent to the historic Asser Levy Recreation Center. Therefore, primary views of the Asser Levy Recreation Center from East 23rd Street and Asser Levy Place would not be affected.

As described above, Alternative 2 would not result in adverse effects to the visual characters of East River Park and Stuyvesant Cove Park, which are considered aesthetic and visual resources. However, sections of floodwalls would block views of East River Park from multiple locations within the study area, resulting in adverse effects.

Viewer Groups

Viewers from the Project Area

Within the project area, viewer groups include motorists on the FDR Drive and users of East River Park, Captain Patrick J. Brown Walk, Stuyvesant Cove Park, and Asser Levy Playground.

Although views of East River Park and the East River and East River vista are passing and of short duration, they would be completely blocked to motorists on the FDR Drive as described above. Views of the other aesthetic and visual resources from the FDR would be unaffected by Alternative 2.

Users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park include pedestrians, bicyclists, fishermen, people engaged in active recreation on the athletic fields and tennis courts, and people engaged in passive recreation like sitting, sunbathing, and picnicking. These viewer groups have expansive views of the East River and East River vista and of the

Williamsburg Bridge, views that would be unaffected by Alternative 2. In addition, the proposed flyover bridge would provide new, elevated vantage points for viewing the East River and East River vista. Along the western edge of East River Park, views west into Manhattan would be blocked by the floodwalls and levees. From locations farther removed from the flood protection measures, park users would continue to have views into Manhattan. From Asser Levy Playground, only users of the outdoor pool have views toward the waterfront; while those views from within the pool would be more obscured, those views are limited and seasonal and largely of the FDR Drive viaduct.

Viewers of the Project Area

Viewers of the project area include residents, pedestrians, motorists, bicyclists, and boaters.

In general, residents within view of the project area have stationary, prolonged views of the project area. However, residential viewers would be limited to those living in the large multi-building developments bordering the FDR Drive with apartments facing the waterfront. As the floodwalls and levees would be no taller than approximately 8.5 feet above grade, residents above the first floor of buildings facing the waterfront would mostly have unaffected views of the waterfront and East River. Residents on higher floors would have more expansive views of the East River vista that would be unaffected by Alternative 2. Residents on the ground floors of buildings facing the waterfront in the Bernard Baruch, Lillian Wald, and Jacob Riis Houses would have blocked waterfront views, and this would result in a significant adverse effect. There are no ground floor apartments in the East River Housing Cooperative.

Within the study area, pedestrians on the local streets have variable views of the waterfront and, as described above, some of these views would likely be blocked, potentially resulting in significant adverse effects. Motorists on the local streets have similar views to pedestrians, but they are passing views of shorter duration. Boaters on the East River have clear views of the project area, but these views can be from a distance, depending on the location of the viewer on the wide East River. In addition, like motorists, boaters would have passing views of short duration. As seen from the river, the floodwalls, levees, and raised landscape of Alternative 2, when visible, would be seen as general elements of East River Park and Stuyvesant Cove Park.

Users of Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park on the Brooklyn waterfront have views of the project area, but these views are from far away (from over 2,000 feet), and it is not expected that the elements of Alternative 2 would be clearly visible. The flyover bridge would be visible, but it would not be prominent due to distance and would be seen in the foreground of the large Con Edison East River Generating Facility.

STORM CONDITIONS

In a storm condition, all of the closure structures would be in operation. These closure structures would not block any significant views, and their use would be temporary.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

URBAN DESIGN

Illustrative visual simulations of Alternative 3 are shown on **Figures 5.5-55 through 5.5-94** (see **Figure 5.5-54** for a key map to these visual simulations). See **Appendix C3** for the preliminary plans of this alternative.

Project Area One

Illustrative visual renderings of this alternative in Project Area One are shown on **Figures 5.5-55** through **5.5-81**.

FDR Drive, Montgomery Street, and Pier 42

Under Alternative 3, the flood protection systems installed at the southern end of Project Area One would be the same as those that would be installed under the Preferred Alternative and Alternative 2, and it is not expected that the floodwalls, closure structures, and interceptor gate building would have adverse urban design effects to the southern end of Project Area One or the surrounding portion of the 400-foot study area (see **Figures 5.5-55 and 5.5-57**).

East River Park

Compared to Alternative 2, Alternative 3 would employ a more extensive use of vegetated slopes, include re-landscaping of additional passive recreation areas, and relocate more active recreation areas, but it would still install some floodwalls along the western edge of East River Park. As described above, the Preferred Alternative would provide a soft, green and visually porous edge to East River Park. Alternative 3, like the Preferred Alternative, would improve the park entrance at East Houston Street by the raising the park at that location and completely reconstruct the pedestrian bridges at Delancey and East 10th Streets, but it would not reconstruct the bridge at Corlears Hook Park. In general, this alternative would provide more enhancements to East River Park than would Alternative 2. As under the Preferred Alternative and Alternative 2, East River Park under Alternative 3 would retain the visual character of a recreational, waterfront park with paths, lawns, and athletic fields.

Removal or alteration of certain existing park features under Alternative 3 would not result in adverse effects to the visual character of East River Park. Throughout the park, where athletic fields would be moved and reoriented, they would be replaced, with the exception of ballfields 7 and 8, which will be reoriented and reconstructed as a one combined multi-use field. At Grand Street, the main play area with the multiple seal statues would be replaced with a new water play area and nature exploration play area as under the Preferred Alternative. At Delancey Street, a picnic area, soccer field with artificial turf, and basketball courts would be removed, as they would under Alternative 2. To compensate for these changes, the vegetated slope in this location would be designed as a sloped lawn and grassed amphitheater to provide a place for passive recreation, such as picnicking, and the soccer field and basketball courts would be relocated to an adjacent lawn. Under this alternative, the 12 tennis courts would remain but in a shifted location, and the relocation of the courts would be made to accommodate a vegetated slope that would not be provided under Alternative 2. North of the tennis courts, the paved plazas, lawns, and rose garden would be removed to accommodate the vegetated slope and the realigned bikeway/walkway. Further, this area of the park would include a new resiliently designed landscape plan. At the northern end of the park, as under the Preferred Alternative, the existing barbecue and picnic area would be removed for the new park-side landing of the reconstructed East 10th Street Bridge and a grassed amphitheater, but a replacement barbecue and picnic area would be located in the immediate vicinity. More trees would be removed throughout East River Park under this alternative than under Alternative 2, resulting in a temporary adverse effect, but the landscape plan for this alternative includes lawns, vegetated slopes, and the planting of new trees to lessen this effect. Views through the park would be altered by this alternative, but the park would retain its overall character of a recreational, waterfront park with paths, lawns, and athletic fields.

Project Area Two

Illustrative visual renderings of this alternative in Project Area Two are shown on **Figures 5.5-82 through 5.5-94** (see **Figure 5.5-54** for a key map to these simulations).

From the southern end of Project Area Two to Stuyvesant Cove Park, the flood protection systems installed under Alternative 3 would be the same as installed under the Preferred Alternative. Like the Preferred Alternative, Alternative 3 would also redesign Murphy Brothers Playground to provide more greenery and to lessen the impact of the adjacent floodwall as experienced within the park. At the northern end of Project Area Two, the system of floodwalls and closure structures installed on the east side and under the FDR Drive in front of the gas station and Marine and Aviation Building would also be the same as under the Preferred Alternative. Therefore, it is not expected that the floodwalls, closure structures, and flyover bridge of Alternative 3, like those of the Preferred Alternative and Alternative 2, would have adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area.

As under the Preferred Alternative and Alternative 2, Stuyvesant Cove Park would be reconstructed as a raised landscape under this alternative, which would not result in an adverse urban design effect.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

While Alternative 3 would not result in an overall significant adverse effect, because East River Park would retain the visual character of a recreational waterfront park with paths, lawns, and athletic fields, this alternative, like the Preferred Alternative, would result in a temporary adverse effect from the removal of existing trees throughout the park. The latter adverse effect would be lessened by the planting of new trees. By constructing vegetated slopes and floodwalls along the entire western edge of East River Park that would range in height from 6 feet to 18.5 feet above grade, this alternative would block or obscure existing views to the East River from within the surrounding 400-foot study area, as well as views out of the park into Manhattan for park users in certain locations (e.g., along the bikeway).

Views to the Waterfront

Although Alternative 3 would employ a more extensive use of vegetated slopes compared to Alternative 2, it would still result in lengthy sections of floodwall that would reduce the visual connectivity between the waterfront and the adjacent, upland neighborhoods. In comparison, the Preferred Alternative would maintain those visual connections. Views to the waterfront would be largely the same with Alternative 3 as with Alternative 2, and there would potentially be significant adverse effects from blocked views of the East River on Cherry and Grand Streets (see **Figures 5.5-64 and 5.5-65)**; blocked waterfront views in the East 6th Street and East 10th Street view corridors (see **Figures 5.5-75 and 5.5-79**); blocked waterfront views from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses; and blocked waterfront and river views seen from the portions of the FDR Drive and FDR Drive Service Road that run through Project Area One. On Grand Street, while river views would be blocked, views would be of the redesigned park, which would lessen the impact on this view corridor. From farther west on Grand Street, which has a higher elevation relative to the FDR Drive and East River Park, there could continue to be views of the East River over the vegetated slopes.

As with the Preferred Alternative and Alternative 2, the floodwalls, raised landscape, and the flyover bridge constructed in Project Area Two would not result in significant adverse visual

effects. The elevated FDR Drive viaduct would continue to dominate views to the waterfront on Avenue C, East 20th Street, and East 23rd Street (see **Figures 5.5-83, 5.5-86, 5.5-88, and 5.5-92**). Views on Avenue C and East 20th Street would continue to be of Stuyvesant Cove Park in the background of the FDR Drive viaduct, although the floodwalls would partially obscure Stuyvesant Cove Park. On East 23rd Street and from the outdoor pool at Asser Levy Playground, the proposed floodwalls would partially obscure views of the existing gas station and the northernmost tip of Stuyvesant Cove Park.

Additional Views of the Project Area

As seen from the Williamsburg Bridge, Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park, views of the components of Alternative 3 would largely be the same as those of the components of the Preferred Alternative and Alternative 2.

Aesthetic and Visual Resources

The primary aesthetic and visual resource in the study area is the East River vista and, as described above, Alternative 3, like Alternative 2, would likely block views of this vista from multiple locations within the 400-foot study area, potentially resulting in significant adverse effects.

Alternative 3, like the Preferred Alternative and Alternative 2, would not affect the expansive views north and south across the East River from within East River Park, along Captain Patrick J. Brown Walk, and within Stuyvesant Cove Park. In addition, as with Alternative 2, the flyover bridge would provide new, elevated vantage points for viewing the East River and the East River vista.

Alternative 3, like the Preferred Alternative and Alternative 2, would also not result in adverse visual effects to any architectural resources, as more fully described in Chapter 5.4, "Historic and Cultural Resources."

As described above, Alternative 3, like the Preferred Alternative, would result in a temporary adverse effect to the visual character of East River Park (which is considered an aesthetic and visual resource) from the removal of existing trees, although this effect would be lessened by the planting of new trees. In addition, sections of floodwalls would block views of and out from East River Park from multiple locations within the study area, potentially resulting in adverse effects. Alternative 3, like the Preferred Alternative and Alternative 2, would not result in significant adverse effects on Stuyvesant Cove Park, which is also considered an aesthetic and visual resource.

Viewer Groups

Viewers from the Project Area

Within the project area, viewer groups include motorists on the FDR Drive and users of East River Park, Captain Patrick J. Brown Walk, Stuyvesant Cove Park, and Asser Levy Playground.

Passing motorists' views of East River Park and the East River vista would be similar to those views under existing conditions, although floodwalls would obscure some views into the park and occasional views of the water would no longer be available. Views of the other aesthetic and visual resources from the FDR Drive would be unaffected.

Users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park have expansive views of the East River and East River vista and of the Williamsburg Bridge, views that would be unaffected by Alternative 3. Further, the proposed flyover bridge would provide

new, elevated vantage points for viewing the East River and East River vista. From Asser Levy Playground, only users of the outdoor pool have views of the waterfront, but those views are limited and seasonal.

Viewers of the Project Area

Viewers of the project area include residents, pedestrians, motorists, bicyclists, and boaters.

Compared to the Preferred Alternative, residents on the ground floors of buildings facing the waterfront in the Bernard Baruch, Lillian Wald, and Jacob Riis Houses would have partially blocked waterfront views, and this could result in a significant adverse effect. There are no ground floor apartments in the East River Housing Cooperative.

Within the study area, pedestrians on the local streets have variable views of the waterfront and, as described above, some of these views would likely be blocked, potentially resulting in significant adverse effects. Motorists on the local streets have similar views to pedestrians, but they are passing views of shorter duration. Boaters on the East River have clear views of the project area, but these views can be from a distance, depending on the location of the viewer on the wide East River. In addition, like motorists, boaters would have passing views of short duration. As seen from the river, the floodwalls, levees, and raised landscapes of Alternative 3, when visible, would be seen as general elements of East River Park and Stuyvesant Cove Park.

Users of Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park on the Brooklyn waterfront have views of the project area, but these views are from far away, and it is not expected that the majority of elements of Alternative 3 would be clearly visible. The flyover bridge would be visible, but it would not be prominent due to distance and would be seen in the foreground of the large Con Edison East River Generating Facility.

STORM CONDITIONS

In a storm condition, all of the closure structures would be in operation. These closure structures would not block any significant views, and their use would be temporary.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION EAST OF FDR DRIVE

URBAN DESIGN

Project Area One

The flood protection measures provided in Project Area One under this alternative would be the same as provided under the Preferred Alternative. Therefore, this alternative would result in the same temporary adverse effect to East River Park as the Preferred Alternative and Alternative 3 from the removal of existing trees.

Project Area Two

Under this alternative, a raised platform would be constructed over the northbound FDR Drive running from about East 13th Street (connecting with the proposed flood protection system in East River Park) to the northbound ramp to the elevated FDR Drive near East 18th Street. Along this approximately 6-block length, the northbound FDR Drive would be raised approximately 6 feet above existing grade. A 9.5-foot-tall floodwall (3.5 feet tall above the raised roadbed) would be installed along the river side of the raised platform. The southbound FDR Drive would

remain as it currently exists. Three types of flood protection designs are currently under consideration for the segment of Project Area Two north of the proposed raised platform to Stuyvesant Cove Park—a floodwall that is affixed to the existing south abutment of the Avenue C viaduct where the northbound FDR Drive lanes become raised; if feasible, a floodwall underneath the elevated FDR Drive that would rest on or penetrate the concrete deck of the existing relieving platform; and a closure structure at the existing ramp. This proposed system would connect with the flood protection system that begins in Stuyvesant Cove Park. This alternative, likes Alternatives 2 and 3, also includes the flyover bridge between East 13th and East 18th Streets.

In general, it is not expected that Alternative 5 would have adverse urban design effects in Project Area Two or on the surrounding portions of the 400-foot study area. The FDR Drive is already elevated north of approximately East 18th Street, and there are ramps to and from the FDR Drive at Avenue C. The section of the northbound FDR that would be elevated is a short 6-block-long section primarily adjacent to the Con Edison East River Generating Facility, a portion of the study area where pedestrians are confined to the existing walkway along the Con Edison pier and to Captain Patrick J. Brown Walk. The raised FDR Drive would not adversely affect the pedestrian experience of those users, because they would be elevated above it on the new flyover bridge between East River Park and East 16th Street. Between East 16th and East 18th Streets where users of Captain Patrick J. Brown Walk would be adjacent to the elevated northbound FDR Drive, the raised platform and floodwall would create a buffer between vehicular traffic on the FDR Drive and users of Captain Patrick J. Brown Walk, resulting in beneficial effects to the pedestrian experience. While the flyover bridge would be a new urban design feature, it would have beneficial urban design effects by elevating pedestrians and bicyclists above the Con Edison pier and the FDR Drive. In this area, pedestrians and bicyclists would no longer be immediately adjacent to vehicular traffic on the FDR Drive, but would be above it. Further, the flyover bridge would enhance pedestrian and bicyclist safety by bypassing the narrowed walkway. North of the proposed raised platform, the floodwalls and closure structures would be installed in locations where there are existing fences and walls and where the FDR Drive is elevated on a viaduct.

VIEWS, AESTHETIC AND VISUAL RESOURCES, AND VIEWER GROUPS

Views to the Waterfront

In Project Area One, views to the waterfront would be the same with this alternative as with the Preferred Alternative. In Project Area Two, the proposed floodwall along the east side of the raised portion of the FDR Drive would potentially result in obscured views of the waterfront as seen from the FDR Drive that would not occur with the Preferred Alternative and Alternatives 2 and 3. There are no view corridors to the waterfront between East 13th and East 18th Streets and, therefore, the elevated northbound FDR Drive and the flyover bridge would not block any views from the study area.

Additional Views of the Project Area

As seen from the Williamsburg Bridge, Grand Ferry Park, Bushwick Inlet Park, and WNYC Transmitter Park, views of this alternative would be largely the same as with the Preferred Alternative and Alternatives 2and 3.

Aesthetic and Visual Resources

Like the Preferred Alternative, this alternative would block some views of the East River itself from within the 400-foot study area, but it would preserve views of the East River vista and views from the study area would be of East River Park.

Alternative 5, like the Preferred Alternative and Alternatives 2 and 3, would not affect the expansive views north and south across the East River from within East River Park, along Captain Patrick J. Brown Walk, and within Stuyvesant Cove Park. The proposed flyover bridge would provide new elevated vantage points for viewing the East River vista. This alternative would also not result in adverse visual effects to any architectural resources.

As described above, Alternative 5, like the Preferred Alternative and Alternative 3 would result in a temporary adverse effect to the visual character of East River Park (which is considered an aesthetic and visual resources) from the removal of trees. Alternative 5, like the Preferred Alternative and Alternatives 2 and 3 would not result in significant adverse effects on Stuyvesant Cove Park, which is also considered an aesthetic and visual resource.

Viewer Groups

Viewers from the Project Area

Passing motorists' views of East River Park and the East River vista would be maintained in Project Area One on the FDR Drive as under the Preferred Alternative, but these views would be obscured in Project Area Two under this alternative. Views of the other aesthetic and visual resources from the FDR Drive would be unaffected.

Users of East River Park, Captain Patrick J. Brown Walk, and Stuyvesant Cove Park have expansive views of the East River and East River vista and of the Williamsburg Bridge that would be unaffected by Alternative 5. In addition, the proposed flyover bridge would provide new, elevated vantage points for viewing the East River and East River vista.

Viewers of the Project Area

Residents above the first floor of buildings facing the waterfront would mostly have unaffected views of the waterfront and East River, and residents on higher floors would have more expansive views of the East River vista that would be unaffected by Alternative 5. Residents on the ground floors of buildings facing the waterfront in the Bernard Baruch, Lillian Wald, and Jacob Riis Houses would continue to have waterfront views of East River Park under this alternative (as under the Preferred Alternative), views that would be blocked by floodwalls under Alternatives 2 and 3.

Within the study area, pedestrians would continue to have views of the waterfront, although there would be no occasional views of the East River itself.

STORM CONDITIONS

In a storm condition, all of the closure structures would be in operation. These closure structures would not block any significant views, and their use would be temporary.

MITIGATION

As described above, the Preferred Alternative and Alternatives 2, 3, and 5 could potentially result in significant adverse visual effects by blocking views to the waterfront and East River from multiple locations within the study area. These potential significant adverse effects would

not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls, levees and/or raised landscape under Alternatives 2 and 3 or not raising East River Park under the Preferred Alternative and Alternative 5 to allow continued views to the waterfront and East River would impair the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, the floodwalls are expected to be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls. ✷

A. INTRODUCTION

This chapter describes existing natural resources within the project area and vicinity and evaluates potential effects that may result from implementation of the proposed project. The natural resources described and evaluated include geologic and soil resources; groundwater resources; wetlands; flood hazard areas; surface waters; aquatic resources; and terrestrial resources including wildlife, ecological communities, and threatened and endangered species. Potential effects to natural resources from construction activities are evaluated in Chapter 6.5, "Construction—Natural Resources."

STUDY AREA

The study area for the analysis of natural resources includes Project Area One, Project Area Two, and a 400-foot buffer surrounding these areas. The 400-foot buffer area encompasses some parts of inland Manhattan that would not be subject to construction. The 400-foot buffer area also encompasses the nearshore area of the East River that abuts Project Area One and Project Area Two. In total, the study area consists of approximately 255 acres of land, 127 acres of water, and 2.2 miles of shoreline (see **Figure 5.6-1**).

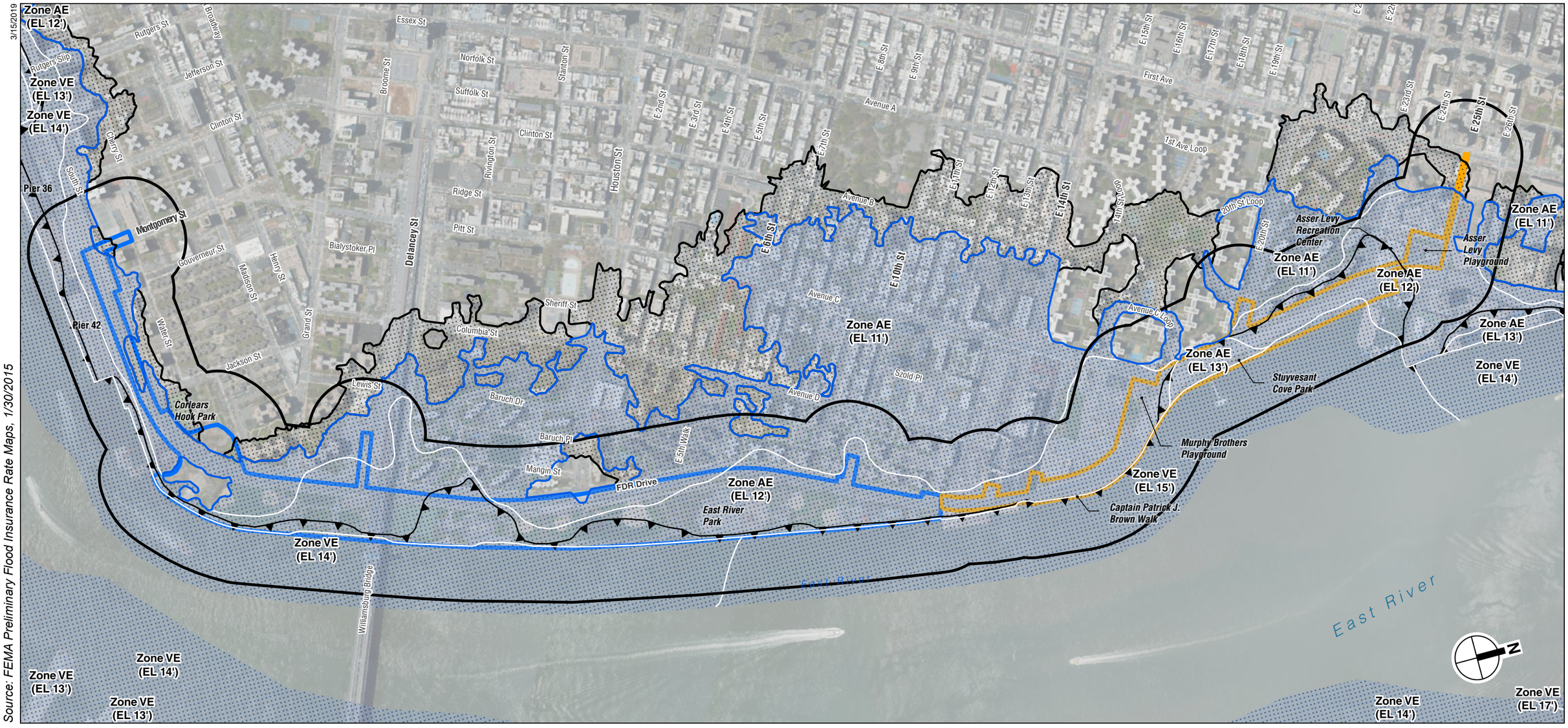
B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative could potentially result in adverse effects to natural resources conditions. In the absence of the proposed project, the neighborhoods in the protected area (see Figure 1.0-2) would remain at risk to coastal flooding during design storm events. Future storms would be expected to cause further damage to natural resources within the Parks, beyond the effects caused by Hurricane Sandy. Hundreds of trees in East River Park have been removed due to salt water inundation, and additional trees are still in decline and will likely require removal in the near future. Targeted resiliency measures described in **Appendix A1** may reduce the effects in certain locations but would not provide comprehensive protection against the design storm (the 100-year flood events with sea level rise projections to the 2050s).

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would reduce the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving



Source: FEMA Preliminary Flood Insurance Rate Maps, 1/30/2015

3/15/2019

Project Area One

Project Area Two

Natural Resources Study Area (400-Foot Study Area Radius)

100-Year Flood Hazard Area (1% Annual Chance)

500-Year Flood Hazard Area (0.2% Annual Chance)

Boundary Dividing Flood Hazard Area Zones and Areas of Different Base Flood Elevations

Limit of Moderate Wave Action (Coastal A Zone)

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Natural Resources Study Area and
FEMA Preliminary Flood Hazard Areas (2015)

Figure 5.6-1

the City's greenway network and north-south connectivity in the project area and reducing the potential for flooding, wave damage, and the resulting scouring and erosion. The Preferred Alternative would, therefore, be consistent with the City's Waterfront Revitalization Program (WRP) policies regarding improving public access to the City's waterfront Parks offering waterfront views and improved experiences while accommodating longstanding passive and active recreational amenities in existence for decades.

The Preferred Alternative would result in temporary adverse effects to trees, with a total of 981 trees to be removed for the proposed flood protection system, of which 784 are located within East River Park. The project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. The landscape restoration plan would ultimately result in a net increase of 399 total trees within the project area. While these trees would not be as mature as some existing trees, over time, the new tree canopy would fill in and represent an improved habitat over the existing conditions, which is largely dominated by London plane trees, known for their poor response to salt-water inundation.

The Preferred Alternative also includes in-water elements such as support foundations for the shared-use flyover bridge to connect the north end of East River Park to Captain Patrick J. Brown Walk to the north as well as relocating the two existing embayments and reconstructing water and sewer infrastructure within the park. Installation of the structural supports for the flyover bridge and relocation of the embayments would result in adverse effects to 24,085 square feet of New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands and U.S. Army Corps of Engineers (USACE) Waters of the United States within the East River. Adverse effects to aquatic resources would be mitigated for with the creation of approximately 26,000 square feet of new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements, and would not be considered significant. The mitigatory elements of the Preferred Alternative are consistent with the City's WRP policies of protecting water quality, sensitive habitats, and the aquatic ecosystem.

Adverse effects to the littoral zone wetland have the potential to affect Essential Fish Habitat (EFH) and habitat for epifaunal benthic organisms that may provide a foraging habitat for certain fish that are protected under the Fish and Wildlife Coordination Act (FWCA). However, for fish species that would not be considered rare or transient within the study area, the EFH and habitat with the potential to be affected by the Preferred Alternative constitutes a very small portion of the available EFH and habitat within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute not only a replacement in kind within the study area, but an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination

of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. Lastly, additional habitat would be created within the NY Harbor Estuary through the creation of off-site tidal wetland habitat or purchase of wetland mitigation credits. A consultation with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) as required by the FWCA, Magnuson Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Clean Water has been reinitiated for the Preferred Alternative. Any conservation measures identified as a result of that consultation will be identified in the Final EIS.

Due to these measures in addition to the limited extent of adverse effects within the East River, the Preferred Alternative is unlikely to result in significant adverse effects to wetland resources, threatened, endangered or special concern species, EFH, FWCA trust resources managed by NOAA NMFS, or surface water resources. No significant adverse effects to other existing natural resources are anticipated.

OTHER ALTERNATIVES

The natural resources that would be affected under the Flood Protection on the West Side of East River Park – Baseline Alternative (Alternative 2), the Flood Protection on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and the Flood Protection System Alignment East of FDR Drive Alternative (Alternative 5) are also analyzed in this chapter. During storm conditions, the flood protection systems of Alternatives 2 and 3 would largely limit storm surge effects to East River Park and Stuyvesant Cove Park to the unprotected side of the flood protection system. This inundation would affect soil and other vegetated areas such as tree pits, landscape beds, all existing horticulture, and other park resources. Alternative 5 includes the same flood protection alignment as the Preferred Alternative, including protection of East River Park, except for the area between East 13th Street and Avenue C where the northbound lanes of the FDR would be raised.

Alternatives 2 and 3 would require the removal of trees but would leave any remaining or newly planted trees in East River Park susceptible to the effects of future storms. Alternative 5 would require the same number of tree removals as the Preferred Alternative and would include the long-term protection of these terrestrial resources accomplished through the raising of East River Park proposed under the Preferred Alternative. For Alternatives 2, 3 and 5, the tree removals would also constitute a temporary adverse effect to terrestrial resources and a NYC Parks approved landscape restoration plan would be implemented to improve the landscape. Alternatives 3 and 5 would result in a net increase of trees within the project area (342 and 399, respectively) while Alternative 2 would result in no net loss of trees. Over time, the new tree canopy would fill in and represent an improved habitat over the existing condition; however, the number of trees that would remain susceptible to future storm events would be significantly higher under Alternatives 2 and 3 than under the Preferred Alternative (944, 433, and 228, respectively).

Similar to the Preferred Alternative, Alternatives 2 and 3 would also adversely affect wetland resources though the footprint of disturbance would be limited to the placement of footings and shafts for the flyover bridge within the East River. Compared to the Preferred Alternative, Alternative 5 would result in a slightly larger footprint of adverse effects to these resources due to the placement of shafts for the raised FDR Drive within NYSDEC littoral zone tidal wetlands and USACE Waters of the United States in addition to the in-water elements described for the Preferred Alternative. The adverse effects to wetland resources would be mitigated through a

combination of on-site and off-site wetland restoration or purchase of credits from the Saw Mill Creek Wetland Mitigation Bank that meets all NYSDEC and USACE permit conditions. Similar to the Preferred Alternative, effects to threatened, endangered or special concern species, EFH, FWCA trust resources managed by NOAA NMFS, or surface water resources are not anticipated to be significant. Any conservation measures identified as part of reinitiated consultation with NOAA NMFS will be identified in the Final EIS. Due to these measures, these alternatives are not anticipated to result in significant adverse effects to wetland resources. No significant adverse effects to other natural resources are anticipated.

A comparison of anticipated adverse effects to natural resources for all With Action Alternatives is shown in **Table 5.6-1**.

Table 5.6-1
Comparison of Anticipated Adverse Effects to Natural Resources

	Proposed Tree Removals	Net Change in Trees with Landscaping Plan	Existing Trees to Remain in FEMA 100-Year Flood Zone	Adverse Effects to Wetlands*
Preferred Alternative	981	+399	228	24,085 square feet
Alternative 2	265	0	944	652 square feet
Alternative 3	776	+342	433	652 square feet
Alternative 5	981	+399	228	24,242 square feet

Note:
*Adverse effects to wetlands would be mitigated for in compliance with NYSDEC and USACE permit requirements, including on- and off-site wetland restoration or purchase of wetland mitigation bank credits. On-site wetland restoration for the Preferred Alternative and Alternative 5 will consist of creating approximately 26,000 square feet of new embayments along East River Park.

C. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following federal, state, and local laws, programs, rules, legal requirements, and policies for which each of the alternatives have been analyzed to result in a determination of environmental effects with project implementation.

FEDERAL

BALD AND GOLDEN EAGLE PROTECTION ACT (16 USC §§ 668 TO 668C)

The Bald and Golden Eagle Protection Act was enacted in 1940 to prohibit anyone without a permit issued by the Secretary of the Interior, acting through the USFWS, from taking bald or golden eagles, including their parts, nests or eggs. The Act defines "take" as pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing. As the proposed project would require the removal of trees, an analysis of the proposed project's compliance with the Act is warranted.

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

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), is the primary federal law in the United States governing water pollution. It regulates point sources of water pollution, such as discharges of municipal sewage and industrial wastewater, and the discharge of dredged or fill material into navigable waters and other waters of the United States. The Act also regulates non-point source pollution from sources other than the end of a pipe, such as runoff from streets, agricultural fields, construction sites and mining that enter waterbodies.

Through the CWA, states identify where water quality may be compromised due to pollutants. The East River was included on the 2014 New York State list of affected waterbodies due to combined sewer overflow (CSO) events, contaminated sediment, and urban runoff.

Under Section 401 of the Act, any applicant for a federal permit or any license for an activity that may result in a discharge to navigable waters must provide to the federal agency issuing a permit a certificate, either from the state where the discharge would occur or from an interstate water pollution control agency, that the discharge would comply with Sections 301, 302, 303, 306, 307, and 316 (b) of the Clean Water Act. Applicants for discharges to navigable waters in the State of New York must obtain a Water Quality Certificate from the New York State Department of Environmental Conservation (NYSDEC).

Section 402 of the Act provides guidance on the National Pollutant Discharge Elimination System (NPDES), which governs the issuance of permits to control and prevent water pollution at point sources that discharge pollutants. In the State of New York, the NPDES permit program is administered through NYSDEC's State Pollution Discharge Elimination System (SPDES) permit program, described below.

The With Action Alternatives would require authorization from the Secretary of the Army acting through USACE for activities that would result in a permanent or temporary discharge to navigable waters and Waters of the United States, including mooring of temporary construction barges, the placement of support structures for the proposed shared-use flyover bridge, relocation of embayments, and modifications of CSO outfalls that outlet to the East River. These activities would also require a Water Quality Certificate from NYSDEC that the discharge from such activities would comply with the CWA.

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

The Endangered Species Act (ESA) of 1973 is intended to protect and recover imperiled species and the ecosystems upon which they depend. ESA also provides for the protection of designated critical habitats on which endangered or threatened species depend for survival.

For the proposed project, the ESA requires consultation with the U.S. Fish and Wildlife Service (USFWS) and NOAA NMFS to ensure the protection of listed species or their habitat. For the U.S. Department of Housing and Urban Development (HUD), which is providing partial funding for the proposed project, Title 24 of the Code of Federal Regulations Sections 50.4 and 58.5 specifically state that HUD must comply with the ESA, among other regulations. If a federal agency determines that a project is likely to adversely affect a listed species, a biological assessment must be conducted to determine the extent of the effect, feasible alternatives, and mitigation. A consultation with USFWS was completed (see **Appendix H2**) and has been reinitiated with NOAA NMFS for the Preferred Alternative (see **Appendix G**).

FISH AND WILDLIFE COORDINATION ACT (*PL 85-624; 16 USC §§ 661 TO 667D*)

The Fish and Wildlife Coordination Act (FWCA), as amended in 1964, requires federal agencies to consult with USFWS and NOAA NMFS when proposed actions may result in modifications to a natural stream or body of water. Under this authority, USFWS and NOAA NMFS seeks to protect, conserve, and enhance species and habitats of a wide range of species to ensure that wildlife conservation receives equal consideration and coordination with other water-resource development programs. For NOAA NMFS, the duty under FWCA is to ensure aquatic resources that are not managed by the federal fisheries management councils and therefore do not have designated EFH are also protected, as deemed necessary. The New York Harbor Estuary and the

East River are highly productive habitat for a wide variety of NOAA trust resources covered by the FWCA, many of which are listed in **Table 5.6-3**. As the proposed project would affect both terrestrial and aquatic resources, a consultation with USFWS was completed for threatened and endangered species and an informal consultation for potential FWCA species and habitat was initiated (see **Appendix H2**) and has been reinitiated with NOAA NMFS for the Preferred Alternative (see **Appendix G**).

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (16 USC §§ 1801 TO 1883)

The Magnuson-Stevens Act, administered through NOAA NMFS is the primary law governing marine fisheries management in U.S. waters, including areas designated as EFH. The Magnuson-Stevens Act outlines the process for NOAA NMFS to comment on activities proposed by federal agencies that may adversely affect EFH. Adverse effects to EFH can include direct effects and indirect effects. Direct effects can include dredging, the placement of permanent structures, or the discharge of pollutants. Indirect effects can include the loss of prey species or submerged aquatic vegetation, or the reduction in feeding rates, fecundity, or other effects to the fitness of managed species. The proposed project includes components that would constitute the placement of permanent structures within the East River, which has the potential to adversely affect EFH and marine fisheries. As such, a consultation with NOAA NMFS is required for the proposed project. This consultation is ongoing and relevant materials are provided in **Appendix G**.

MIGRATORY BIRD TREATY ACT (16 USC §§ 703 TO 712)

The Migratory Bird Treaty Act states that, unless permitted, it is unlawful to pursue, hunt, take, capture, kill, or sell any of the species listed in Code of Federal Regulations Title 50 §10.13. Species may be covered under the Canadian Convention of 1916, the Mexican Convention of 1936, the Japanese Convention of 1972, or the Russian Convention of 1976. The act does not include nonnative species whose occurrences in the United States are solely the result of human-assisted introductions. The statute applies equally to both live and dead birds, and grants full protection to any bird parts, including feathers, eggs, and nests. As the proposed project would require the removal of trees, an analysis to evaluate compliance with the Migratory Bird Treaty Act is warranted.

RIVERS AND HARBORS ACT OF 1899, SECTION 10 (33 USC §§ 403)

Section 10 of the Rivers and Harbors Act of 1899 is administered through USACE and states that it is unlawful to build any structure or obstruction such as piers, pilings, or bulkheads in any navigable Waters of the United States and that it is also unlawful to excavate or fill, in any manner, any navigable Waters of the United States without authorization. The purpose of the Act is to protect navigation and navigable channels. Any structure built up to the mean high-water line in navigable water requires authorization from USACE. The East River is classified as a navigable Waters of the United States and, as such, excavation or filling proposed within this waterbody would be subject to this federal statute. The With Action Alternatives propose one or both of the following components that would constitute filling within the East River: installation of support structures for the shared-use flyover bridge, and relocation of existing embayments.

EXECUTIVE ORDER 11988 – FLOODPLAIN MANAGEMENT

Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Floodplain mapping used to identify the presence of a floodplain in a project area is managed by the Federal Emergency Management Agency (FEMA). FEMA issues maps, called Flood Insurance Rate Maps (FIRMs), as part of the National Flood Insurance Program. For HUD, which is providing partial funding for the proposed project, Title 24 of the Code of Federal Regulations Section 55 specifically states HUD must comply with Executive Order 11988.

The applicable HUD regulations for Executive Order 11988 are contained in Code of Federal Regulations Title 44, §9.6, which includes an Eight-Step Decision Making Process. This analysis would discuss why the proposed project must be situated within the floodplain and provide the full range of effects associated with the proposed project. Further, the analysis requires a discussion of any reasonable alternative to locating the proposed project in a floodplain. This analysis can be found in **Appendix L**.

EXECUTIVE ORDER 11990- PROTECTION OF WETLANDS

Executive Order 11990 requires federal agencies to avoid to the extent possible the long- and short-term adverse effects associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Title 24 of the Code of Federal Regulations Section 55 specifically states HUD, which is providing partial funding for the proposed project, must comply with Executive Order 11990. In addition, as noted above, under Code of Federal Regulations Title 44, §9.6, an analysis pursuant to HUD's Eight-Step Decision Making Process would be required to evaluate adverse effects to wetlands associated with the project as well as reasonable alternatives that would minimize or eliminate those adverse effects. This analysis can be found in **Appendix L**.

NEW YORK STATE

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (ECL ARTICLE 17; 6 NYCRR PART 750)

Title 8 of ECL Article 17 authorizes the creation of the State Pollutant Discharge Elimination System (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, discharge of stormwater runoff, and construction activities that disturb one or more acres. As the proposed project would include modifications to the combined sewer system, which is regulated under a SPDES permit for Newtown Creek Wastewater Treatment Plant (WWTP), an analysis of compliance with this regulation is warranted.

TIDAL WETLANDS ACT (ECL ARTICLE 25, 6NYCRR PART 661)

Tidal wetland regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis, such as the East River. 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 tidal wetlands or tidal wetland adjacent areas (within the limits of the City of New York, tidal wetland adjacent areas are identified up to 150 feet inland from a tidal wetland boundary). As the proposed project would include temporary and permanent alterations to NYSDEC littoral zone tidal wetlands, an analysis of the proposed project's compliance with this Act is warranted.

PROTECTION OF WATERS, (ECL ARTICLE 15, 6NYCRR PART 608)

NYSDEC administers the Protection of Waters Permit Program to prevent unregulated effects to surface waters of New York. The Protection of Waters Program regulates the following: protected streams including their bed and banks; the construction of or modification to dams or other impoundment structures; the construction of or modification to docks, piers, wharves, or other floating structures in navigable waters; and the excavation or placement of fill in navigable waters and adjacent areas. Additionally, the Protection of Waters Program issues Water Quality Certifications for actions that result in discharges to Waters of the United States in accordance with Section 401 of CWA. As the proposed project would involve placement of fill in navigable waters, an analysis of the proposed project's compliance with the Protection of Waters Permit Program is warranted.

ENDANGERED AND THREATENED SPECIES OF FISH AND WILDLIFE; SPECIES OF SPECIAL CONCERN (ECL ARTICLE 11, 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. The proposed project involves substantial modifications to habitat and as such an analysis of the proposed project's consistency with this statute is warranted.

COMBINED SEWER OVERFLOW ABATEMENT PROGRAM AND COMBINED SEWER OVERFLOW LONG-TERM CONTROL PLAN (DEP)

Implemented by DEP, the objective of this program and long-term control plan is to reduce pollution in and around the City's waters. The plan provides for field investigations, sewer system and water quality monitoring, and modeling in areas that are heavily impacted by combined sewer overflows (CSO) to determine appropriate mitigation measures. The program aims to establish source controls and stormwater best management practices suited for New York City. The CSO abatement program is under a 2005 Consent Order, which was executed between NYSDEC and DEP and contains milestones for the completion of various projects and planning documents associated with the program. A 2011 modification to the Consent Order contained changes to various planned and ongoing CSO abatement construction projects, as well as to long-term control plan (LTCP) milestones, funding for green infrastructure, and fines for any missed LTCP milestones. A Citywide Open Waters LTCP is currently in the early development stage and includes the East River within the study area. Consistency with the long-term control plan is evaluated for the proposed project as changes are proposed to the existing combined sewer system under the With Action Alternatives.

NEW YORK STATE DEPARTMENT OF STATE (NYSDOS) COASTAL MANAGEMENT PROGRAM

After enactment of the federal Coastal Zone Management Act (CZMA) in 1972, the New York State Department of State (NYSDOS) developed a Coastal Management Plan (CMP) and enacted implementing legislation (Waterfront Revitalization and Coastal Resources Act) in 1981, with the purpose of achieving a balance between economic development and preservation, thus promoting waterfront revitalization and water-dependent uses and protecting open space, scenic areas, and public access to the shoreline, fish, wildlife, and farmland. The program also aims to minimize significant adverse effects to ecological systems, erosion, and flood hazards. The NYSDOS administers the program at the State level, and the New York City Department of City Planning

(DCP) administers it in the City. As the proposed project is located within a coastal zone, compliance with CZMA is warranted. A full consistency analysis is available in **Appendix D**.

NEW YORK CITY

TITLE 56 CHAPTER 5 OF THE RULES OF THE NEW YORK CITY, NYC PARKS

The Title 5 Chapter 56 Rules require the review and approval of tree removals and restitution for trees under the jurisdiction of NYC Parks. NYC Parks has jurisdiction over trees growing in the public right-of-way, including trees along streets, parkways, and in city parks. NYC Parks Forestry Division evaluates the trees proposed for removal and determines the restitution value. In addition to the Rules, work within 50-feet of a street tree requires a Tree Work Permit from NYC Parks prior to the start of construction to ensure measures such as tree protection are made to avoid unsafe or hazardous conditions that may be detrimental to any City tree. Since the proposed project involves removal of trees under the jurisdiction of NYC Parks in East River Park, Murphy Brothers Playground, and Asser Levy Playground, an analysis for compliance with these rules is warranted.

NEW YORK CITY LOCAL WATERFRONT REVITALIZATION PROGRAM

The proposed project would be located within the Coastal Zone as designated by New York State and New York City, and would therefore be subject to City and State coastal management policies. Pursuant to federal legislation, New York State and the City have adopted policies aimed at protecting resources in the coastal zone. New York City's WRP is the City's primary tool for guiding the development of the coastal zone and waterfront. The WRP contains 10 major policies, each with several objectives focused on improving public access to the waterfront; reducing damage from flooding and other water-related disasters; protecting water quality, sensitive habitats, such as wetlands, and the aquatic ecosystem; reusing abandoned waterfront structures; and promoting development with appropriate land uses. When a proposed project is located within the coastal zone and requires federal, state or local discretionary action, a determination of the project's consistency with the policies of the WRP must be made before the project can proceed. Since the waterfront portions of the area affected by the proposed project are within the City's coastal zone, a detailed assessment of the project's consistency with New York City's WRP policy is covered in Section F, "Environmental Effects," below as well as in **Appendix D**.

D. METHODOLOGY

This section identifies the methods used to define baseline conditions within the study area and assess the potential effects resulting from the proposed project on natural resources including geologic and soil resources; groundwater resources; wetlands; flood hazard areas; surface waters; aquatic resources; and terrestrial resources including wildlife, ecological communities, and threatened and endangered species. The methodology was informed by applicable federal and State policies, as appropriate, as well as guidance from the 2014 *City Environmental Quality Review (CEQR) Technical Manual*.

The *CEQR Technical Manual* was used as guidance to inform the criteria taken into consideration when determining whether adverse effects to natural resources as a result of the proposed project rise to the level of significant. Consistent with the manual's guidance, the analyses considered the direct and indirect effects on natural resources and their ability to continue to serve designated functions within the larger ecological setting, including but not limited to recreational use, aesthetic enhancement, and physical protection (e.g., flood protection). Loss of habitat or degradation of existing habitat was considered as well as consistency with natural resources

policies of the City, including the policies identified in the WRP. The possibility for direct or indirect effects to significant, sensitive, or designated resources, or the potential effects to resident or migratory endangered, threatened, or rare animal species or species of special concern was also considered.

GEOLOGIC AND SOIL RESOURCES

Geologic and soil resources currently and historically occurring within the study area were identified using the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, literature, and technical data from project-related boring activities. The potential for effects to geologic and soil resources was assessed by determining whether construction or operational activities associated with the proposed project would have the potential to cause erosion, instability, or compositional changes to geology and soils within the study area.

GROUNDWATER RESOURCES

Groundwater resources occurring within the study area were described using the USDA NRCS Web Soil Survey, literature, and technical data from project-related boring activities. The potential for effects to groundwater resources was assessed by determining whether construction or operational activities associated with the proposed project would have the potential to result in the displacement, degradation, or changes in conveyance of groundwater within the study area.

WETLANDS

Wetlands in the study area were identified by utilizing USFWS National Wetlands Inventory (NWI) maps, NYSDEC freshwater and tidal wetland maps, and on-site surveys. Additionally, a jurisdictional determination was approved by USACE on July 21, 2017 to identify and locate jurisdictional waters of the United States, including USACE regulated wetlands (see **Appendix F2**). The NWI maps are generated based on orthoimagery, soil surveys, and USGS topographic maps. No field verification of NWI wetlands occurs in the mapping process. NYSDEC freshwater wetlands maps are identified with similar processes but are typically field-verified and are a minimum of 12.4 acres in size. NYSDEC tidal wetlands maps from 1974 are used to identify tidal wetlands and are field verified through use of visual observation and site survey. The potential for effects to wetland resources was assessed by determining if any activities associated with the proposed project could cause direct and indirect effects on wetland water levels, size, and quality within the study area.

As documented in a March 22, 2016 memorandum, natural resources field surveys were conducted within the project areas (see **Appendix F1**). Low tide surveys were conducted on July 10, 2015, and high tide surveys were conducted on June 19, 2015. The surveys were performed along the East River shoreline within the project area. During the low tide survey, any areas adjacent to the largely bulkheaded East River Park were inspected to identify any observable intertidal habitat.

SPECIAL FLOOD HAZARD AREAS

Floodplains alleviate flooding by allowing flood waters to dissipate their energy and recharge into the ground. Floodplains include Special Flood Hazard Areas (SFHA) defined by FEMA as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year.[1] SFHA in the study area were identified using preliminary FEMA

[1] The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.

Flood Insurance Rate Maps (FIRMs) for New York City. The preliminary FIRMs are currently the Best Available Flood Hazard Data (BAFHD) for New York City. FIRMs typically show the areas of inundation anticipated for the 100-year storm, or the storm that has a 1 percent chance of occurring annually and the areas of inundation anticipated for the 500-year storm, or the storm that has a 0.2 percent chance of occurring annually. The potential for effects to SFHA was assessed by determining if any construction and/or operational activities associated with the proposed project could cause disturbance to SFHA within the study area.

Since the waterfront portions of the area affected by the proposed project are within the City's coastal zone, an assessment of the project's consistency with the City's Waterfront Revitalization Program (WRP) is covered in Section F, "Environmental Effects," below as well as in **Appendix D**.

SURFACE WATER RESOURCES

Surface waters in the study area were identified using desktop mapping such as orthoimagery and NYSDEC hydrography data and with on-site surveys (see **Appendix F1**). Water quality classification and standards specified in Part 701 of the New York Code of Rules and Regulations for surface waters in the study area were identified. Baseline conditions regarding the water quality of identified surface waters were defined using the DEP Harbor Water Quality Survey, US Environmental Protection Agency (EPA) National Sediment Quality Survey Database, and additional literature and studies from governmental and non-governmental agencies such as NYSDEC, USACE, and the NY/NJ Harbor Estuary Program. The potential for effects to surface waters was assessed by determining if activities associated with the proposed project could cause direct or indirect effects on surface water levels and water quality within study areas.

AQUATIC RESOURCES

Aquatic resources, such as benthic invertebrates, fish, and EFH occurring in the study area, were identified using the results of surveys and studies of the East River conducted by governmental and non-governmental organizations including DEP, NYC Parks, USACE, NOAA, Con Edison, and the New York State Energy Research and Development Authority (NYSERDA). EFH potentially occurring in the study area was identified using "The Guide to Essential Fish Habitat Designations in the Northeastern United States" published by NOAA NMFS. The potential for effects to aquatic resources were assessed by determining if any construction and/or operational activities associated with the proposed project could cause direct or indirect effects to aquatic and benthic resources within the study area. A consultation with NOAA NMFS in accordance with the Magnuson-Stevens Fisheries Act Conservation and Management Act as well as the FWCA was reinitiated for the Preferred Alternative and remains ongoing (see **Appendix G**).

TERRESTRIAL RESOURCES

Terrestrial resources occurring in the study area, including ecological communities, wildlife, and threatened, endangered, and special concern species, were identified using the NYSDEC Breeding Bird Atlas, the NYSDEC Amphibian and Reptile Atlas, through a request for information with the New York Natural Heritage Program (NYNHP), and a Section 7 Endangered Species Act consultations with USFWS and NOAA NMFS. Site investigations were also conducted on two occasions in early and late summer 2015. The results and findings of these site investigations are documented in an August 10, 2015, memorandum (see **Appendix F1**).

The 2000–2005 Breeding Bird Atlas is the result of a five-year survey which divided the State into three-mile by three-mile survey blocks that were assessed for breeding bird species by State

biologists, researchers, volunteer ornithologists, and bird watchers. This data is available in a database through the NYSDEC website (New York State Breeding Bird Atlas, 2000).

The NYSDEC Amphibian and Reptile Atlas is a State-wide survey of amphibians and reptiles that was conducted over 10 years starting in 1990. The NYSDEC Amphibian and Reptile Atlas information is organized by USGS 7.5-minute quadrangles and is also available through the NYSDEC website (New York Amphibian and Reptile Atlas Project, 1999).

NYSNHP is a joint venture between NYSDEC and State University of New York College of Environmental Science and Forestry that maintains a continuously updated scientific inventory of rare plants and animals native to New York State. NYNHP's database of state listed rare species and natural communities was consulted to identify the potential for any such species or natural communities to occur within the project area (see **Appendix H1**).

A Section 7 consultation with USFWS was initiated utilizing the Information Planning and Conservation (IPaC) tool to identify federally protected species with the potential to occur in the study area. The Official Species List indicated no threatened or endangered species under USFWS jurisdiction within the study area (see **Appendix H2**).

The potential for effects to terrestrial resources was assessed by determining if activities associated with the proposed project could result in a disturbance to terrestrial resources from activities that could require tree removal or cause a disturbance to significant natural communities within the study area.

A tree inventory of the study area was conducted over the months of June through August of 2015, following NYC Parks' Tree Inventory Protocols and New York City Department of Design and Construction's (DDC) General Requirements (GR) 4.16 and subsequently updated on June 22, 2017, and July 7, 2017 (see **Appendix I**). A limited tree survey was conducted on January 4, 2019, to identify trees that would be potentially affected by the drainage management and drainage isolation features (described in Chapter 5.8, "Water and Sewer Resources."). This information was sorted in the following categories:

- Trees to be removed with project implementation—trees in the footprint of disturbance (regrading/construction) of the proposed alternative that would be removed due to construction of the proposed project
- Trees to be removed due to condition—trees that were determined by a Certified Arborist to be in a condition which may require removal within the timeframe of the proposed construction, and any tree stumps that would require removal
- Trees to be retained—trees outside of the project disturbance footprint that would be protected during construction
- Trees to be planted—replacement trees proposed as part of the proposed project's landscaping plan

Trees to be removed included trees in poor condition and dead trees (including tree stumps) that were identified for removal during the 2015, 2017, and 2019 tree inventory[2] or trees in poor to fair condition that were noted for potential future removal.[3]

[2] If the notes and scores suggested that the tree is in poor condition, the Certified Arborist reviewed the photographs of the tree and determined the potential for future removal.

[3] No potential trees to be removed due to condition were counted in any other categories.

Of the trees to be removed with project implementation, some were designated as potential transplant trees, which may be moved elsewhere within the City. Trees measuring 7 inches diameter at breast height (dbh) or less were evaluated as potential transplant candidates as per NYC Parks. If a tree scored 27 or higher in the inventory it was considered to be in "excellent" condition and, therefore, a transplant candidate.[4]

Due to routine maintenance of East River Park by NYC Parks forestry officials, trees have been removed in the project areas and vicinity since the tree inventory was initially collected. Many of these trees had been in severe decline due to the effects of salt water inundation from Hurricane Sandy. To keep an accurate inventory, a desktop geospatial analysis was conducted using NYC Parks' tree work order data to identify which trees included on the initial project survey have since been removed.

E. AFFECTED ENVIRONMENT

GEOLOGIC AND SOIL RESOURCES

The native surficial geology of Manhattan consists of unconsolidated glacial deposits made up of sand, gravel, clay, and boulders ranging from 0 feet below land surface to greater than 250 feet below land surface. This unconsolidated material was deposited as a result of the Pleistocene glaciation (Perlmutter and Theodore, 1953; Stumm et. al., 2007). The island of Manhattan is underlain by metamorphic bedrock consisting of Harrison/Ravenswood Gneiss (Baskerville and Mose, 1989).

The surficial soils in the study area consist of highly modified urban soils. The Manhattan shoreline has been subject to intense anthropogenic modification, including the filling of coastal areas, to expand usable land surface. The study area, which was historically part of the East River, was filled approximately 100 years ago and has been modified numerous times since, including during the original construction of East River Park in 1939 (Walsh, 1991). Fill materials during the last century have varied and may consist of waste materials such as coal ash, wood ash, putrescible and commercial refuse, and demolition debris. Subsurface material in the study area is known to contain contamination consistent with manufactured gas plant (MGP) operations. MGPs were historically present in the study area at several locations. Other contaminants from legacy sources such as lead and volatile organic compounds (VOC) were also documented. See Chapters 5.7, "Hazardous Materials," and 6.6, "Construction—Hazardous Materials," for additional detail on hazardous materials in the study area.

GROUNDWATER RESOURCES

Groundwater is known to occur on the island of Manhattan within fractures in the bedrock. The bedrock is metamorphic and is overlain with unconsolidated glacial sediments. Depth to bedrock can range between 8 and 108 feet below ground surface. Fractures in the bedrock that contain and convey groundwater can occur as shallow as sea level (Stumm et al. 2003). At sea level, groundwater is often tidally influenced.

From central Manhattan, groundwater passes through the fractures in the bedrock downgradient towards the adjacent waterbodies, primarily the Hudson River and the East River. Groundwater on the island of Manhattan is not used for potable purposes. Soil borings in the project area were conducted to identify potential contamination (see Chapters 5.7, "Hazardous Materials," and 6.6,

[4] As documented in the NYC Parks "Field Inventory" Sheet of the Tree Inventory Spreadsheet (version 7.2) template prepared during the tree inventory.

"Construction—Hazardous Materials"). Depth to groundwater at boring locations in Project Area One and Project Area Two was approximately seven feet below ground surface.

WETLAND RESOURCES

The entire East River shoreline within the study area is bulkheaded. The East River is mapped by NWI as estuarine subtidal wetlands with an unconsolidated bottom (E1UBL) (see **Figure 5.6-2**). Subtidal estuarine wetlands are defined by USFWS as deep-water tidal habitats and adjacent tidal wetlands that are influenced by water runoff, often enclosed by land, that have low energy and variable salinity. Unconsolidated bottoms have at least 25 percent cover of particles smaller than six to seven centimeters and less than 30 percent vegetative cover (Cowardin et. al., 1979).

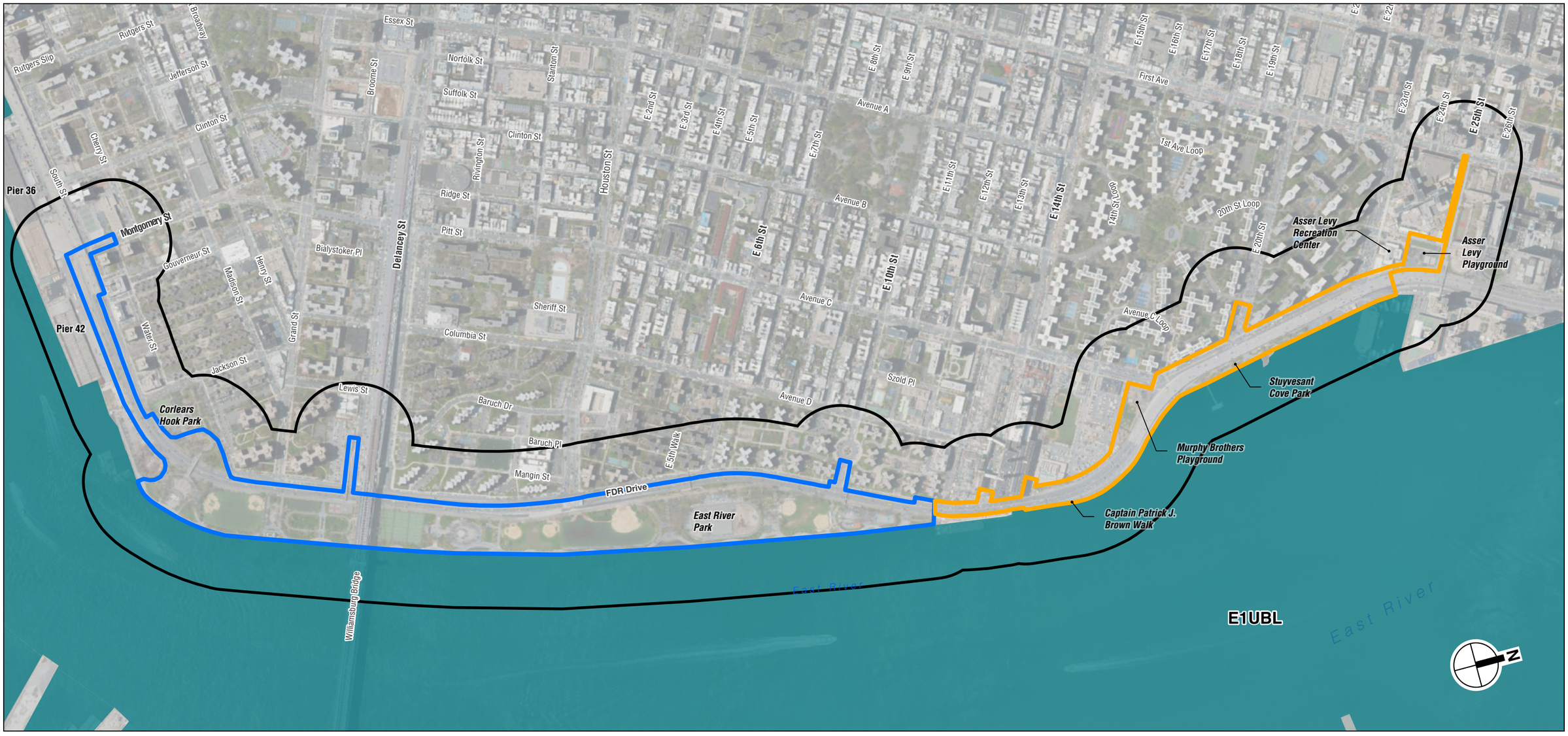
The study area also includes NYSDEC regulated littoral zone tidal wetland (see **Figure 5.6-3**). Littoral zone is defined as "the tidal wetland zone that includes all lands under tidal waters which are not included in any other category. There shall be no littoral zone under waters deeper than six feet at mean low water (6NYCRR Part 661)." NYSDEC tidal wetland maps indicate that the entire East River constitutes littoral zone. However, much of the East River exceeds depths of six feet below mean low water (see **Figure 5.6-4**). Based on observations made during the low tide shoreline surveys, it is anticipated that there are portions of the East River adjacent to or underneath the bulkhead that are six feet deep or less at mean low water and, therefore, have the littoral zone classification. This includes two existing embayments, which are areas where the shoreline curves inward, located along the East River just north and south of the Houston Street entrance to the park. These embayments were created as part of the esplanade redesign in 2005–2008 to make the East River more accessible to park users and heighten their experience of the river and its currents and tidal flow. They consist of narrow areas that allow tidal water from the East River to flow beneath short pedestrian bridges along the esplanade onto a rip rap slope that ends at the bulkhead. In the existing condition both the northern and southern embayments were conceived and constructed with pedestrian bridges spanning across the entrance to the embayment, shading significant portions of the water below. Along the land side of the embayments, the bulkhead edge includes rocky fill material that was placed as part of the recent reconstruction to improve slope stabilization. The southern embayment is approximately 4,600 square feet, of which approximately 3,600 square feet (78 percent) is shaded by the short pedestrian bridge; the northern embayment is approximately 16,000 square feet, of which approximately 5,200 square feet (32 percent) is shaded.

There are no NYSDEC mapped freshwater wetlands in the study area and no freshwater wetlands were identified in the study area during natural resources surveys.

The study area also includes wetlands that are regulated by USACE as Waters of the United States. USACE also regulates tidal and freshwater wetlands, when deemed jurisdictional. Jurisdictional wetlands are those that are navigable and/or have a significant nexus with a navigable waterway.

Shoreline surveys conducted during low tide found three locations within the study area where the substrate of the East River is either visible or exposed (see **Figure 5.6-5**). Although these areas are mapped as littoral zone, they could be classified by NYSDEC as coastal shoals, bars, and mudflats tidal wetlands. Growth of rockweed (*Ascophyllum spp.)*, a brown alga, and sea lettuce (*Ulva spp*.), a green alga, was visible in these areas. While the entirety of the East River has been mapped as littoral zone, only the areas up to six feet in depth are regulated as such by NYSDEC.

3/15/2019



Source: USFWS

Project Area One

Project Area Two

Natural Resources Study Area (400-Foot Study Area Radius)

Estuarine and Marine Deepwater (Estuarine Subtidal Wetlands with an Unconsolidated Bottom- E1UBL)

0 1,000 FEET

Capital Project SANDRESM1

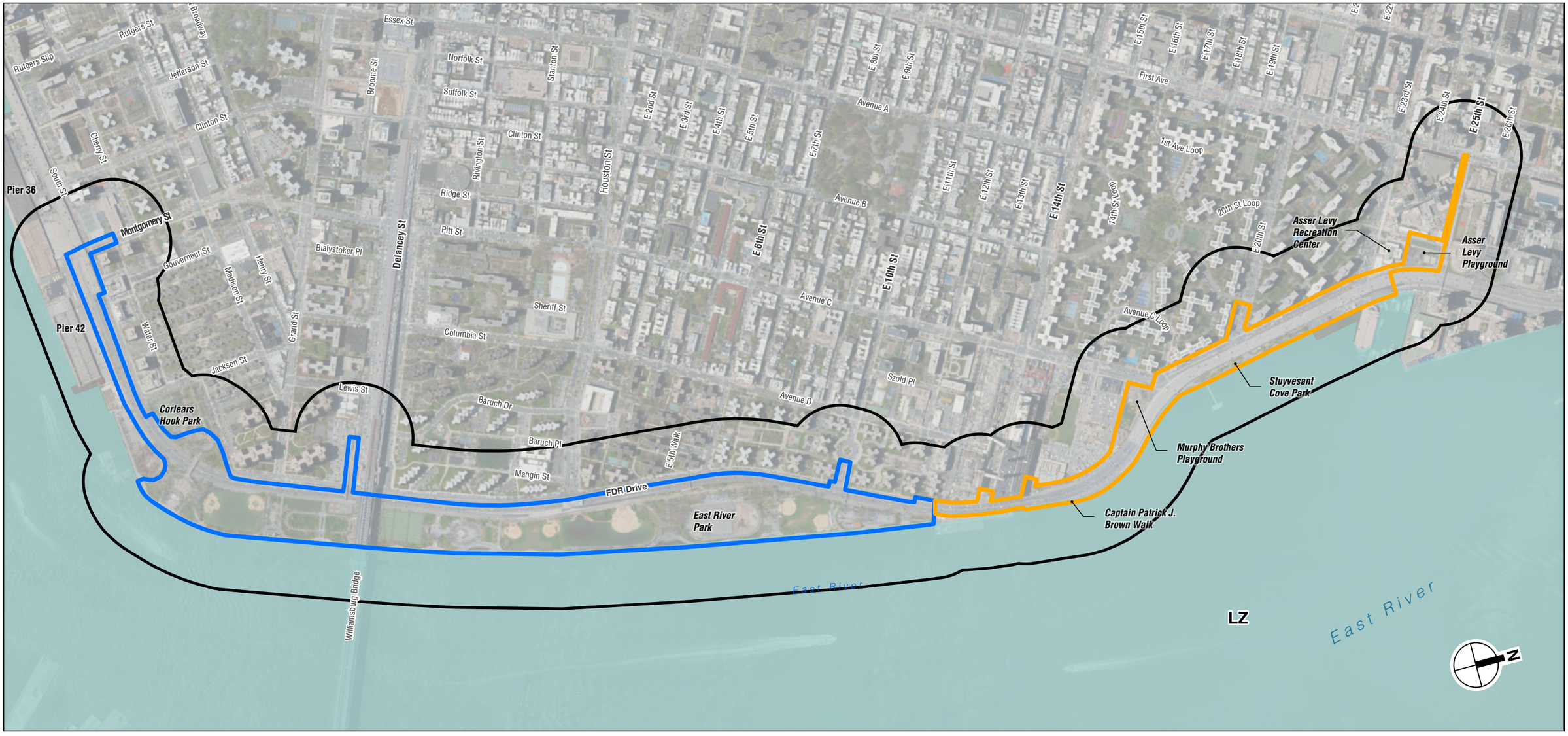
EAST SIDE COASTAL RESILIENCY PROJECT

Natural Wetlands Inventory Map

Figure 5.6-2

3/15/2019

Source: Tidal Wetlands, NYS Department of Environmental Conservation, 1974



Project Area One

Project Area Two

Natural Resources Study Area (400-Foot Study Area Radius)

Littoral Zone

0 1,000 FEET

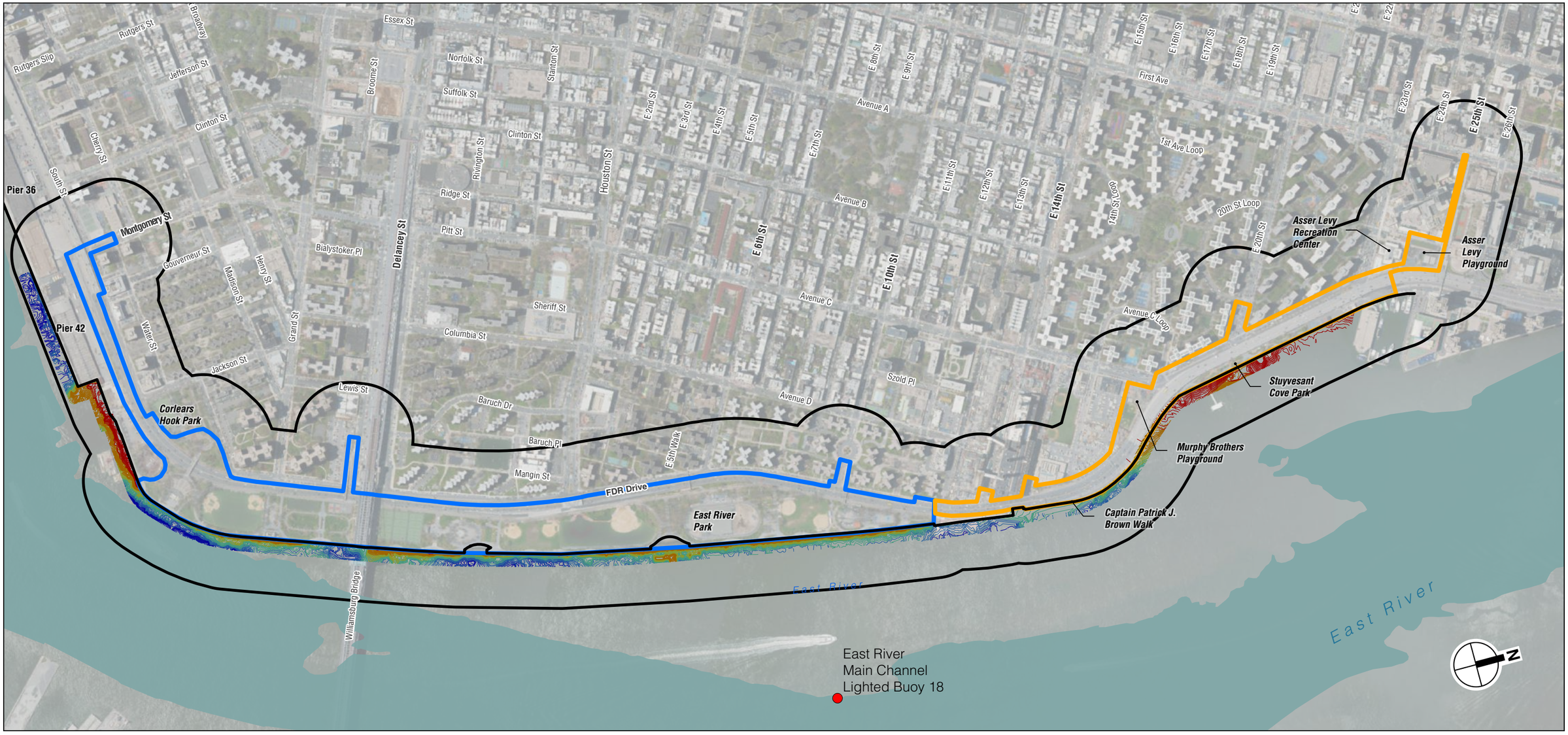
Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

NYSDEC Tidal Wetlands Map

Figure 5.6-3

3/15/2019



Project Area One

Project Area Two

Natural Resources Study Area (400-Foot Study Area Radius)

Mean High Water Line/Bulkhead Line

Approximate Federal Navigation Channel (35 Foot Depth or Greater)

Bathymetry - Depth in Feet

- *43 to 35*
- *35 to 30*
- *30 to 25*
- *25 to 20*
- *20 to 10*
- *<10*

0 1,000 FEET

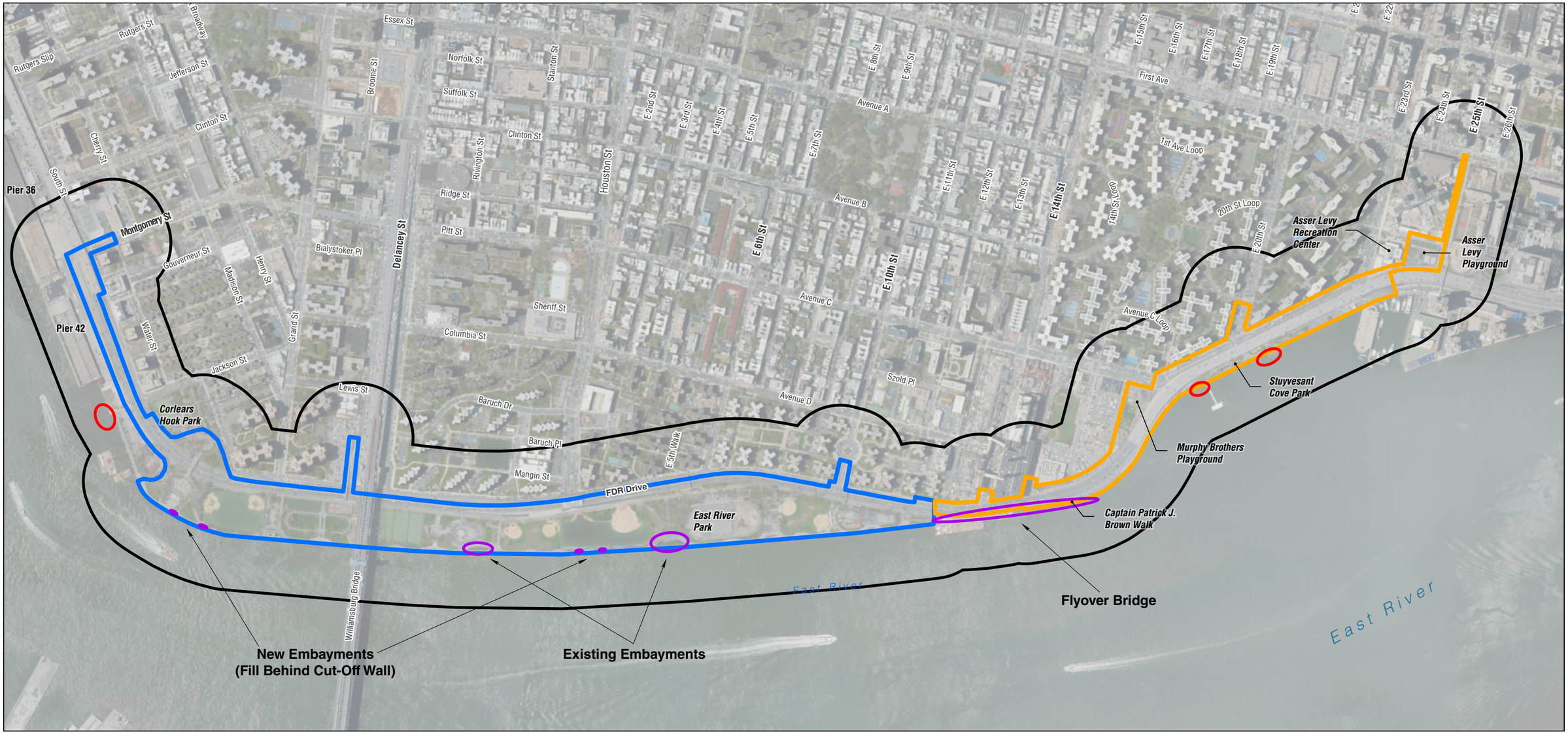
Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Depth of Water and East River Channel

Figure 5.6-4

3/15/2019



Project Area One

Project Area Two

Natural Resources Study Area (400-Foot Study Area Radius)

Approximate Locations of Permanent In-Water Disturbance

Areas Exposed at Low Tide

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Locations of Permanent In-Water Disturbance for the Preferred Alternative

Figure 5.6-5

SPECIAL FLOOD HAZARD AREA

The majority of the study area is designated as within the 100-year floodplain (see **Figure 5.6-1**) according to the preliminary FIRMs for New York City. Exceptions to this in Project Area One include inland portions west of Water Street, the area surrounding East River Park Amphitheater, the area surrounding the Houston Street Overpass, and an area along East 7th Street between Avenue D and the FDR Drive. In Project Area Two, exceptions include an area in Stuyvesant Town between Avenue C Loop and Avenue C, East 23rd Street between First and Second Avenues and an area north and west of East 25th Street.

SURFACE WATER RESOURCES

The study area is located along the western shore of the lower East River, a tidal strait that connects New York Harbor with Long Island Sound. The river is approximately 16 miles long and generally ranges between 600 to 4,000 feet wide. The lower East River, which runs from the Battery in Manhattan to Hell Gate in Queens, is narrower and deeper than the upper East River, which runs from Hell Gate in Queens to Long Island Sound. Mean depth of the lower East River is approximately 30 feet below mean low water (Blumberg and Pritchard, 1997); however, depth varies and can be as deep as approximately 65 feet below mean low water (USACE, 2015).

The East River's circulation and salinity structure are largely determined by conditions in the Upper Harbor and Long Island Sound. Currents in the East River are swift and can approach 8 feet/second (Bowman, 1976). The strong currents are a result of the width of the East River, its channelization and bottom topography, and the influence of tidal water from the Hudson River, Harlem River, and Long Island Sound. Ebb tides are particularly powerful. A large difference in water surface elevation from the Long Island Sound to The Battery also contributes to the strong currents (Blumberg and Pritchard, 1997).

Freshwater input into the East River consists of several systems: the Bronx River, Westchester Creek, and the Hudson River. Additionally, overland flow, combined sewer overflow, and point source discharges from wastewater treatment plants account for freshwater inputs into the East River. There are over 100 combined sewer overflow outfalls in the lower East River, with 23 occurring along the shoreline of Project Area One and Project Area Two (OASIS, 2014).

WATER QUALITY

Title 6 NYCRR Part 701 is the regulatory framework that classifies surface water and groundwater in New York State. The lower portion of the East River within the study area is a Class I saline surface water body. Class I water bodies are best suited for secondary contact, which includes fishing and recreational activities. Wildlife species should be capable of establishing successful habitats in these waters. Prolonged physical contact, such as swimming in these waters, is not advised. Consumption of fish from this classification of water body is restricted or not advised.

Title 6 NYCRR Parts 703.3 and 703.4 establish water quality standards for fecal and total coliform, dissolved oxygen (DO), and pH in New York. The water quality standards for the lower East River are provided in **Table 5.6-2**.

DEP has monitored New York Harbor water quality since 1909 through the Harbor Survey. Data from the Harbor Survey are used to produce the annual State of the Harbor Report. DEP evaluates surface water quality of four designated regions: Inner Harbor Area, Upper East River-Western Long Island Sound, Lower New York Bay-Raritan Bay, and Jamaica Bay (DEP 2012). The study area is included in the Inner Harbor Area, which spans from the lower East River to the Battery. Harbor Survey Station E2 is located within the study area at East 23rd Street.

Table 5.6-2
New York State Water Quality Standards for Class I Waterbodies

Standard	Criteria
Fecal Coliform	Monthly geometric mean of ≤ 200 colonies/100mL from five or more samples.
Total Coliform	Monthly median value ≤2,400 colonies/100 mL from five or more samples. Monthly 80th percentile ≤5,000 colonies from five or more samples
Dissolved Oxygen (DO)	Never less than 4 mg/L
pH	Normal range shall not be extended by >0.1 of a pH unit.

Over the past twenty years, Harbor Survey data show that the water quality of New York Harbor has improved significantly as a result of measures undertaken by the City (DEP 2012). These measures include eliminating 99 percent of raw dry-weather sewage discharges, reducing illegal discharges, increasing the capture of wet-weather related floatables, and reducing the toxic metals loadings from industrial sources by 95 percent (DEP 2002). The 1999 and 2000 Interstate Environmental Commission (IEC) 305(b) reports also indicate that the year-round disinfection requirement for discharges to waters within its district (including New York Harbor) has contributed significantly to water quality improvements since the requirement went into effect in 1986 (IEC 2000, 2001). In the 2012 State of the Harbor Report, seven of the eight water quality performance metrics showed an improvement in the Inner Harbor (DEP 2012).

Temporary increases in fecal coliform concentrations may occur during wet weather due to increased fecal coliform loadings from CSOs following a rain event. Overall, fecal coliform concentrations in this area have declined, significantly improving water quality from the early 1970s, when levels were well above 2,000 colonies/100 mL (DEP 2001). Fecal coliform concentrations in the study area at Harbor Survey Station E2 station ranged from 4 to 168 colonies/100mL at the surface in 2017 (DEP 2017). The peak concentration of fecal coliform was recorded in July. No fecal coliform samples were collected from bottom waters at Station E2. Higher concentrations in warmer months are anticipated, as there can be more wet weather events.

Dissolved oxygen in the water column is necessary for respiration by all aerobic forms of life, including fish and invertebrates such as crabs, clams, and zooplankton. The bacterial breakdown of high organic loads from various sources can deplete dissolved oxygen to low levels and persistently low dissolved oxygen can degrade habitat and cause a variety of sublethal or, in extreme cases, lethal effects. Consequently, dissolved oxygen is one of the most common indicators of overall water quality in aquatic systems. Dissolved oxygen concentrations in the Inner Harbor area have increased over the past 30 years from an average of below 3 mg/L in 1970 to above 5 mg/L in 2001, a value supportive of ecological productivity (DEP 2002). Dissolved oxygen concentrations in the study area at Harbor Survey Station E2 station ranged from 4.03 to 10.67 mg/l at the surface and from 3.80 to 10.71 mg/l in bottom waters in 2017 (DEP 2017). The lower dissolved oxygen values were recorded during the summer months.

High levels of nutrients can lead to excessive plant growth (a sign of eutrophication) and depletion of dissolved oxygen. Eutrophication occurs when a water body experiences undesirable levels of nutrients. The elevated nutrients can occur from both natural and anthropogenic sources. 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. The average summer chlorophyll-a value in the Inner Harbor area of the DEP Harbor Survey program (which includes Station E2) was 7.69 µg/l, which was fairly consistent with Harbor Survey results over the past

five years (DEP, 2016). DEP is implementing a program to reduce nitrogen loadings from wastewater treatment plants to the East River. Upgrades implemented at four upper East River treatment plants have decreased nitrogen discharges from these plants by over 30,000 pounds per day since 1993.

Secchi transparency measures the clarity of surface waters.[5] Transparency greater than 5 feet is indicative of clear water. Decreased clarity can be caused by high suspended solid concentrations or blooms of plankton. Secchi transparencies less than 3 feet are generally 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 about 3.5 and 5.5 feet (DEP 2012). For the Harbor Survey Monitoring Program in 2017, secchi transparency at Station E2 averaged 3.3 feet (DEP 2017).

NYSDEC is leading a collaborative effort to reduce toxic chemicals in New York Harbor. The overall goal of the initiative is to reduce the flow of contaminants to the Port of New York and New Jersey. The principal chemicals of concern include dioxins/furans, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), metals (mercury, cadmium, and lead), and pesticides (dieldrin and chlordane). This work is being done under the Contamination Assessment and Reduction Project (CARP). NYSDEC developed a comprehensive, multi-media contaminant identification program simultaneously with the Office of the Governor of New Jersey, New Jersey Department of Environmental Protection (NJDEP), and the CARP Work Group, a group of government, academic, and consultant experts. Together with the CARP Work Group, New York and New Jersey are undertaking a variety of projects including studies of the water in the Harbor and tracking down contaminant sources in the surface water, groundwater, and wastewater of the Harbor.

AQUATIC RESOURCES

The East River is an urban water body situated along the shores of the boroughs of Queens, Manhattan, and Brooklyn. The variation in sources of runoff affect the type of biota that can exist in the river where a wide array of conditions must be tolerated.

PHYTOPLANKTON

Phytoplankton are microscopic plants whose movements are largely dictated by prevailing tides and currents. Light penetration, turbidity, and nutrient concentrations are important in determining phytoplankton productivity and biomass. Organisms found in Long Island Sound and Hudson River are also usually found in the East River due to the proximity of these waterbodies to each other and strong currents.

A survey conducted in 1983 of the East River concluded that diatoms were generally the most widely represented class of phytoplankton, accounting for over 90 percent of the different taxa collected, and the green alga *Nannochloris* was the most abundant single taxa identified (Hazen and Sawyer 1983). In a 1993 survey of New York Harbor, 29 taxa of phytoplankton were identified, with the diatom *Skeletonema costatum* and the green algae *Nannochlorus atomus* determined to be the most abundant species at the monitored sites (Brosnan and O'Shea 1995). The average summer cell counts in that year ranged from 6,300 to 97,000 cells/mL. Resident times of phytoplankton species within New York Harbor are short as species move quickly through the

[5] Completed using a secchi disk (plain white circular disk 12 inches in diameter attached to a measurement demarcated pole or line). The disk is lowered into the water until the disc is no longer visible from the water's surface. This is known as the Secchi depth.

system due to strong tidal currents. Investigators have suggested that the overall composition and relative abundance of phytoplankton taxa in the East River are more heavily influenced by the influx from waters of Long Island Sound and New York Harbor than by localized water quality conditions (Con Edison 1982).

SUBMERGED AQUATIC VEGETATION AND BENTHIC ALGAE

Submerged aquatic vegetation (SAV) refers to rooted aquatic plants that are often found in shallow areas of estuaries. These organisms are important because they provide nursery and refuge habitat for fish. Benthic algae can be large multicellular plants that can be important primary producers in the aquatic environment. They are often seen on rocks, jetties, pilings, and sandy or muddy bottoms (Hurley 1990). Since these organisms require sunlight as their primary source of energy, the limited light penetration of New York Harbor limits their distribution to shallow areas. Light penetration, turbidity, and nutrient concentrations are all important in determining SAV and benthic algae productivity and biomass. Surveys conducted in the study area documented sea lettuce and rockweed, which are species of benthic algae, occurring on intertidal riprap at several locations along the shoreline including just north of Pier 42, the riprap coves at Stanton Street and East 4th Street, and at Stuyvesant Cove Park. No SAV was observed within the study area.

ZOOPLANKTON

Zooplankton are an integral component of aquatic food webs. They are primary grazers on phytoplankton and detritus material and are themselves used by organisms of higher trophic levels as a food source. The higher-level consumers of zooplankton typically include forage fish, such as bay anchovy, as well as commercially and recreationally important species, such as striped bass (*Morone saxatilis*) and white perch (*Morone americana*) during their early life stages. Predacious zooplankton species can consume eggs and larvae, which can have a detrimental effect on certain fish species.

Crustacean taxa are generally the most abundant group of zooplankton collected in New York Harbor. The most dominant species include the copepods *Acartia tonsa*, *Acartia hudsonica*, *Eurytemora affinis*, and *Temora longicornis*. These species are not all present at the same time and their abundance varies seasonally (Stepien et al. 1981, Lonsdale and Cosper 1994, Perlmutter 1971, Lauer 1971, Hazen and Sawyer 1983).

BENTHIC INVERTEBRATES

Benthic invertebrates typically inhabit bottom sediments and the surfaces of submerged objects such as rocks, pilings, or debris. These organisms contribute to the flow of energy within an ecosystem by converting detrital and suspended organic material into carbon (or living material) and are part of the diets of fish and waterfowl within the East River. Benthic invertebrates promote the exchange of nutrients between the sediment and water column. Benthic invertebrates that are typically retained on a 0.5 mm screen are referred to as macroinvertebrates. Smaller benthic invertebrates are referred to as meiofauna and include nematodes (a class of roundworm) and harpacticoid copepods (order of copepods that are primarily benthic). Some of these animals live on top of the substratum (epifauna) and some within the substratum (infauna). The concentration of benthic invertebrates found is influenced by the type of substrate (rocks, pilings, sediment grain size, etc.), salinity, and dissolved oxygen levels. Currents, wave action, predation, succession, and disturbance also influence their concentrations and survival.

Over 100 benthic invertebrate taxa (mostly crustaceans or polychaete worms) have been identified in the East River (Coastal Environmental Services 1987). Common infaunal macroinvertebrates

include aquatic earthworms, segmented worms, snails, bivalves, soft-shell clams, barnacles, cumaceans, amphipods, isopods, crabs, and shrimp. Epifauna include hydrozoans, sea anemones, flatworms, oligochaete worms, polychaetes, bivalves, barnacles, gammaridean and caprellid amphipods, isopods, sea squirts, hermit crabs, rock crabs, grass shrimp, sand shrimp, blue crabs, mud dog whelks, mud crabs, horseshoe crabs, blue mussels, softshell clams, and the sea slug (EA Engineering, Science, and Technology 1990, Able et al. 1995, NYC Parks 1994, PBS&J 1998). Two benthic invertebrate sub-communities have been identified in the East River on the basis of substrate hardness (Hazen and Sawyer 1983). The hard substrate community is characterized by organisms that are either firmly attached to rocks and other hard objects (e.g., mussels or barnacles), or that build or live in tubes. Species of polychaete worms, amphipods, and several other species have adapted to the East River's hard bottoms and rapid currents by living within the abandoned tubes of other species. The soft substrate community occurs in the more protected areas within the East River where detritus, clay, silt, and sand have accumulated in shallow, low velocity areas near piers and pilings. Common soft substrate organisms included oligochaete worms, the soft-shelled clam *Mya arenaria*, and a variety of flatworms, nemerteans, polychaetes, and crustaceans (Hazen and Sawyer, 1985). Recent benthic and epibenthic sampling by DEP in the lower East River documented nine benthic macroinvertebrate taxa, including annelids, arthropods, and mollusks. The annelid *Haploscoloplos robustus* and mollusks *Melampus bidentatus* and *Mulinia lateralis* were found in the highest densities (DEP 2007). Benthic macroinvertebrates sampled between Piers 6 and 9 on the Manhattan shoreline of the East River in 2002 found mostly pollution-tolerant taxa (primarily polychaetes in the families *Capitellidae* and *Spionidae*), although some pollution-sensitive species (e.g., *Ampelisca* spp.) were also found. Other invertebrates collected were mussels, crabs, shrimp, isopods, and nematodes (AKRF 2002).

FISH

The finfish community in Upper New York Harbor, including the lower East River, is typical of large coastal estuaries and inshore waterways along the Mid-Atlantic Bight, supporting a variety of estuarine, marine, and diadromous fish species that use this area as spawning grounds, a migratory pathway, or nursery/foraging habitat. Diadromous fish species can be either anadromous or catadromous. Anadromous species live as adults in the open ocean and return to freshwater locations to breed. Catadromous species live as adults in freshwater locations and return to open ocean to breed.

Hogchoker (*Trinectes maculates*), tomcod (*Microgadus tomcod*), winter flounder (*Pseudopleuronectes americanus*), white perch, bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*) and striped bass, are examples of common fish found within the lower East River during at least one life stage. Atlantic silverside (*Menidia menidia*), mummichog (*Fundulus heteroclitus*), northern pipefish (*Syngnathus fuscus*), striped killifish (*Fundulus majalis*), and three-spined stickleback (*Gasterosteus aculeatus*) are common to the East River year-round (NOAA 2001). Among breeding finfish of the lower East River, ichthyoplankton tow sampling (NOAA) found egg density to be greatest for cunner (*Tautogolabrus adspersus*), followed by tautog (*Tautoga onitis*). Other species' eggs that were found in relatively low abundance included bay anchovy, herrings (*Clupeidae* spp.), fourbeard rockling (*Enchelyopus cimbrius*), wrasses (*Labridae* spp.), North American searobins (*Prionotus* spp.), and windowpane flounder (*Scophthalmus aquosus*). Winter flounder was the most abundant species collected at the larval stage. Other larvae found included American sand lance (*Ammodytes americanus*), bay anchovy, blennies (*Blenniidae* spp.), Atlantic menhaden, herrings, fourbeard rockling, true gobies (*Gobiidae* spp.), sculpins (*Myoxocephalus* spp.), windowpane flounder, northern pipefish, and tautog (DEP 2007).

American eel (*Anguilla rostrata*), 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 diadromous fish that may pass through the East River during migration to and from spawning areas in the upper Hudson River and its tributaries (NOAA 2001). Transient shortnose sturgeon (*Acipenser brevirostrum*) also have the potential to occur briefly in the East River (Bain 1997). Examples of marine species found in the East River from spring through fall include bluefish (*Pomatomus saltatrix*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), tautog, and weakfish (*Cynoscion regalis*) (NOAA 2001). Overall, the East River's fish community is spatially and seasonally dynamic. See **Table 5.6-3** for a complete list of currently known species that have the potential to be found in the study area.

Table 5.6-3
Fish Species with the Potential to Occur in the East River

Common Name	Scientific Name
Alewife	*Alosa pseudoharengus*
Alosa sp.	*Alosa* spp.
American eel	*Anguilla rostrata*
American sand lance	*Ammodytes americanus*
American shad	*Alosa sapidissima*
Atlantic croaker	*Micropogonias undulatus*
Atlantic herring	*Clupea harengus*
Atlantic menhaden	*Brevoortia tyrannus*
Atlantic silverside	*Menidia menidia*
Atlantic sturgeon	*Acipenser oxyrhynchus*
Atlantic tomcod	*Microgadus tomcod*
Bay anchovy	*Anchoa mitchilli*
Black sea bass	*Centropristis striata*
Blenny	*Blenniidae* spp.
Bluefish	*Pomatomus saltatrix*
Blueback herring	*Alosa aestivalis*
Clearnose skate	*Raja eglanteria*
CongereEel	*Conger* spp.
Cunner	*Tautogolabrus adspersus*
Fourbeard rockling	*Enchelyopus cimbrius*
Gizzard shad	*Dorosoma* spp.
Grubby	*Myoxocephalus aeneus*
Hickory shad	*Alosa mediocris*
Hogchoker	*Trinectes maculatus*
Little skate	*Leucoraja erinacea*
Mummichug	*Fundulus heteroclitus*
Naked goby	*Gobiosoma bosc*
Northern pipefish	*Syngnathus fuscus*
Northern puffer	*Sphoeroides maculatus*
Red hake	*Urophycis chuss*
Scup	*Stenotomus chrysops*
Shortnose sturgeon	*Acipenser brevirostrum*
Silver hake	*Merluccius bilinearis*
Smallmouth flounder	*Etropus microstomus*
Spotted hake	*Urophycis regia*
Striped bass	*Morone saxatilis*
Striped cusk-eel	*Ophidion marginatum*
Striped killifish	*Fundulus majalis*

Table 5.6-3 (cont'd)
Fish Species with the Potential to Occur in the East River

Common Name	Scientific Name
Striped mullet	*Mugil cephalus*
Striped searobin	*Prionotus evolans*
Summer flounder	*Paralichthys dentatus*
Tautog	*Tautoga onitis*
Three-spined stickleback	*Gasterosteus aculeatus*
Weakfish	*Cynoscion regalis*
White perch	*Morone americana*
Windowpane flounder	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
Wrasse	*Labridae* spp.

Sources:
Bain, 1997; Lawler, Matusky and Skelly Engineers, LLP (LMS), 2003; National Oceanic and Atmospheric Administration (NOAA), 2001; New York City Department of Parks and Recreation (NYC Parks), 2003; United States Fish and Wildlife Service (USFWS); 1997; USFWS, 2012.

ESSENTIAL FISH HABITAT

Essential Fish Habitat (EFH) is any aquatic habitat that promotes fish spawning, breeding, feeding, or growth for any federally regulated fish species. These species and their EFH are regulated by the NOAA NMFS. A consultation with NOAA NMFS has been reinitiated and documents pertaining to that consultation are in **Appendix G**. The study area is located within the Hudson River Estuary EFH. This EFH identifies one or multiple life stages for 16 species of fish (see **Table 5.6-4**) that are described in greater detail below.

Table 5.6-4
Species with Essential Fish Habitat within the Natural Resources Study Area

Species	Eggs	Larvae	Juveniles	Adults
Red hake (*Urophycis chuss*)	N/A	X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic herring (*Clupea harengus*)	N/A	X	X	X
Bluefish (*Pomatomus saltatrix*)	N/A	N/A	X	X
Atlantic butterfish (*Peprilus triacanthus*)	N/A	X	X	X
Summer flounder (*Paralichthys dentatus*)	N/A	X	X	X
Black sea bass (*Centropristis striata*)	N/A	N/A	X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Little skate (*Leucoraja erinacea*)	N/A	N/A	X	X
Clearnose skate (*Raja eglanteria*)	N/A	N/A	X	X
Winter skate (*Leucoraja ocellata*)	N/A	N/A	X	X

Notes:
X = Lifestage is present in study area.
N/A = The species does not have this lifestage in its life history or has no EFH designation for this lifestage.
Source:
National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" posted on the internet at http://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/conn_li_ny/40407350.html
Consultation with NOAA NMFS, ongoing (see **Appendix G**)

Red hake (Urophycis chuss)

EFH for red hake larva consists of surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Generally, the following conditions exist where red hake larvae are found: sea surface temperatures below 19°C, water depths less than 200 meters, and a salinity greater than 0.5 ppt (NMFS, 1998b). Red hake larvae have been reported from the Hudson-Raritan Estuary; however, they are most abundant at the middle and outer continental shelf throughout the Middle Atlantic Bight (Steimle et al., 1999).

EFH for red hake juveniles consists of bottom habitats with a substrate of shell fragments, including areas with an abundance of live scallops in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where red hake juveniles are found: water temperatures below 16°C, depths less than 100 meters, and a salinity range from 31–33 ppt (NMFS, 1998b). Shelter is considered crucial for juvenile red hake (Steimle et al., 1999).

EFH for red hake adults consists of bottom habitats in depressions with a substrate of sand and mud in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where non-spawning red hake adults are found: water temperatures below 12°C, depths from 10–130 meters, and a salinity range from 33–34 ppt (NMFS, 1998b). This salinity is above the range found in the East River. Additionally, non-spawning red hake are abundant in the Long Island Sound, but not in the Hudson-Raritan Estuary (Steimle et al., 1999). Spawning adult red hake are known to use the New York Bight primarily in May–June and will utilize waters with salinity less than 25 ppt. The East River meets this salinity range, however both non-spawning and spawning adults do not inhabit water with dissolved oxygen (DO) less than 3 parts per million (ppm). DO in the East River is at or below 3.0 ppm periodically during the summer (NYCDEP, 2015).

High-quality EFH for larval and juvenile red hake is not found in the East River, and red hake larvae and juveniles that occur in the East River are most likely transient. Adult red hake are known to occur in the East River from impingement and entrainment studies conducted at the Ravenswood Power Plant on the Queens side of the East River (Normandeau Associates, 1994). However, adult red hake are not abundant in the Hudson-Raritan Estuary during any season (Stiemle et al., 1999a). Therefore, spawning and non-spawning adult red hake have the potential to occur in the East River but would most likely be transient individuals. Adult red hake would not be anticipated to be found in the East River during the summer when DO is periodically low.

Winter flounder (Pleuronectes americanus)

EFH for winter flounder eggs consists of bottom waters with a substrate of sand, muddy sand, mud and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay. Generally, the following conditions exist where winter flounder eggs are found: water temperatures less than 10°C, salinities between 10 to 30 ppt, and water depths less than 5 meters (NMFS, 1998c).

Winter flounder larvae EFH consists of pelagic and bottom waters of Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay. Generally, the following conditions exist where winter flounder larvae are found: sea surface temperatures less than 15°C, salinities between 4–30 ppt, and water depths less than 6 meters (NMFS, 1998c).

EFH for winter flounder juveniles consists of bottom waters with a substrate of mud or fine-grained sand on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay. Young-of-the-year juveniles generally persist where the following conditions are found: water temperatures below 28°C, depths from 0.1–10.0 meters, and salinities between 5–33 ppt. Juveniles over one year old are generally found where the following conditions exist: water temperatures below 25°C, depths from 1–50 meters, and salinities between 10–30 ppt (NMFS, 1998c).

Adult winter flounder EFH consists of bottom waters with a substrate of mud, sand, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay. Generally, the following conditions exist where winter flounder adults are found: water temperatures below 25°C, depths from 1–100 meters, and salinities between 15–33 ppt (NMFS, 1998c). Adults found in the Hudson-Raritan Estuary are known to utilize waters with salinities as low as 15 ppt, although most were found at salinities less than 22 ppt (Pereira et al. 1999). Spawning winter flounder are typically found in shallower, cooler bottom waters where the temperature is below 15°C, depth is less than 6 meters, and salinity is between 5.5–36 ppt (NMFS, 1998c). Winter flounder spawn between February and April in waters with temperatures lower than 15°C, salinities between 10 and 32 ppt, and on substrates like sand, gravel, or mud in depths less than 6 meters. Spawning winter flounder have the potential to be present in shallow areas of the East River. Winter flounder were collected during impingement and entrainment studies at the Ravenswood power plant on the Queens side of the East River and found to be the most abundant fish at the site (Normandeau Associates, 1994).

Windowpane flounder (Scopthalmus aquosus)

Windowpane flounder, also called sand flounder, is found from the Gulf of St. Lawrence to South Carolina and has its maximum abundance in the New York Bight. EFH for windowpane flounder eggs consists of surface waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Generally, windowpane flounder eggs are found where sea surface temperatures are less than 20°C and water depths are less than 70 meters (NMFS, 1998d).

EFH for windowpane flounder larvae consists of pelagic waters (i.e., the water column of open coastal waters) around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Generally, windowpane flounder larvae are found where sea surface temperatures are less than 20°C, and water depths are less than 70 meters (NMFS, 1998d). Based on collections from southern New Jersey, it appears that settlement of spring-spawned individuals occurs both in estuaries and on the continental shelf, while settlement of autumn-spawned individuals occurs primarily on the continental shelf (Chang et al., 1999).

EFH for juvenile windowpane flounder consists of bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras (NMFS, 1998d). Generally, the following conditions exist where windowpane flounder juveniles are found: water temperatures below 25°C, depths between 1–100 meters, and salinities between 5.5–36 ppt (NMFS, 1998d). In the Hudson-Raritan Estuary, juveniles were fairly evenly distributed throughout the estuary, but were most abundant in the deeper channels in winter and summer (Wilk et al., 1996).

EFH for adult windowpane flounder consists of bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England

and the middle Atlantic south to the Virginia-North Carolina border. Generally, the following conditions exist where windowpane flounder adults are found: water temperatures below 21°C, depths between 1–75 meters, and salinities between 5.5–36 ppt. Adult windowpane flounder are sensitive to hypoxic conditions and have been found to avoid conditions where DO levels were less than 3 ppm (Howell and Simpson 1994). During the summer, DO in the water column and bottom waters of the East River can be reduced to less than 3 ppm, making this unsuitable habitat for windowpane flounder.

Atlantic sea herring (Clupea harengus)

EFH for Atlantic herring larvae consists of pelagic waters in the Gulf of Maine, Georges Bank, and southern New England. Generally, the following conditions exist where Atlantic herring larvae are found: sea surface temperatures below 16°C, water depths from 50–90 meters, and salinities around 32 ppt (NMFS, 1998e). The East River does not contain suitable depth or salinity for Atlantic herring larvae. Therefore, no significant adverse effects to Atlantic herring larvae EFH are anticipated as a result of the proposed project.

EFH for Atlantic herring juveniles and adults consists of pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where Atlantic herring juveniles and adults are found: water temperatures below 10°C, water depths from 15–135 meters, and a salinity range from 26–32 ppt. The East River is on the low end of the preferred salinity for juvenile and adult Atlantic herring (NMFS, 1998e).

Atlantic herring juveniles and adults are known to occur in the Hudson-Raritan Estuary in winter and spring from bottom trawling surveys (Stevenson and Scott, 2005) and have been collected during entrainment studies at the Ravenswood power plant in Queens (Normandeau Associates, 1994). However, water temperatures in other seasons in the East River would likely be too high to support juvenile and adult Atlantic herring. Juvenile and adult Atlantic herring prefer DO in bottom habitats between 6–12 ppm. Water quality monitoring in the East River shows DO at the bottom of the East River is only suitable for Atlantic herring in the winter and spring (NYCDEP, 2015). Atlantic herring could potentially utilize the East River during winter and spring when DO and water temperatures are suitable.

Bluefish (Pomatomus saltatrix)

EFH for juvenile bluefish consists of pelagic waters over the continental shelf from Nantucket Island south to Key West, and estuaries from Penobscot Bay south to coastal Florida. Generally, juvenile bluefish prefer water temperatures between 19–24°C and salinities between 23–36 ppt (NMFS, 1998f). Trawl surveys in the Hudson-Raritan Estuary found juvenile bluefish throughout the area in all depths sampled during the summer and fall, and no occurrences of juvenile bluefish during the winter and spring (Fahay et al., 1999).

Adult bluefish EFH consists of pelagic waters over the continental shelf from Nantucket Island south through Key West, and estuaries from Penobscot Bay, Maine south to Key West, Florida. Generally, juvenile bluefish prefer water temperatures between 14–16°C and salinities greater than 25 ppt (NMFS, 1998f). Adult bluefish are highly migratory and occur seasonally in Mid-Atlantic estuaries from April to October (Fahay et al., 1999). Due to their migratory tendencies, any adult bluefish that occur in the East River would be anticipated to be transient individuals.

Atlantic butterfish (Peprilus triacanthus)

EFH for Atlantic butterfish larvae consists of pelagic waters over the continental shelf from the Gulf of Maine to Cape Hatteras, and estuaries from Boston Harbor south to the Chesapeake Bay. Generally, the following conditions exist where Atlantic butterfish larvae are found: water temperatures between 9–19°C, salinities between 6.4–37 ppt, and water depths between than 10–1,829 meters (NMFS, 1998f).

Juvenile Atlantic butterfish EFH consists of pelagic waters over the continental shelf from the Gulf of Maine through Cape Hatteras, and estuaries from Boston Harbor south to the James River in Virginia. Generally, the following conditions exist where Atlantic butterfish juveniles are found: water temperatures between 3–28°C, salinities between 3–37 ppt, and water depths between 10–365 meters (though most are found at depths less than 120 meters) (NMFS, 1998f).

EFH for Atlantic butterfish adults consists of pelagic waters over the continental shelf from the Gulf of Maine through Cape Hatteras, and estuaries from Boston Harbor south to the James River in Virginia. Generally, the following conditions exist where Atlantic butterfish juveniles are found: water temperatures between 3–28°C, salinities between 4–26 ppt, and water depths between 10–365 meters (though most are found at depths less than 120 meters) (NMFS, 1998f). Adults are most common in the New York Harbor in the summer and have been found over shallow flats, estuaries, and may congregate on the bottom during the day.

In Hudson-Raritan trawl surveys, juvenile and adult Atlantic butterfish were collected at water temperatures ranging from 8–26ºC, depths ranging from 3–23 meters, salinities ranging from 19–32 ppt, and DO levels ranging from 3–10 ppm (Cross et al, 1999). Atlantic butterfish is primarily a pelagic species (Woodhead, 1990), and although Atlantic butterfish may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient.

Summer flounder (Paralicthys dentatus)

EFH for summer flounder larvae consists of pelagic waters over the continental shelf from the Gulf of Maine south to the east coast of Florida, and estuaries from the Waquoit Bay, Massachusetts south to the Indian River, Florida. Generally, the following conditions exist where summer flounder larvae are found: water temperatures between 9–12°C, salinities between 23–33 ppt, and water depths between 10–70 meters (NMFS, 1998f).

EFH for summer flounder juveniles consists of bottom habitat with mud or sand substrates in continental shelf waters from Gulf of Maine south to the east coast of Florida, and estuaries from the Waquoit Bay south to the Indian River. Generally, the following conditions exist where summer flounder juveniles are found: water temperatures greater than 11°C, salinities between 10–30 ppt, and water depths between 0.5–5 meters (NMFS, 1998f).

EFH for summer flounder adults consists of bottom habitat with mud or sand substrates in continental shelf waters from Gulf of Maine south to the east coast of Florida, and estuaries from the Buzzards Bay, Massachusetts south to the Indian River (NMFS, 1998f). Generally, adults are found at depths up to 25 meters and in temperatures ranging from 9–26°C in the autumn, 4–13°C in the winter, 2–20°C in the spring, and 9–27°C in the summer. Salinity is known to have minimal effect on distribution in comparison to substrate preference. Trawl surveys from 1992 to 1997 found adult summer flounder to be present in moderate numbers throughout the Hudson-Raritan Estuary in all seasons except winter (Packer et al., 1999; Zetlin et. al., 1999).

Black sea bass (Centropristus striata)

EFH for black sea bass juveniles consists of demersal waters over the continental shelf from the Gulf of Maine to Cape Hatteras, and estuaries from Buzzards Bay south to the James River. Generally, juvenile black sea bass are found in waters warmer than 6°C with salinities greater than 18 ppt, and depths between 1–28 meters. Juvenile black sea bass are found in the estuaries in the summer and spring and overwinter offshore from New Jersey and south. Juvenile black sea bass require structural complexity in both offshore and inshore substrates including rough bottoms, shellfish and eelgrass beds, and man-made structures in sandy-shelly areas. Offshore clam beds and shell patches may also be used during the wintering (NMFS, 1998h; Drohan et al., 2007). Black sea bass were captured during impingement and entrainment studies at the Ravenswood power plant in Queens (Normandeau Associates, 1994).

EFH for black sea bass adults consists of demersal waters over the continental shelf from the Gulf of Maine to Cape Hatteras, and estuaries from Buzzards Bay south to the James River. Black sea bass adults are generally found in estuaries from May through October and overwinter offshore south of New York to North Carolina from November through April. Generally, adult sea bass are found in waters warmer than 6°C with salinities greater than 20 ppt, and depths between 20–50 meters. Structured habitats (natural and man-made), sand and shell rocky reefs, cobble and rock fields, stone coral patches, exposed stiff clay, and mussel beds are usually the substrate preference (NMFS, 1998h; Drohan et al., 2007). Spawning occurs in the Mid-Atlantic Bight in April through October. Black sea bass are only present in the inshore areas of the New York Harbor in the winter months. Due to the preference of black sea bass for structured habitats, they are not uncommonly found underneath man-made structures such as docks and piers. Therefore, it is likely that black sea bass juvenile and adults are present in the study area.

King mackerel (Scomberomorus cavalla)

King mackerel are marine species of fish that can occur as far north as Rhode Island and south to Brazil. They are most common in warmer waters around the Chesapeake Bay southward. EFH for King mackerel eggs, larvae, juveniles, and adults consists of sandy shoals of capes and offshore bars, high profile rocky bottom and barrier-island ocean-side waters from the surf to the shelf break zone, from the Gulf Stream shoreward, including *Sargassum*, coastal inlets, and all state-designated nursery habitats of particular importance to coastal migratory pelagic species (NMFS, 1998i). King mackerel generally favor deeper and warmer waters than are typically found in the East River. Any king mackerel in the East River would be anticipated to be rare and transient individuals.

Spanish mackerel (Scomberomorus maculatus)

Spanish mackerel are marine species of fish that can occur as far north as Connecticut and south to the Yucatan Peninsula. They are most common between the Chesapeake Bay and the Gulf of Mexico. Spanish mackerel overwinter in waters off of south Florida. EFH for Spanish mackerel eggs, larvae, juveniles, and adults consists of sandy shoals of capes and offshore bars, high profile rocky bottom and barrier-island ocean-side waters from the surf to the shelf break zone, from the Gulf Stream shoreward, including *Sargassum*, coastal inlets, and all state-designated nursery habitats of particular importance to coastal migratory pelagic species (NMFS, 1998i). Spanish mackerel generally favor higher salinities (greater than 30 ppt) and warmer waters (18°C or more). Any Spanish mackerel in the East River would be anticipated to be rare and transient individuals.

Cobia (Rachycentron canadum)

Cobia is a large, highly migratory species that is known to occur from Cape Cod, Massachusetts to Argentina (ESS, 2013). EFH for cobia eggs, larvae, juveniles, and adults consists of sandy shoals of capes and offshore bars, high profile rocky bottom and barrier-island ocean-side waters from the surf to the shelf break zone, from the Gulf Stream shoreward, including *Sargassum*, coastal inlets, high-salinity bays, estuaries, and seagrass habitat. Information about the distribution of cobia lifestages on the East Coast is limited. However, cobia are most abundant in the Gulf of Mexico where they spawn and then leave the Gulf to commence extreme migrations. No cobia lifestages were documented in entrainment studies at the Ravenswood power plant (Normandeau Associates, 1994). Any cobia in the East River would be anticipated to be rare and transient individuals.

Atlantic mackerel (Scomber scombrus)

Atlantic mackerel are found in the western Atlantic Ocean from Laborador, Canada to Cape Lookout, North Carolina and is extremely common occurring in huge sholas in the pelagic zone down to about 200 meters (NOAA, 2019a). It spends the warmer months close to shore and near the ocean surface, appearing along the coast in spring and departing for deeper and more southern water in fall and winter. Its preferred water temperature is above 8°C. The Atlantic mackerel is an active fish that must keep in constant motion to bring in enough oxygen for survival. Atlantic mackerel are fast growers and can reach 16.5 inches and 2.2 pounds. There are two major spawning groups in the western Atlantic: the southern group spawns primarily in the Mid-Atlantic Bight, which includes the proposed project area, from April to May and the northern group spawns in the Gulf of St. Lawrence in June and July.

Scup (Stenotomus chrysops)

Scup is a migratory, schooling, coastal fish species that occurs from Nova Scotia to South Carolina, but is most common between Cape Cod, Massachusetts, and Cape Hatteras, North Carolina. Spawning occurs annually from May to August with a peak in June in deep parts of large bays and coastal areas between New Jersey and Massachusetts. Eggs are pelagic as are larvae in coastal waters. Scup settle to inshore bottom habitat during the late larval stage starting in early July. Juveniles reside in high salinity waters until the early fall. Juveniles and adults overwinter on the mid- and outer shelf between New Jersey and Cape Hatteras during which time, little is known about habitat preferences. During spring, juveniles and adults migrate north and inshore to coastal and estuarine areas where they use a variety of bottom types from open sandy areas to structured rocky or reef areas.

Little skate (Leucoraja erinacea)

The little skate is found only in the northwest Atlantic Ocean where it ranges from southeastern Newfoundland to the Scotian Shelf, the Bay of Fundy, and Georges Bank southward to North Carolina (Fisheries and Oceans Canada, 2019b). The little skate is sympatric with the winter skate sharing its distribution throughout its range. The little skate is a benthic species that lives primarily on the continental shelf over sand and gravel bottom often in shallow waters less than 111 meters. The little skate can tolerate a relatively wide range of temperatures (1.2–21°C). Little skate has been classified as "winter periodic," moving inshore in the winter and offshore into deeper water in the summer.

The little skate is one of the fastest growing species of northwest Atlantic skates. Studies on age, growth, and maturity have demonstrated that this species matures at a smaller size and earlier age and is less long-lived than other species of skate that inhabit the northwest Atlantic Ocean. Little

skate along the US northeast coast exhibit a partially defined annual reproductive cycle with peaks in reproductive activity and egg deposition in June-July and late October-January.

Clearnose skate (Raja eglanteria)

The clearnose skate is found in the northwest Atlantic Ocean where it ranges from Massachusetts to southern Florida and into the Gulf of Mexico from mid-Florida to eastern Texas (Miller 2019). The clearnose skate is a benthic species that lives primarily on the continental shelf over sand and gravel bottom often in shallow waters less than 111 meters. The little skate can tolerate a relatively wide range of temperatures (5–27°C) and salinities (12–35 ppt). Clearnose skate vary their habitat and water depth mainly to remain within their preferred temperature range moving inshore in the winter and offshore into deeper water in the summer.

Winter skate (Leucoraja ocellate)

The range of the winter skate is restricted to the northwest Atlantic Ocean (Fisheries and Oceans Canada, 2019a). The northern most limit of the winter skate is the south coast of New Foundland from which it ranges south into the Gulf of St. Lawrence along the Scotian shelf, the Bay of Fundy, and Georges Bank southward to Cape Hatteras, North Carolina. The winter skate is a benthic species living over sand or gravel bottoms usually in depths less than 111 meters. The preferred temperature range for winter skate is -1.2 to 15°C. In the southern parts of its range, the winter skate appears to move shoreward in autumn and offshore in the summer suggesting a preference for cooler temperatures (i.e., winter periodic). Winter skate eat mostly amphipods and polychaete worms but also consume fish, decapods, isopods, and bivalves.

Studies on age, growth, and maturity in winter skate have demonstrated that this species is a slow growing, late-maturing, and long-lived species. Of particular concern is the late age at maturity reached by females relative to the maximum observed age, leaving very few total lifetime spawning episodes for each individual female.

FISH AND WILDLIFE COORDINATION ACT SPECIES

The New York Harbor Estuary and the East River are highly productive habitat for a wide variety of NOAA trust resources covered by the FWCA many of which are listed in **Table 5.6-3**. NOAA NMFS has identified FWCA species that include the following forage species (see **Appendix G**):

River herring: Alewife (Alosa psuedoharengus) and Blueback herring (Alosa aestivalis)

Two species of fish—the alewife (*Alosa psuedoharengus*) and the blueback herring (*A. aestivalis*)—are known collectively as river herring. River herring are anadromous, meaning that they mature in the ocean and then migrate up coastal rivers to estuarine and freshwater rivers, ponds, and lake habitats to spawn. Adult river herring generally live in the ocean for two years (mid-Atlantic states) to four years (Northeast states) before returning to freshwater rivers to spawn (RiverHerring.com, 2018). While some adults die after spawning, most return to the ocean until the following year's spawning. Alewife and blueback herring can live up to eight years.

River herring spawn over a wide range of substrates such as gravel, sand, detritus, and submerged vegetation. In areas where alewife and blueback herring co-exist, blueback herring will exhibit more variety in spawning site selection including shallow areas covered in vegetation, swampy areas, and small tributaries upstream from the tidal zone. In the mid-Atlantic region, alewife herring spawn from late February through April, whereas blueback herring spawn from late March through mid-May (NOAA, 2009). Spawning is generally initiated when water temperatures reach approximately 5°C to 10°C and spawning generally takes place when water temperatures are between 16°C and 19°C (NOAA, 2009).

Silversides (Menidia spp.)

Atlantic silversides can be found along the Atlantic Coast of North America from the Gulf of St. Lawrence, Canada to the northeast part of Florida (Chesapeake Bay Program, 2019a). They can tolerate a wide range in salinities and can be found in dense feeding schools along the shoreline in summer or in beds of underwater grasses hiding from predators. In winter they migrate to deeper, warmer waters. Atlantic silversides are small fish that grow no bigger than six inches. They breed from May to July. Atlantic silversides eat algae and small invertebrates including crustaceans, polychaete worms, zooplankton, and fish. Predators of Atlantic silversides include large predatory fish such as bluefish, mackerel, and striped bass as well as shorebirds. Smaller fish like mummichog eat their eggs and larvae.

Killifish (Fundulus spp.)

Killifish are found on the Atlantic Coast of North America from Laborador, Canada, to Mexico (Chesapeake Bay Program, 2019b). The prefer muddy marshes, tidal creeks, and grass flats along sheltered shorelines in summer. During colder months they often retreat to deeper waters or burrow into bottom mud or silt. Killifish are opportunistic feeders eating a range of items including algae, plants, insects, insect larvae, worms, small crustaceans, mollusks, and other fish. Predators of killifish include larger fish, wading birds, and seabirds.

Menhaden (Brevoortia tyrannus)

Menhaden inhabit estuaries along the western Atlantic coast, forming large schools that swim just below the water's surface from spring through fall and then migrate to deeper, warmer waters in winter (Chesapeake Bay Program, 2019c). Spawning occurs over the mid-Atlantic continental shelf in spring and autumn. Eggs hatch at sea and larvae spend about two months there before drifting into estuaries. Larvae eventually move into brackish waters where they grow rapidly throughout the summer. Menhaden are an important source of food for larger predators, including bluefish, weakfish, striped bass, sharks, mackerels, and fish-eating seabirds and mammals.

Anchovies (Anchoa spp.)

Anchovies also inhabit estuaries along the western Atlantic coast, forming large schools and are generally abundant throughout the year (Chesapeake Bay Program, 2019d). They are an important food source for larger predators including bluefish, weakfish, striped bass, sharks, mackerels, and fish-eating seabirds and mammals.

American eel (Anguilla rostrate)

American eels can be found along the Atlantic coast from Greenland to northern South America. American eels spawn in the Sargasso Sea. After hatching, larvae float and drift for about a year until they develop into glass eels and migrate into fresh and brackish tributaries including rivers, streams, creeks, lakes, and ponds (Chesapeake Bay Program, 2019e). Once they reach freshwater, they develop pigment. Eels may spend anywhere from 10 to 40 years in freshwater before returning to the Sargasso Sea to spawn.

Striped bass (Morone saxatilis)

Striped bass range along the western Atlantic coast from the St. Lawrence River and southern Gulf of St. Lawrence, Canada to the St. Johns River, Florida (Atlantic States Marine Fisheries Commission, 2019a). In Atlantic coast rivers from Albermarle Sound, North Carolina north, many adult striped bass are migratory, travelling annually from the ocean to riverine spawning grounds and back again to the ocean. Upon returning to the ocean, they undertake a northern summer

migration and southward winter migration. However, some adults in the Mid-Atlantic region remain in or near their areas of origin.

Young and juvenile fish are generally found over clean, sandy bottoms in shallow water with salinities between 0.2 and 16 ppt. Adults occur over a wide variety of substrates including rock, gravel, sand, submerged aquatic vegetation and mussel beds. Atlantic striped bass have formed the basis of one of the most important fisheries on the Atlantic coast for centuries. However, overfishing and poor environmental conditions lead to the collapse of the fishery in the 1980s.

Tautog (Tautoga onitis)

Tautog are found from Nova Scotia, Canada, to South Carolina but are most abundant from Cape Cod to the Chesapeake Bay (Atlantic States Marine Fisheries Commission, 2019b). Tagging studies show that tautog do not migrate north and south along the coast but make inshore/offshore seasonal migrations triggered by changes in bottom water temperatures. In late fall when water temperatures fall below 10°C, adult tautog migrate to deep (25 to 45 meters) offshore wintering areas. In spring when water temperatures warm to 11°C, they migrate inshore to spawn in the vicinity of estuaries and inshore marine waters. The most important habitat parameter affecting the distribution and abundance of juvenile and adult tautog is the availability of cover. They depend on shelter for protection from predation during the night when they are not foraging. Shelter may consist of rock reefs, rock outcrops, gravel, eelgrass beds, and kelp or sea lettuce beds.

Weakfish (Cynoscion regalis)

Weakfish are found along the western Atlantic coast from Massachusetts to southern Florida and are occasionally occurring up to Nova Scotia, Canada and into the eastern Gulf of Mexico (Atlantic States Marine Fisheries Commission, 2019c). They are most abundant from New York to North Carolina. Adults migrate both north and south and onshore/offshore seasonally along the Atlantic coast. Warming waters in spring keys migration inshore and northwards to bays, estuaries, and sounds. Weakfish spawn in estuarine and nearshore habitats throughout its range. Principal spawning areas are from North Carolina to Montauk, New York. Nursery habitat also includes estuarine and nearshore waters.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

Requests for information regarding endangered, threatened, and special concern species were made to the NYNHP, USFWS, and NOAA NMFS (see **Table 5.6-5**). The NYNHP provided a record of peregrine falcons (*Falco peregrinus*; NYS Endangered) nesting on the Williamsburg Bridge (see **Table 5.6-5** and **Appendix H1**). Reconnaissance field surveys for peregrine falcons in the study area were conducted on June 19, 2015, and July 10, 2015 (see **Appendix F1**). USFWS protected species with the potential to occur in the study area were identified via their online Information for Planning and Consultation (IPaC) tool and produced a report with no federally listed endangered species within the project area (see **Appendix H2**).

Table 5.6-5
Endangered and Threatened Species with the Potential to Occur in the Study Area

Name (Common)	Name (Scientific)	Federal Status	State Status	Identifying Source
Peregrine Falcon	*Falco peregrinus*	Not Listed	Endangered	NYNHP
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*	Endangered	Endangered	NOAA NMFS
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Endangered	NOAA NMFS

The reinitiated NOAA NMFS consultation indicated that federally listed shortnose sturgeon and Atlantic sturgeon have the potential to occur in New York Harbor (see **Appendix G**).

Peregrine falcons commonly nest on buildings and bridges in urban areas, including New York City, demonstrating a tolerance of human disturbance and an ability to exploit resources in human-modified environments (Cade et al. 1996, White et al. 2002). The closest nest site to the study area is on the Williamsburg Bridge. Peregrine falcons are aerial hunters, and in urban areas primarily feed on rock pigeons (*Columbia livia*; DeMent et al. 1986, Rejt 2001). Peregrine falcons associated with the nest site on the Williamsburg Bridge have the potential to pass briefly through the study area on occasion in pursuit of pigeons or other prey. No peregrine falcons were observed during targeted surveys of the species that were conducted within the study area on June 19, 2015, and July 10, 2015 (see **Appendix F1**).

Atlantic sturgeon belonging to the New York Bight Distinct Population Segment (DPS) spawn in freshwater sections of the Hudson River and overwinter throughout the Bight, off the south shore of Long Island, and throughout Long Island Sound (Bain 1997, Savoy and Pacileo 2003). Atlantic sturgeon are most abundant in these waters from late September to late March (Dunton et al. 2010). The Atlantic waters off of Rockaway Peninsula and Sandy Hook are a significant concentration area of wintering Atlantic sturgeon (Dunton et al. 2010), and transients moving between Hudson River spawning grounds and these overwintering areas must pass through Upper Bay and may pass through the East River. Telemetry receivers in the lower East River and on the east and west sides of Roosevelt Island have recently detected tagged Atlantic sturgeon moving through this area (Tomechik et al. 2015). Occurrences of Atlantic sturgeons in the East River are likely brief, as these individuals are strictly transients. Atlantic sturgeons prefer open, marine waters and greater water depths than those of the East River for overwintering (Hatin et al. 2002, 2007; Savoy and Pacileo 2003, Dunton et al. 2010).

The shortnose sturgeon is an anadromous fish that spawns, develops, and usually overwinters in the upper Hudson River. The Upper East River is at the extreme southern limit of this population's overwintering range (Dadswell et al. 1984, Jenkins et al. 1993). Waters below the Tappan Zee region of the river are suboptimal due to their high salinities (Bain 1997). Shortnose sturgeon, therefore, have limited potential to occur in the lower East River, and only on rare and brief occasions as transients emigrating from the Hudson River to more southerly populations (Waldman et al. 1996, Kynard 1997).

In addition to the Section 7 requirements to identify threatened or endangered species, the USFWS IPaC tool was also used to generate a list of 58 migratory birds that could potentially occur in the project area. This list includes birds that are on the USFWS Birds of Conservation Concern (BCC) or warrant special attention to the project location (see **Table 5.6-6**). Of the 58 migratory birds, 4 species were observed and identified during the natural resource surveys that took place on June 19, 2015 and July 10, 2015 (see **Appendix F1**). Those species are Double-crested Cormorant (*Phalacrocorax auratus*), Great Black-billed Gull (*Larus marinus*), Herring Gull (*Larus argentatus*), and Ring-billed Gull (*Larus delawarensis*).

The Golden Eagle (*Aquila chrysaetos*), which was never believed to be common in the eastern United States, was extirpated from New York's breeding bird fauna in the 1970s mainly due to loss of habitat human persecution and chemical contamination (NYNHP 2019). The species, which prefers wild, remote mountainous areas with open habitat where small game is abundant and cliffs are available for nesting, is currently known only as a few scattered individuals during breeding season and in migration, and one consistently occupied winter territory in Duchess County. No

Golden Eagle habitat is present within the study area and no records of its occurrence within the project area were returned by NYNHP or USFWS.

Similarly, although Bald Eagles (*Haliaeetus leucocephalus*) are known to breed throughout New York State and while populations have recently begun to increase, the species prefers relatively undisturbed, wooded areas near wetlands or large bodies of water with abundant fish (NYNHP 2019). No Bald Eagle habitat is present within the study area and no records of its occurrence within the project area were returned by NYNHP or USFWS.

Table 5.6-6
USFWS List of Migratory Birds within the Study Area

Common Name	Scientific Name	Breeding Season
American Oystercatcher	*Haematopus palliatus*	Breeds Apr 15 to Aug 31
Bald Eagle	*Haliaeetus leucocephalus*	Breeds Oct 15 to Aug 31
Band-rumped Storm-petrel	*Oceanodroma castro*	Breeds elsewhere
Black Scoter	*Melanitta nigra*	Breeds elsewhere
Black Skimmer	*Rynchops niger*	Breeds May 20 to Sep 15
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Breeds May 15 to Oct 10
Bobolink	*Dolichonyx oryzivorus*	Breeds May 20 to Jul 31
Bonaparte's Gull	*Chroicocephalus philadelphia*	Breeds elsewhere
Bridled Tern	*Onychoprion anaethetus*	Breeds Apr 15 to Sep 20
Buff-breasted Sandpiper	*Calidris subruficollis*	Breeds elsewhere
Canada Warbler	*Cardellina canadensis*	Breeds May 20 to Aug 10
Cerulean Warbler	*Dendroica cerulea*	Breeds Apr 29 to Jul 20
Clapper Rail	*Rallus crepitans*	Breeds Apr 10 to Oct 31
Common Loon	*Gavia immer*	Breeds Apr 15 to Oct 31
Common Tern	*Sterna hirundo*	Breeds May 10 to Sep 10
*Double-crested Cormorant	*Phalacrocorax auritus*	Breeds Apr 20 to Aug 31
Dunlin	*Calidris alpina arcticola*	Breeds elsewhere
Eastern Whip-poor-will	*Antrostomus vociferus*	Breeds May 1 to Aug 20
Evening Grosbeak	*Coccothraustes vespertinus*	Breeds elsewhere
Golden Eagle	*Aquila chrysaetos*	Breeds elsewhere
Golden-winged Warbler	*Vermivora chrysoptera*	Breeds May 1 to Jul 20
*Great Black-backed Gull	*Larus marinus*	Breeds Apr 15 to Aug 20
*Herring Gull	*Larus argentatus*	Breeds Apr 20 to Aug 31
Hudsonian Godwit	*Limosa haemastica*	Breeds elsewhere
Kentucky Warbler	*Oporornis formosus*	Breeds Apr 20 to Aug 20
King Rail	*Rallus elegans*	Breeds May 1 to Sep 5
Leach's Storm-petrel	*Oceanodroma leucorhoa*	Breeds May 15 to Nov 20
Least Tern	*Sterna antillarum*	Breeds Apr 20 to Sep 10
Lesser Yellowlegs	*Tringa flavipes*	Breeds elsewhere
Long-eared Owl	*Asio otus*	Breeds elsewhere
Long-tailed Duck	*Clangula hyemalis*	Breeds elsewhere
Nelson's Sparrow	*Ammodramus nelsoni*	Breeds May 15 to Sep 5
Northern Gannet	*Morus bassanus*	Breeds elsewhere
Pomarine Jaeger	*Stercorarius pomarinus*	Breeds elsewhere
Prairie Warbler	*Dendroica discolor*	Breeds May 1 to Jul 31
Prothonotary Warbler	*Protonotaria citrea*	Breeds Apr 1 to Jul 31
Purple Sandpiper	*Calidris maritima*	Breeds elsewhere
Razorbill	*Alca torda*	Breeds Jun 15 to Sep 10

Table 5.6-6 (cont'd)
USFWS List of Migratory Birds within the Study Area

Common Name	Scientific Name	Breeding Season
Red-breasted Merganser	*Mergus serrator*	Breeds elsewhere
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Breeds May 10 to Sep 10
Red-necked Phalarope	*Phalaropus lobatus*	Breeds elsewhere
Red-throated Loon	*Gavia stellata*	Breeds elsewhere
*Ring-billed Gull	*Larus delawarensis*	Breeds elsewhere
Roseate Tern	*Sterna dougallii*	Breeds May 10 to Aug 31
Royal Tern	*Thalasseus maximus*	Breeds Apr 15 to Aug 31
Ruddy Turnstone	*Arenaria interpres morinella*	Breeds elsewhere
Rusty Blackbird	*Euphagus carolinus*	Breeds elsewhere
Saltmarsh Sparrow	*Ammodramus caudacutus*	Breeds May 15 to Sep 5
Seaside Sparrow	*Ammodramus maritimus*	Breeds May 10 to Aug 20
Semipalmated Sandpiper	*Calidris pusilla*	Breeds elsewhere
Short-billed Dowitcher	*Limnodromus griseus*	Breeds elsewhere
Snowy Owl	*Bubo scandiacus*	Breeds elsewhere
Sooty Tern	*Onychoprion fuscatus*	Breeds Mar 10 to Jul 31
Surf Scoter	*Melanitta perspicillata*	Breeds elsewhere
Whimbrel	*Numenius phaeopus*	Breeds elsewhere
White-winged Scoter	*Melanitta fusca*	Breeds elsewhere
Willet	*Tringa semipalmata*	Breeds Apr 20 to Aug 5
Wilson's Storm-petrel	*Oceanites oceanicus*	Breeds elsewhere
Wood Thrush	*Hylocichla mustelina*	Breeds May 10 to Aug 31

Notes:
*Birds observed during natural resource surveys on June 19, 2015 and July 10, 2015
Source:
United States Fish and Wildlife Service. Information for Planning and Consultation Tool. Accessed 1/30/2019 at https://ecos.fws.gov/ipac/

TERRESTRIAL RESOURCES

Areas containing terrestrial resources in the study area include East River Park, Stuyvesant Cove Park, Asser Levy Playground and Murphy Brothers Playground. These areas, generally consisting of permeable surfaces, make up approximately 23 percent of the land cover in the study area. The terrestrial environment within the study area is heavily urbanized, and consists of recreational parks, infrastructure such as underground sewage pipes, steel railings, light posts, other appurtenances typical of City parks, transportation rights-of-way, and buildings. Impervious surfaces—such as asphalt, masonry, and iron or steel used for streets, infrastructure, and buildings—are generally devoid of natural resources aside from planted street trees and non-native wildlife species such as the rock pigeon, European starling (*Sterna vulgarus*), house sparrow (*Passer domesticus*), and Norway rat (*Rattus norvegicus*). East River Park, Stuyvesant Cove Park, Asser Levy Playground and Murphy Brothers Playground contain numerous vegetated areas that include landscaped planting beds, manicured lawns, ball fields, and trees (see Chapter 5.3, "Open Space," for complete description of these parks).

Landscaped planting beds in East River Park are typically lined with mulch and contain mostly ornamental plants with some native species such as seaside goldenrod (*Solidago sempervirens*), joe-pye-weed (*Eupatorium maculatum*), and black-eyed Susan (*Rudbeckia hirta*). Planting beds that line the primary waterfront promenade contain a mix of herbaceous and shrubby plants and trees. Common reed (*Phragmites australis*), a non-native, invasive species, occurs in small, isolated stands. Trees throughout the study area are varied and consist of native and ornamental

species. The majority of the trees in the study area are shade trees. The most commonly found trees include pin oak (*Quercus palustris*), London plane tree (*Platanus* × *acerifolia*), and honey locust (*Gleditsia triacanthos*). See **Appendix I** for a complete list of trees surveyed in the study area. In total, 1,271 trees were inventoried during tree surveys conducted in 2015, 2017, and 2019.

Today, East River Park is susceptible to sea level rise, storm surge, and heavy rainfall. Storm surge from sporadic, severe events like hurricanes can overwhelm the park and the surrounding neighborhood, as happened in Hurricane Sandy. The threat from gradually accelerating sea level rise increases the risk of frequent flooding from every day storms or high tides. Flooding not only interrupts the recreational capacity of East River Park, the subsequent rise in water is also already exposing plant life to salt water inundation in ways that are detrimental to the existing ecology. In 2014, NYC Parks removed 258 trees from East River Park due to salt water damage from Hurricane Sandy. The current landscaping and planting within East River Park is reflective of the popular styles of the late 1930s, when the Park was designed and completed. The planting design is formal, with a focus on tree geometry and placement that maximizes open spaces for recreation. At the time, plant selection relied heavily on canopy trees, such as London plane trees, a non-native species, and oaks. Species diversity and ecology was not a priority in the planting palette composition; over half of the current tree canopy is comprised of just two species. London plane trees were particularly hard hit by salt inundation post Hurricane Sandy and have comprised most of the tree removals in East River Park post-2013. In Stuyvesant Cove Park, the landscaped beds primarily contain native plants that include wild bergamot (*Monarda fistulosa*), purple coneflower (*Echinacea purpurea*), switchgrass (*Panicum virgatum*), butterfly weed (*Asclepias tuberosa*), milkweed (*Asclepias syriaca*), seaside goldenrod, joe-pye-weed, eastern bluestar (*Amsonia tabernaemontana*), upland sea oats (*Chasmanthium latifolium*), black-eyed Susan, and others. The non-native Asiatic dayflower (*Commelina communis*) also occurs in this area. Of the native species observed, several are considered tolerant to salt. These species are pin oak, swamp white oak (*Quercus bicolor*), seaside goldenrod, and switchgrass.

Wildlife observed in the study area during site visits conducted on June 19, 2015, and July 10, 2015, consisted mostly of common and disturbance-tolerant species. Birds observed utilizing or flying through the study area included American robin (*Turdus migratorius*), barn swallow (*Hirundo rustica*), black-crowned night-heron (*Nycticorax nycticorax*), Canada goose (*Branta canadensis*), common grackle (*Quiscalus quiscula*), double-crested cormorant (*Phalacrocorax auritus*), European starling, gray catbird (*Dumetella carolinensis*), great egret (*Ardea alba*), house sparrow, laughing gull (*Leucophaeus atricilla*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), ring-billed gull (*Larus delawarensis*), and rock pigeon. Other birds that were not observed in the study area but were documented by the 2000–2005 New York State Breeding Bird Atlas as breeding or potentially breeding in the census block in which the study area is located (5850A) include chimney swift (*Chaetura pelagica*), downy woodpecker (*Picoides pubescens*), northern mockingbird (*Mimus polyglottos*), and northern cardinal (*Cardinalis cardinalis*). Potential nesting habitat for these species occurs within the study area. As noted above, targeted surveys for peregrine falcons were conducted in the study area near the Williamsburg Bridge on June 19, 2015 and July 10, 2015. No peregrine falcons were observed.

Other wildlife observed in the study area included honey bees (*Apis mellifera*) and bumblebees (*Bombus spp*.) in low densities in East River Park and in high densities in Stuyvesant Cove Park, several unidentified species of dragonfly (*Odonata* spp.), an eastern tiger swallowtail (*Papilio glaucus*) butterfly in East River Park, and several monarch butterflies (*Danaus plexippus*) in Stuyvesant Cove Park. Stuyvesant Cove Park is planted with numerous species of plants that

attract and are utilized by monarch butterflies. Stuyvesant Cove Park has been designated by the National Wildlife Federation (NWF) as a "Certified Wildlife Habitat" and by the Monarch Watch organization as a "Monarch Waystation." NWF is a non-governmental organization that advocates for and implements wildlife and habitat conservation and wildlife and habitat conservation policies. NWF "Certified Wildlife Habitat" is a program administered by NWF that will certify and track planted gardens that are designed to provide essential habitat features to wildlife such as food sources, water, cover, and nesting/mating areas. Monarch Watch is a non-governmental organization that educates, advocates, and implements programs for the conservation of the monarch butterfly and monarch butterfly habitat throughout its American migratory route, with a dedicated focus on planting milkweeds. Species of the milkweed family are obligate host plants for monarch butterfly feeding and reproduction. Monarch Watch "Monarch Waystations" are locations certified to contain suitable milkweed habitat for monarch butterflies.

The only mammal observed in the study area was eastern grey squirrel (*Sciurus carolinensis*). Other mammals common in New York City parks that are likely to occur in the study area include white-footed mouse (*Peromyscus leucopus*) and Norway rat.

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area.

NON-STORM

Under the No Action Alternative, natural resources within the study area are assumed to be generally unchanged from existing conditions. Trees identified for potential removal due to their condition are assumed to be removed and others would be pruned as needed. The projects identified in **Appendix A1** would be constructed as planned. These projects are not anticipated to alter the natural resources within the study area with the exception of the reconstruction of Pier 42 and eco-habitat restoration at Pier 35, which is expected to create new natural resources habitat.

As part of the Pier 42 project, the existing warehouse has been demolished and improvements are planned to be made to the bulkhead, lighting, and pathways and landscaping would be introduced. Under the Pier 35 project, the pier is being redeveloped into a landscaped, waterfront open space, with picnic seating, recreational areas, and an eco-habitat restoration area. Both projects would enhance ecological communities in the study area. Therefore, under the No Action Alternative, there would be minor improvements to terrestrial resource conditions in the study area, but no significant changes to other natural resources.

STORM

Under storm conditions, there would be no comprehensive flood protection system, and natural resources could experience effects similar to what was experienced during Hurricane Sandy. This includes damage to vegetation in landscaped beds and trees from high velocity winds and salt-water inundation. The threat from gradually accelerating sea level rise increases the risk of frequent flooding from every day storms or high tides. Flooding not only interrupts the recreational capacity of East River Park, the subsequent rise in water is also already exposing plant life to salt water inundation in ways that are detrimental to the existing ecology. In 2014, NYC Parks

removed 258 trees from East River Park due to salt water damage from Hurricane Sandy and declining trees continue to be removed as needed. As a result, terrestrial resources would continue to be at-risk of inundation under the No Action Alternative.

Storm-related effects to terrestrial resources such as trees and landscaped spaces would be lessened or avoided at sites where there are currently planned or completed resiliency measures, such as the NYCHA properties. Effects to vegetation in the study area as a result of inundation would include potential erosion of soil and attendance destabilization of existing vegetation, including trees, and the removal of storm-related damage such as downed and/or damaged trees and vegetation to ensure public safety.

Under the No Action Alternative, excessive precipitation and storm surge waters have the potential to result in localized and temporary negative effects on the water quality of the East River. The protected area could be subject to overland flooding from storm surge and rainfall, and storm surge could prevent excess flows from being discharged from the combined sewers as combined sewer overflow, resulting in the potential for sewer infrastructure surcharge.[6] Under these conditions, there is the potential for surface flooding from this surcharge and stormwater runoff (overland flow) to collect in lower elevations and flow to the East River. As the surge recedes, the tide gates on the outfalls would be able to open, allowing combined flow that exceeds the capacity of the Manhattan Pump Station to outlet to the East River as designed. Once the surge recedes and the precipitation ceases, the sewer system would return to pre-storm operation and overland flow and CSOs would cease. Water quality would then gradually return to pre-storm conditions.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

GEOLOGIC AND SOIL RESOURCES

Under non-storm conditions, the Preferred Alternative would not adversely affect geologic or soil resources. It is estimated that approximately 600,000 cubic yards of fill would be required to elevate East River Park. Soils that would be imported to East River Park to raise the park elevation would need to meet the required soil criteria included in the Soil and Groundwater Management Plan (SGMP), a plan that would be approved by DEP (see also Chapter 5.7, "Hazardous Materials"). During design storm conditions, East River Park and inland areas would be protected by the elevated bulkhead, landscape and other flood protection elements, which reduces the adverse effects of erosion from the design storm on geologic and soil resources. During design storm conditions, wave action and inundation has the potential to cause limited soil erosion in areas such as Stuyvesant Cove Park and unelevated portions of East River Park. The erosive potential within the project area would overall be greatly reduced compared to the No Action Alternative due to the elevation of the majority of East River Park. Operation of the proposed drainage management elements would consist largely of the collection and conveyance of storm water and sanitary waste through sewers and would not result in erosion, instability, or compositional changes to geology or soils. The Preferred Alternative would neither directly or indirectly cause a noticeable decrease in the ability of geologic and soil resources within the study area to serve designated functions. Therefore, the Preferred Alternative would not result in significant adverse effects to geologic and soil resources.

[6] Surcharge refers to the condition in which combined sewer flow exceeds the capacity of sewer pipes and/or drainage infrastructure, potentially resulting in backups in sewer pipes and, ultimately, above-grade flooding.

GROUNDWATER RESOURCES

The Preferred Alternative would not extract, convey, degrade, or otherwise utilize groundwater resources for potable or non-potable purposes. As under the No Action Alternative, during design storm conditions in which storm surge occurs, the inundation and rise in water levels may result in a temporary elevation of groundwater levels, which would return to typical levels after the storm. Drainage management elements would not discharge to or drain groundwater in the study area. The Preferred Alternative would not alter the function served by groundwater resources within the study area. In sum, the quality, depth, and quantity of groundwater would not differ from the No Action Alternative and would therefore not be adversely affected as a result of the Preferred Alternative.

WETLAND RESOURCES

Under the Preferred Alternative, construction of the shared-use flyover bridge would require support shafts with some limited concrete fill along with concrete footings atop the support shafts. The support shafts, footings, and concrete fill would result in a adverse effects to 652 square feet of unvegetated and shaded littoral zone tidal wetland habitat. Some of the support shafts or piles would be placed in a portion of the East River that is shaded by the East River Park Promenade and/or numerous other support shafts for existing infrastructure and would therefore not alter the operational character or habitat of these tidal wetlands. The support shafts, piles and/or limited fill would not affect tidal exchange or tidal patterns in the study area.

In addition, the two existing embayments would be filled and reconstructed elsewhere within the project area. Filling of these embayments is necessary to provide adequate space to site heavily utilized active recreation facilities. Additional filling would be required at the location of the new embayments to allow for an Americans with Disabilities Act (ADA) accessible path to improve accessibility to the waterfront for Park users. Filling of the existing embayment would permanently remove approximately 24,085 square feet of littoral zone tidal wetland habitat that consists largely of rip rap, which has the potential to provide habitat for epifaunal benthic organisms, as shown in **Table 5.6-7**. However, the two proposed embayments would be comparable or larger in size and would be similarly located within East River Park. As the proposed project design progresses, the proposed embayments would provide improved habitat type over what currently exists in the embayments that are to be filled by omitting bridges that shade aquatic habitat, which can reduce benthic productivity and biomass, and providing habitat enhancements designed for the recruitment of shellfish and other aquatic life which is consistent with the City's WRP policies of protecting and enhancing sensitive resources, such as wetlands. The locations of these adverse effects are shown in **Figure 5.6-5**.

While this alternative would result in adverse effects to tidal wetland habitat, it would be mitigated for in accordance with all NYSDEC and USACE permit conditions which would conform with applicable regulations, including CWA, Section 10 of the Rivers and Harbors Act, ECL Article 25, NYCRR Part 661, and ECL Article 15, NYCRR Part 608. This mitigation would include in-kind, on-site replacement of improved habitat as well as the creation of new tidal wetland habitat off-site, or the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank. Details of the proposed mitigation are provided in Section G, "Mitigation" below.

A detailed analysis of the proposed project's compliance with Executive Order 11990 – Protection of Wetlands as determined by the Eight-Step Decision Making Process is located in **Appendix L**. That analysis concludes that the proposed project would be in compliance with Executive Order 11990. In addition, the adverse effects would not affect the classification of the East River; would

likely not diminish the habitat for a resident or migratory endangered, threatened or rare animal or plant species or species of special concern; would not contribute to a cumulative loss of habitat or function which diminishes the ability of littoral zone habitat to perform its primary function; would not affect a resources that is large, unusual or singular; or noticeably decrease this resource's ability to serve its various functions. Therefore, the Preferred Alternative would not result in significant adverse effects to tidal wetland resources.

Table 5.6-7
Adverse Effects to Tidal Wetlands under the Preferred Alternative

Project Component	Total #	Adverse Effects (square feet)	Volume of Fill (cubic yards)
Flyover Bridge Substructure (shafts)	10	502	242
Flyover Bridge Substructure (footings)	5	150	28
Filling Northern Embayment	1	16,000	6,412
Filling Southern Embayment	1	4,600	569
Filling Behind Cutoff Wall for New Embayments (Existing Esplanade)	2	2,833	9,915
Total	**19**	**24,085**	**17,166**

SPECIAL FLOOD HAZARD AREA

The Preferred Alternative would install new flood protection structures to the SFHA that would not be introduced under the No Action Alternative. However, no residential, commercial, or industrial structures would be introduced to the SFHA and the structures proposed under the Preferred Alternative are designed to reduce the risk of flood loss; to minimize the effect of floods on human safety, health, and welfare; and to preserve the beneficial value of the existing floodplain, as determined by the Eight-Step Decision Making Process, which is consistent with Executive Order 11988 – Floodplain Management (**see Appendix L**). This alternative would protect East River Park from impacts from design storm events in addition to inundation from sea level rise, reducing the risk of flood loss compared to the No Action Alternative. Similarly, the proposed project would be consistent with the City's WRP as discussed in Chapter 5.1, "Land Use, Zoning, and Public Policy," and documented in **Appendix D**. Specifically, as documented in the WRP, physical and recreational access to the waterfront would be provided along the esplanade with stepped seating areas to offer additional locations for passive recreation and waterfront views. Improving the resiliency of the park, coupled with expanded public access, furthers the enhancement of East River Park for public access, operations, functionality, and usability during pre- and post-storm periods. The addition of resiliency measures to park amenities and facilities proposed under this alternative would reduce impacts to East River Park as a result of design storm events and sea level rise, and be consistent with the policy goals to preserve, maintain, and protect existing physical and recreational access to the waterfront. As such, the Preferred Alternative would not be likely to cause, either directly or indirectly, a noticeable decrease in the SFHA's ability to serve its primary function. Therefore, the Preferred Alternative would not result in significant adverse effects to the 100-year FEMA-designated SFHA.

SURFACE WATER RESOURCES

The Preferred Alternative would not adversely affect surface water resources or water quality in the study area. The flood protection elements of the Preferred Alternative would not result in changes to overland flow into the East River. The flyover bridge would represent new impervious surface in the study area that would drain to East River Park and eventually into the East River. As currently contemplated, the proposed flyover bridge would be a steel thru-truss superstructure supported on footings and shafts placed adjacent to the eastern edge of the northbound FDR Drive lanes, within the limits of the existing East River Bikeway (see Figures 2.0-8 and 2.0-9 and **Appendix C1b**). The proposed flyover bridge would cantilever over the northbound FDR Drive. The thru truss bridge would be approximately 15 feet wide and approximately 13 feet tall from the surface of the bridge deck to the top of the truss. The flyover bridge would slope down to connect to East River Park on the south and to Captain Patrick J. Brown Walk near East 16th Street on the north. The new impervious surface would be approximately 15,000 square feet; however, this represents a small increase in impervious area within the study area and there would be no vehicular traffic and therefore no associated contaminants to be mobilized by stormwater runoff; therefore, no significant adverse effects on the water quality of the East River are expected.

In addition, under this alternative, the existing sewer infrastructure would be modified to reduce or eliminate flow into the protected area from the East River and the larger sewershed during design storm events, as described in Chapter 5.8, "Water and Sewer Infrastructure." Under non-storm conditions, implementation of the Preferred Alternative would not alter the normal function and performance of the combined sewer system. The large interceptor gates and the isolation gate valve in regulator M-39 would remain open. However, under rainfall events or periods of high sewer flow, combined sewer flow would be conveyed to the interceptor via both the existing branch interceptors and the parallel conveyance. During rainfall events that result in CSOs, there is a potential for redistribution of overflows in the across the outfalls in the study area due to the modifications described above. However, the overall volume of CSO would not vary substantially from existing conditions and is not anticipated to impact water quality in the East River. A hydraulic model simulation indicated that with the proposed parallel conveyance in place, CSOs from outfalls within the project area would decrease compared to the No Action Alternative, while CSOs from outfalls upstream of the project area would increase by approximately the same volume. While the annual CSO volumes would vary depending on annual rainfall and tidal conditions, this model simulation indicates no anticipated increase in total CSO volume from the study area as a result of constructing the proposed parallel conveyance. During wet weather events, storm water that flows into the reconfigured storm drainage system on the unprotected side of the flood protection system would flow to the outfalls, instead of to the combined sewer system as it does under existing conditions. This increase in storm water flows to the outfalls would not increase the volume of CSO from the outfalls.

Under design storm conditions, the outfalls along the river would be closed as a result of increased surge height. In contrast to the No Action Alternative, the Preferred Alternative would provide drainage isolation elements, such as interceptor gates and an isolation gate valve that would be operated to shield the protected area sewer system from storm surge inundation in the larger sewershed. The Preferred Alternative would also manage the increased combined sewer flow within the protected area while the outfall tide gates are closed, and isolation elements are activated. Drainage management elements (i.e., parallel conveyance and upsized sewers) would be installed and deployed under the Preferred Alternative. Use of these drainage management elements would allow combined flow from the protected area to be directed to the Manhattan Pump Station and then to the Newtown Creek WWTP in Brooklyn, New York. These drainage

management elements would reduce the potential for sewer surcharge in the protected area. As the storm surge recedes, the tide gates on the outfalls would reopen, allowing combined flow that exceeds the capacity of the pump station to outlet to the East River. Under the Preferred Alternative, the combined sewer system within the study area would continue to comply with conditions set by the Newtown Creek WWTP SPDES permit and be consistent with the CWA, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. The Preferred Alternative would therefore not affect the use classification or function of the East River, or directly or indirectly affect a significant, sensitive, or designated resource which is consistent with the City's WRP policies regarding protection of water quality. Therefore, no significant adverse effects to surface water resources are anticipated.

AQUATIC RESOURCES

Phytoplankton, Benthic Algae, Zooplankton, and Benthic Invertebrates

As described above in "Wetland Resources," the Preferred Alternative would result in adverse effects to 24,085 square feet of littoral zone tidal wetland habitat from the installation of the permanent support structures for the shared use flyover bridge and fill placed within the existing embayments and at the location of the proposed embayments. This area of benthic habitat would not be available in the future for invertebrates and other organisms. The existing embayments that are proposed to be filled would be replaced with comparably sized or larger embayments (approximately 26,000 square feet). The new embayments would provide improved habitat type that eliminates bridges that shade aquatic habit, which can reduce benthic productivity and biomass, and provides habitat enhancements designed for the recruitment of shellfish and other aquatic life within the project area. The lack of sunlight in this area of benthic habitat limits the amount of ecological activity that would typically be anticipated to occur in East River tidal wetlands and inhibits the growth of SAV. Additionally, off-site wetland mitigation will be sought out to fulfill the requirements of the USACE and NYSDEC permits as described in Section G, "Mitigation" below. The area of benthic habitat that would be lost represents a small fraction (<0.1 percent) of the overall benthic habitat available in the New York Harbor Estuary. Therefore, the Preferred Alternative would not result in significant adverse effects to phytoplankton, benthic algae, zooplankton, and benthic invertebrates which is consistent with the City's WRP policies of protecting the aquatic environment.

Fish and Essential Fish Habitat

An updated consultation has been reinitiated with NOAA NMFS for the Preferred Alternative (see **Appendix G**). Any conservation measures identified as a result of that consultation will be identified in the Final EIS.

Essential Fish Habitat Species

The Preferred Alternative has the potential to result in adverse effects to EFH from the installation of the permanent support structures for the shared use flyover bridge, fill placed within the existing embayments, and at the location of the proposed embayments, as described above; however, these adverse effects are not anticipated to rise to the level of significant. With this alternative, the existing habitat would no longer support benthic organisms that may provide a foraging habitat for certain fish. However, the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and

biomass. In addition, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored. As a result, these effects to EFH would not be substantial for one or more lifestages of winter flounder, windowpane flounder, summer flounder, Atlantic herring, scup, black sea bass, clearnose skate, little skate, and winter skate. Several species (cobia, Spanish mackerel, king mackerel, Atlantic mackerel, bluefish, Atlantic butterfish) listed as potentially occurring in the study area are either at the extreme limit of their known range or are highly migratory and are therefore anticipated to occur in the East River only as uncommon or transient individuals. The remaining species evaluated (red hake) would not be anticipated to be found in the East River due to unsuitable environmental conditions, unsuitable depths, and unsuitable substrates or other habitat features. These conclusions are summarized in **Table 5.6-8**. A consultation with NOAA NMFS is ongoing (see **Appendix G**). Any conservation measures identified as a result of that consultation will be identified in the Final EIS.

Red hake (Urophycis chuss)

High-quality EFH for larval and juvenile red hake is not found in the East River, and red hake larvae and juveniles that occur in the East River are most likely transient. Adult red hake are known to occur in the East River from impingement and entrainment studies conducted at the Ravenswood Power Plant on the Queens side of the East River (Normandeau Associates, 1994). However, adult red hake are not abundant in the Hudson-Raritan Estuary during any season (Stiemle et al., 1999a). Therefore, spawning and non-spawning adult red hake have the potential to occur in the East River but would most likely be transient individuals. Adult red hake would not be anticipated to be found in the East River during the summer when DO is periodically low. Therefore, no significant adverse effects to adult red hake or spawning red hake EFH are anticipated as a result of the Preferred Alternative.

Winter flounder (Pleuronectes americanus)

While the EFH for this species includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom waters with a substrate of sand, muddy sand, mud and/or gravel in addition to pelagic waters), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, design possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for any lifestage of winter flounder are anticipated as a result of the Preferred Alternative.

Windowpane flounder (Scopthalmus aquosus)

As with winter flounder, the windowpane flounder is a bottom-dwelling species that has the potential to be affected by the Preferred Alternative. While the EFH for this species includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom habitats with a substrate of mud or fine-grained sand), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). Moreover, adult windowpane flounder are sensitive to hypoxic conditions and have been found to avoid conditions where DO levels were less than 3 ppm (Howell and Simpson 1994). During the summer, DO in the water column and bottom waters of the East River can be reduced to less than 3 ppm, making this unsuitable habitat for windowpane flounder. In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed

embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, design possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for any lifestage of windowpane flounder are anticipated as a result of the Preferred Alternative.

Atlantic herring (Clupea harengus)

Water quality monitoring in the East River shows DO at the bottom of the East River is only suitable for Atlantic herring in the winter and spring (NYCDEP, 2015). Atlantic herring could potentially utilize the East River during winter and spring when DO and water temperatures are suitable. While the EFH for this species includes habitat with the potential to be affected by the Preferred Alternative (i.e., pelagic waters and bottom habitats), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). Moreover, the East River is on the low end of the preferred salinity for juvenile and adult Atlantic herring (NMFS, 1998e). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, design possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for any lifestage of Atlantic herring are anticipated as a result of the Preferred Alternative.

Bluefish (Pomatomus saltatrix)

Due to their migratory tendencies, any adult bluefish that occur in the East River would be anticipated to be transient individuals. Bluefish are also not a bottom dwelling species so filling of the existing embayments would be unlikely to affect this species. Overall, the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). Therefore, no significant adverse effects to EFH for any lifestage of bluefish are anticipated as a result of the Preferred Alternative.

Atlantic butterfish (Peprilus triacanthus)

Atlantic butterfish is primarily a pelagic species (Woodhead, 1990), and although Atlantic butterfish may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of Atlantic butterfish.

Summer flounder (Paralicthys dentatus)

As with the winter flounder and windowpane flounder described above, the summer flounder is a bottom dwelling species that has potential to be affected by the Preferred Alternative due to filling associated with relocating the embayments as well as the installation of the shared use flyover bridge shafts and footings. While the EFH for this species during juvenile and adult lifestages includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom waters with a substrate of mud or sand), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments.

The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for the larvae, juvenile and adult lifestages or the fishery of summer flounder are anticipated as a result of the proposed project.

Black sea bass (Centropristus striata)

Due to the preference of black sea bass for structured habitats, they are not uncommonly found underneath man-made structures such as docks and piers. Therefore, it is likely that black sea bass juvenile and adults are present in the study area. The removal of the existing pedestrian bridges and their associated piles in the vicinity of the embayments could constitute a loss of habitat for this species. However, this is a small portion of the habitat created by the esplanade within the study area, which would largely remain under the Preferred Alternative. In addition, the shafts associated with the shared use flyover bridge would potentially allow for additional habitat. Overall, the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of black sea bass.

King mackerel (Scomberomorus cavalla)

King mackerel generally favor deeper and warmer waters than are typically found in the East River. Any king mackerel in the East River would be anticipated to be rare and transient individuals. Therefore, no significant adverse effects to EFH for any lifestage of king mackerel are anticipated as a result of the proposed project.

Spanish mackerel (Scomberomorus maculatus)

Spanish mackerel EFH is limited within the study area, and the species generally favor higher salinities (greater than 30 ppt) and warmer waters (18 °C or more) than are found within the East River. Any Spanish mackerel in the East River would be anticipated to be rare and transient individuals. Therefore, no significant adverse effects to EFH for any lifestage of Spanish mackerel are anticipated as a result of the proposed project.

Cobia (Rachycentron canadum)

Cobia is a large, highly migratory species whose EFH is limited within the study area. Information about the distribution of cobia lifestages on the East Coast is limited. However, cobia are most abundant in the Gulf of Mexico where they spawn and then leave the Gulf to commence extreme migrations. No cobia lifestages were documented in entrainment studies at the Ravenswood power plant (Normandeau Associates, 1994). Any cobia in the East River would be anticipated to be rare and transient individuals. Therefore, no significant adverse effects to EFH for any lifestage of cobia are anticipated as a result of the proposed project.

Atlantic mackerel (Scomber scombrus)

Although Atlantic mackerel may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of Atlantic mackerel.

Scup (Stenotomus chrysops)

While the EFH for this species includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom waters with a substrate of sand and mud substrates), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for any lifestage of winter flounder are anticipated as a result of the Preferred Alternative.

Little skate (Leucoraja erinacea)

As with the flounders, the little skate is a bottom dwelling species that has potential to be affected by the Preferred Alternative due to filling associated with relocating the embayments as well as the installation of the shared use flyover bridge shafts and footings. While the EFH for this species during juvenile and adult lifestages includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom waters with a substrate of mud or sand), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for the larvae, juvenile and adult lifestages or the fishery of little skate are anticipated as a result of the proposed project.

Clearnose skate (Raja eglanteria)

As with the flounders, the clearnose skate is a bottom dwelling species that has potential to be affected by the Preferred Alternative due to filling associated with relocating the embayments as well as the installation of the shared use flyover bridge shafts and footings. While the EFH for this species during juvenile and adult lifestages includes habitat with the potential to be affected by the Preferred Alternative (i.e., bottom waters with a substrate of mud or sand), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for the larvae, juvenile and adult lifestages or the fishery of clearnose skate are anticipated as a result of the proposed project.

Winter skate (Leucoraja ocellate)

As with the flounders, the winter skate is a bottom dwelling species that has potential to be affected by the Preferred Alternative due to filling associated with relocating the embayments as well as the installation of the shared use flyover bridge shafts and footings. While the EFH for this species during juvenile and adult lifestages includes habitat with the potential to be affected by the

Preferred Alternative (i.e., bottom waters with a substrate of mud or sand), the study area constitutes a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent). In addition, the installation of new embayments may constitute an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic productivity and biomass. In addition, possibilities that seek to specifically improve the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park are also being explored. Therefore, no significant adverse effects to EFH for the larvae, juvenile and adult lifestages or the fishery of winter skate are anticipated as a result of the proposed project.

Fish and Wildlife Coordination Act Species

Under the Preferred Alternative, there would be adverse effects to trust resources covered by the FWCA resulting from the installation of the permanent support structures for the shared use flyover bridge, fill placed within the existing embayments, and at the location of the new embayments as described above. With this alternative, this habitat would no longer support benthic organisms that may provide a foraging habitat for certain FWCA fish. However, the majority of these species (river herring, silversides, killifish, menhaden, anchovies, American eel, striped bass, and weakfish) listed as potentially occurring in the study area are either at the extreme limit of their known range or are highly migratory and are therefore anticipated to occur in the East River only as uncommon or transient individuals. The removal of potential habitat for the remaining species – tautog – would constitute a very small portion of the available EFH for this species within the New York Harbor Estuary waters (<0.1 percent), and new habitat would be created through the installation of shafts for the shared use flyover bridge. Therefore, these effects would not be considered substantial for FWCA trust species. These conclusions are summarized in **Table 5.6-8**. A consultation with NMFS ongoing (see **Appendix G**). Any conservation measures identified by NMFS as a result of that consultation would be identified in the Final EIS.

River herring: Alewife (Alosa psuedoharengus) and Blueback herring (Alosa aestivalis)
Although river herring may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of river herring.

Silversides (Menidia spp.)
Although silversides may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of silversides.

Killifish (Fundulus spp.)
Although killifish may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Additionally, the East River does not provide optimum habitat for killifish. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1

percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of killifish.

Menhaden (Brevoortia tyrannus)

Although menhaden may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of menhaden.

Anchovies (Anchoa spp.)

Although anchovies may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of anchovies.

American eel (Anguilla rostrate)

Although American eel may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing EFH proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of American Eel.

Striped bass (Morone saxatilis)

Although striped bass may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing habitat proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of striped bass.

Tautog (Tautoga onitis)

Tautog may occur in the East River in spring when water temperatures warm as they migrate inshore to spawn in the vicinity of estuaries and inshore marine waters. The most important habitat parameter affecting the distribution and abundance of juvenile and adult tautog is the availability of cover. They depend on shelter for protection from predation during the night when they are not foraging. Shelter may consist of rock reefs, rock outcrops, gravel, eelgrass beds, and kelp or sea lettuce beds. Therefore, it is likely that tautog juvenile and adults may present in the study area. The removal of the existing pedestrian bridges and their associated piles in the vicinity of the embayments could constitute a loss of habitat for this species. However, this is a small portion of the habitat created by the esplanade within the study area, which would largely remain under the Preferred Alternative. In addition, the shafts associated with the shared use flyover bridge would potentially allow for additional habitat. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing habitat habitat proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of tautog.

Weakfish (Cynoscion regalis)

Although weakfish may be present in the East River, it is primarily anticipated to use the East River as a migratory route and therefore their presence would be transient. Overall, the study area constitutes a very small portion of the available habitat for this species within the New York Harbor Estuary waters (<0.1 percent). As such, the modifications to existing habitat proposed under the Preferred Alternative would not be expected to significantly adversely affect any lifestage of weakfish.

Table 5.6-8

Potential Effects to EFH and FWCA Species under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species				
Red hake	*Urophycis chuss*	Transient	High-quality EFH for larval and juvenile red hake is not found in the East River.	No effect
Winter flounder	*Pseudopleuronectes americanus*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Windowpane flounder	*Scophthalmus aquosus*	Bottom-dwelling species with potential to occur; DO in East River in summer months can be reduced to unacceptable levels	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Atlantic herring	*Clupea harengus*	The East River does not contain suitable depth or salinity for Atlantic herring larvae, and is on the low end of the preferred salinity for juvenile and adult Atlantic herring	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Bluefish	*Pomatomus saltatrix*	Transient	Habitat unlikely to be affected as bluefish is not a bottom-dwelling species.	No effect
Atlantic butterfish	*Peprilus triacanthus*	Transient	Habitat unlikely to be affected as Atlantic butterfish is not a bottom-dwelling species.	No effect
Summer flounder	*Paralichthys dentatus*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat	Not substantial
Black sea bass	*Centropristis striata*	Likely to occur under docks, piers	Affected area is <0.1 percent of EFH within NY Harbor Estuary; installation of footings/ shafts for shared-use flyover bridge could be new habitat	Not substantial

Table 5.6-8 (cont'd)
Potential Effects to EFH and FWCA Species under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species (cont'd)				
King mackerel	*Scomberomorus cavalla*	Rare and transient	Generally, favors deeper and warmer waters than are typically found in the East River	No effect
Spanish mackerel	*Scomberomorus maculatus*	Rare and transient	Limited EFH within study area; generally, favors higher salinities and warmer waters than found in the East River	No effect
Cobia	*Rachycentron canadum*	Rare and transient	No cobia lifestages documented within East River; limited EFH within study area	No effect
Atlantic mackerel	*Scomber scombrus*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Scup	*Stenotomus chrysops*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Little skate	*Leucoraja erinacea*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat	Not substantial
Clearnose skate	*Raja eglanteria*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat	Not substantial
Winter skate	*Leucoraja ocellata*	Bottom-dwelling species with potential to occur	Affected area is <0.1 percent of EFH within NY Harbor Estuary; new embayments likely to result in improved habitat	Not substantial
FWCA Species				
Alewife	*Alosa psuedoharengus*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Blueback herring	*Alosa aestivalis*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Silversides	*Menidia spp.*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial

Table 5.6-8 (cont'd)
Potential Effects to EFH and FWCA Species under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
FWCA Species (cont'd)				
Killifish	*Fundulus spp*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Menhaden	*Brevoortia tyrannus*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
American eel	*Anguilla rostrate*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Striped bass	*Morone saxatilis*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial
Tautog	*Tautoga onitis*	Likely to occur under docks, piers	Affected area is <0.1 percent of habitat within NY Harbor Estuary; installation of footings / shafts for shared-use flyover bridge could be new habitat	Not substantial
Weakfish	*Cynoscion regalis*	Transient	Affected area is <0.1 percent of habitat within NY Harbor Estuary; new embayments likely to result in improved habitat.	Not substantial

Note: * Conservation measures identified by ongoing consultation with NOAA NMFS will be identified in Final EIS.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

The Preferred Alternative is not anticipated to have significant adverse effects to endangered, threatened, or special concern species. Atlantic sturgeon that use the East River would be expected to be transient individuals. For shortnose sturgeon, the Upper East River is at the extreme southern limit of the population's overwintering range and waters in the vicinity of the project area are suboptimal due to their high salinities. Shortnose sturgeon, therefore, have limited potential to occur in the lower East River. Therefore, the presence of the support structures and placement of fill would not adversely affect their migratory patterns or wellness. An updated consultation with NOAA NMFS has been reinitiated for the Preferred Alternative (see **Appendix G**). Any conservation measures identified as a result of that consultation will be identified in the Final EIS. Any mitigation measures required as a result of completion of the consultation would be implemented.

This alternative would not result in any adverse effects to currently existing habitat for peregrine falcons (i.e., the Williamsburg Bridge). While the initial loss of tree canopy may represent a loss of habitat for migratory birds, the project area does not contain a unique habitat in the region, and migratory birds would be expected to seek out similar resources in the area. As detailed in terrestrial resources below, over time, the tree canopy would mature and fill in. Therefore, the Preferred Alternative would not be in conflict with the 6NYCRR Part 182, and no significant adverse effects to New York State listed threatened, endangered, or special concern species or habitats are anticipated for operation of the proposed project under the Preferred Alternative.

TERRESTRIAL RESOURCES

Construction of the Preferred Alternative would temporarily disturb lawn and landscaped areas within East River Park, Stuyvesant Cove Park, including the National Wildlife Federation (NWF)-designated "Certified Wildlife Habitat" and the Monarch Watch designated "Monarch Waystation," and other upland spaces such as Murphy Brothers Playground and Asser Levy Playground. These disturbed areas would be restored in accordance with a pre-approved NYC Parks landscape restoration plan. The pre-approved landscape restoration plan would include plantings that would support typical urban wildlife upon completion of construction, including four different milkweed species that attract and support monarch butterflies. Additionally, by raising the park and its recreational fields, passive use lawns, and other permeable park surfaces such as the esplanade, flooding of the park is eliminated or greatly reduced in the event of a design storm, as is scouring, erosion, and sediment transport to the East River, thereby improving the resiliency and long-term health of the terrestrial habitat.

As shown in **Table 5.6-9**, a total of 981 trees (77 percent of trees surveyed) would be removed with implementation of the Preferred Alternative. An additional 62 trees would be potentially removed due to poor conditions, and 228 trees would be retained. Of the 981 trees expected to be removed for project implementation, trees in excellent condition measuring up to 7 inches dbh would be considered potential transplant candidates and may reduce the total number of trees to be removed As part of the proposed replanting plan, there would be 1,442 trees planted in the project areas (see **Appendix C1o** and **Figure 5.6-6**). Thus, the net change in overall tree numbers would be an increase of 399 trees.

Table 5.6-9
Summary of Tree Effects under the Preferred Alternative

Category	Trees
Existing Trees	1271
Total Tree Removals with Project Implementation	**-981**
Tree Removals Due to Condition	-62
Total Tree Removals	**-1043**
Trees Retained	228
Trees to be Planted	+1442
Net Change	**+399**

As shown in **Table 5.6-10**, the total numbers of trees to be removed as a result of the Preferred Alternative would be 981, which is a combination of 784 trees from East River Park, 45 trees from Stuyvesant Cove Park, 18 trees from Murphy Brothers Playground, 22 trees from Asser Levy Playground, and 112 trees from the remainder of the project area vicinity. The tree removals from East River Park represent 80 percent of the total tree removals with the Preferred Alternative project implementation.

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Proposed Planting Plan
Figure 5.6-6

Table 5.6-10
Tree Removals by Location under the Preferred Alternative

Location	Trees
East River Park	-784
Stuyvesant Cove Park	-45
Murphy Brothers Playground	-18
Asser Levy Playground	-22
Project Area Vicinity	-112
Total Tree Removals with Project Implementation	**-981**

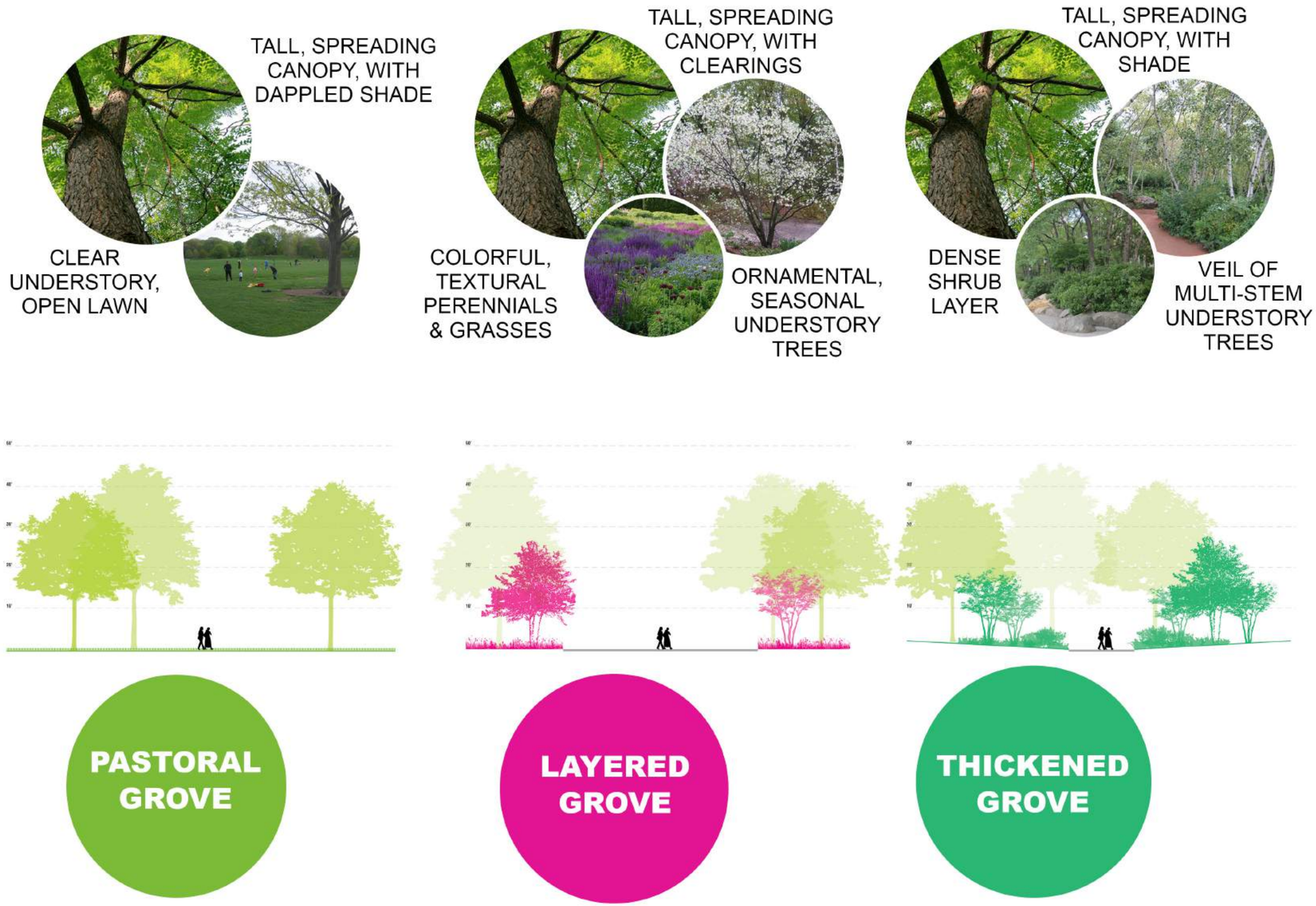
Overall, the loss of these trees would temporarily remove habitat from the study area resulting in the loss of other benefits provided by trees such as air quality improvements, carbon sequestration, and visual aesthetics. The Preferred Alternative would require a NYC Parks approved landscape restoration plan in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010, to address the tree removal proposed, which would include salt tolerant native species, among a diverse selection of 52 tree species. The landscape restoration plan will also aim to improve ecological habitat and be resistant to the effects of salt spray and wind using the concept of different types of groves (see **Figure 5.6-7**). The landscape restoration plan will incorporate these groves of trees with a diverse mix of tree species for ecology, shade, and resiliency and will depart from the existing formal landscape to allow the park user to experience an escape from the hard surfaces of the urban landscape (see **Figure 5.6-8**). The proposed raised elevation of the East River Park in the Preferred Alternative would also reduce inundation related effects to trees in East River Park in the event of a design storm and is expected to potentially significantly reduce damage to terrestrial resources overall and allow the park to more rapidly return to pre-storm conditions. Additionally, compared to Alternatives 2, 3 and 5, the accelerated construction schedule of the Preferred Alternative would allow trees to be planted and become established earlier, reducing the amount of time with limited canopy coverage and habitat. Therefore, the Preferred Alternative would result in temporary adverse effects to trees in the study area.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

The anticipated effects to groundwater resources, wetland resources, SFHA, surface water resources, aquatic resources, and endangered, threatened, and special concern species would be similar to or less than the Preferred Alternative; therefore, those analyses are not repeated here.

GEOLOGIC AND SOIL RESOURCES

Under non-storm conditions, Alternative 2 would not cause erosion, instability, or compositional changes to geologic or soil resources. During design storm conditions, wave action and inundation has the potential to cause erosion of park surfaces and the levees, although the levees have been designed to withstand tidal effects to the greatest extent practicable with a compacted clay layer. Soil erosion within the areas on the unprotected side of the flood protection alignment would be greater than the Preferred Alternative as more of East River Park would be susceptible to the effects of wave action and inundation. Slopes, when vegetated, would be stabilized with grass. Operation of the proposed drainage management elements would consist largely of the collection and conveyance of storm water and sanitary waste through sewers and would not result in erosion, instability, or compositional changes to geology or soils. Alternative 2 would neither directly or indirectly cause a noticeable decrease in the ability of geologic and soil resources within the study


TALL, SPREADING CANOPY, WITH DAPPLED SHADE
CLEAR UNDERSTORY, OPEN LAWN
TALL, SPREADING CANOPY, WITH CLEARINGS
COLORFUL, TEXTURAL PERENNIALS & GRASSES
ORNAMENTAL, SEASONAL UNDERSTORY TREES
TALL, SPREADING CANOPY, WITH SHADE
DENSE SHRUB LAYER
VEIL OF MULTI-STEM UNDERSTORY TREES
PASTORAL GROVE
LAYERED GROVE
THICKENED GROVE


RENDERING DEPICTS 2050 MEAN HIGHER HIGH WATER

area to serve designated functions. Therefore, this alternative would not result in significant adverse effects to geologic and soil resources.

TERRESTRIAL RESOURCES

Construction of Alternative 2 would require the removal of trees within the project area, which would constitute a temporary adverse effect, similar to the Preferred Alternative. As shown in **Table 5.6-11**, a total of 265 trees (20 percent of the trees surveyed) would be removed with Alternative 2 project implementation. An additional 62 trees would be potentially removed due to poor conditions, and 944 trees would be retained. Of the 265 trees expected to be removed with project implementation, trees in excellent condition measuring up to 7 inches dbh would be considered potential transplant candidates and may reduce the total number of trees to be removed under Alternative 2.

Table 5.6-11
Summary of Tree Effects under Alternative 2

Category	Trees
Existing Trees	1271
Total Tree Removals with Project Implementation	**-265**
Tree Removals Due to Condition	-62
Total Tree Removals	**-327**
Trees Retained	944

As shown in **Table 5.6-12**, the total numbers of trees to be removed as a result of the Alternative 2 would be 265, which is a combination of 111 trees from East River Park, 43 trees from Stuyvesant Cove Park, 13 trees from Murphy Brothers Playground, 15 trees from Asser Levy Playground, and 83 trees from the remainder of the project area vicinity. The tree removals from East River Park represent 42 percent of the total tree removals with Alternative 2 project implementation.

Table 5.6-12
Tree Removals by Location under Alternative 2

Location	Trees
East River Park	-111
Stuyvesant Cove Park	-43
Murphy Brothers Playground	-13
Asser Levy Playground	-15
Project Area Vicinity	-83
Total Tree Removals with Project Implementation	**-265**

Implementation of Alternative 2 would require a NYC Parks approved landscape restoration plan to address the proposed tree removal. Replacement for tree removal would need to be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. This alternative would provide no protection to natural resources within East River Park from the threat of gradually accelerating sea level rise, which increases the risk of frequent flooding from every day storms or high tides. Flooding not only interrupts the recreational capacity of East River Park, the subsequent rise in water is also

already exposing plant life to salt water inundation in ways that are detrimental to the existing ecology.

Under storm conditions, operation of Alternative 2 would protect upland areas and limit the design storm surge to the unprotected areas in East River Park and Stuyvesant Cove Park on the riverside of the flood protection system. This would result in inundation of East River Park and, to a lesser degree, Stuyvesant Cove Park, much of which would be elevated as a raised landscape. Thus, the effects of inundation on East River Park would be similar to the No Action Alternative, and 944 existing trees and other terrestrial resources would remain vulnerable and could be anticipated to be significantly damaged, requiring extended periods of post-storm tree removals for damaged or dying trees. Landscaped areas in these parks would be impacted from debris, inundation, salt damage, or wind and effects to terrestrial resources in East River Park and, to a lesser degree, Stuyvesant Cove Park. However, these effects would be experienced under the No Action Alternative, as well. Therefore, there could be potentially adverse effects to terrestrial resources during storm conditions as a result of Alternative 2.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

The effects to groundwater resources, wetland resources, special flood hazard area, surface water resources, aquatic resources, and endangered, threatened, and special concern species would be similar to the Preferred Alternative and the effects to geologic and soil resources would be similar to Alternative 2; therefore, those analyses are not repeated here. No significant adverse effects to these resources are anticipated as a result of Alternative 3.

As shown in **Table 5.6-13**, a total of 776 trees (61 percent of the trees surveyed) would be removed with Alternative 3 project implementation. An additional 62 trees would be potentially removed due to poor conditions, and 433 trees would be retained. Of the 776 trees expected to be removed for project implementation, trees in excellent condition measuring up to 7 inches dbh would be considered potential transplant candidates and may reduce the total number of trees to be removed under Alternative 3. As part of the proposed design landscape restoration plan, there would be 1,180 trees planted in the project areas. Thus, the net change in overall tree numbers would be an increase of 342 trees.

Table 5.6-13
Summary of Tree Effects under Alternative 3

Category	Trees
Existing Trees	1271
Total Tree Removals with Project Implementation	**-776**
Tree Removals Due to Condition	-62
Total Tree Removals	**-838**
Trees Retained	433
Trees to be Planted	+1180
Net Change	**+342**

As shown in **Table 5.6-14**, the total numbers of trees to be removed as a result of the Alternative 3 would be 776, which is a combination of 590 trees from East River Park, 45 trees from Stuyvesant Cove Park, 18 trees from Murphy Brothers Playground, 22 trees from Asser Levy Playground, and 101 trees from the remainder of the project area vicinity. The tree removals from East River Park represent 76 percent of the total tree removals with Alternative 3 project implementation.

Table 5.6-14
Tree Removals by Location under Alternative 3

Location	Trees
East River Park	-590
Stuyvesant Cove Park	-45
Murphy Brothers Playground	-18
Asser Levy Playground	-22
Project Area Vicinity	-101
Total Tree Removals with Project Implementation	**-776**

Implementation of Alternative 3 would also require a NYC Parks approved landscape restoration plan to address the proposed tree removal. Replacement for tree removal would need to be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. This alternative would not provide protection to natural resources within East River Park from the threat of gradually accelerating sea level rise, which increases the risk of frequent flooding from every day storms or high tides. Flooding not only interrupts the recreational capacity of East River Park, the subsequent rise in water is also already exposing plant life to salt water inundation in ways that are detrimental to the existing ecology.

Under storm conditions, operation of Alternative 2 would protect upland areas and limit the design storm surge to the unprotected areas in East River Park and Stuyvesant Cove Park on the riverside of the flood protection system. This would result in inundation of East River Park and, to a lesser degree, Stuyvesant Cove Park, much of which would be elevated as a raised landscape. Thus, the effects of inundation on East River Park would be similar to the No Action Alternative, and 433 existing trees and other terrestrial resources would remain vulnerable and could be anticipated to be significantly damaged, requiring extended periods of post-storm tree removals for damaged or dying trees. Landscaped areas in these parks would be impacted from debris, inundation, salt damage, or wind and effects to terrestrial resources in East River Park and, to a lesser degree, Stuyvesant Cove Park. However, these effects would be experienced under the No Action Alternative, as well. Therefore, there would be no significant adverse effects to terrestrial resources as a result of Alternative 3.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 would be the same as the Preferred Alternative except for the portion of Project Area Two where the northbound lane of the FDR Drive would be elevated. This would necessitate an additional 157 square feet of disturbance to littoral zone wetlands, for a total of 24,242 square feet. As with the Preferred Alternative, adverse effects to wetland resources would be mitigated for in accordance with USACE and NYSDEC permit requirements, including both in-kind on-site and off-site wetland restoration, or purchase of credits from a wetland mitigation bank. The effect of Alternative 5 on other natural resources would be the same as described for the Preferred Alternative, and no significant adverse effects are anticipated.

G. MITIGATION

This section presents the proposed mitigation for the adverse effects to natural resources associated with the Preferred Alternative. Mitigation measures fall under the general categories of avoidance, minimization, restoration, and compensation. Where possible, the Preferred Alternative has been designed to avoid and minimize adverse effects to natural resources to the greatest extent

practicable. The esplanade elevation and reconstruction work is largely replacement in-kind that utilizes existing piles and sheetpile walls instead of extending the bulkhead eastward with bulk fill of tidal wetlands. In addition, the footprint of the flyover bridge footings and shafts would be minimized to the maximum extent practicable as design progresses.

The Preferred Alternative would result in temporary adverse effects to terrestrial resources with the removal of 981 trees within the study area. Mitigation for the temporary adverse effects to terrestrial resources will be provided through the implementation of a landscape restoration plan that includes 1,442 replacement trees within the study area in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Parks Rules) and Local Law 3 of 2010 (see **Appendix C1o** and **Figure 5.6-6**). This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate.

The removal of trees would occur principally within the waterfront parks and is not expected to result in any disproportionately high or adverse effects on minority and low-income populations within the inland neighborhoods. Over a period of years to decades, depending on many factors such as tree specific growth rates and climatological factors such as drought and seasonal temperature variations, the new tree canopy, comprised of diverse and resilient species, would mature and fill in, and would represent an improved habitat over the existing conditions (see **Figure 5.6-8**).

Temporarily disturbed lawn and landscaped areas within East River Park, Stuyvesant Cove Park, including the National Wildlife Federation (NWF)-designated "Certified Wildlife Habitat" and the Monarch Watch designated "Monarch Waystation," and other upland spaces such as Murphy Brothers Playground and Asser Levy Playground would also be restored with the landscape restoration plan and would include plantings that would support typical urban wildlife upon completion of construction, including four different milkweed species that attract and support monarch butterflies.

The Preferred Alternative would result in a total of 24,085 square feet of adverse effects to tidal wetland habitat, which would require 48,170 square feet of tidal wetland mitigation. On-site, in-kind tidal wetland mitigation would consist of constructing two new embayments within the project area which would restore approximately 26,000 square feet of the adversely affected tidal wetlands. The remaining 22,170 square feet of required mitigation would be accomplished through the purchase of tidal wetland mitigation bank credits or with off-site tidal wetland restoration or creation. The NY/NJ Harbor Estuary Program has identified potential tidal wetland restoration sites within their Harlem River, East River, and Western Long Island Sound Planning Region as part of their Comprehensive Restoration Plan (HEP, 2016). NYC Parks has also identified potential tidal wetland restoration sites within this region. The New York City Economic Development Corporation (EDC) operates the Saw Mill Creek Wetland Mitigation Bank in Staten Island, NY, where credits may be purchased to mitigate adverse effects to tidal wetlands. As the proposed project is within the Primary Service Area for the mitigation bank, this option is being explored to fulfill the tidal wetland mitigation requirements. Selection and implementation of off-

site tidal wetland mitigation will be coordinated with the Harbor Estuary Program, NYC Parks, EDC, and other involved agencies. It is anticipated that the design and construction of both the on-site and off-site tidal wetland mitigation would be completed by the proposed construction end date of 2023.

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Chapter 5.7: Hazardous Materials

A. INTRODUCTION

This chapter assesses the potential for the presence of hazardous materials in the project area, the potential for exposure to hazardous materials following construction, and the specific measures that would be employed to protect public health, worker safety, and the environment. A "hazardous material" is generally defined as any substance that poses a threat to human health or the environment. It is often used interchangeably with "contaminated material," but should not be confused with the term "hazardous waste," which is a regulatory term.[1]

The project area has a long history of commercial/industrial and residential uses. Based on the area's history, subsurface contaminants would be expected to include those related to gasoline and petroleum, manufactured gas plants (MGPs) that were historically located nearby, as well as other subsurface contamination (in the fill, soil, and/or groundwater).

The proposed project would involve the installation of a flood protection system generally located within City parkland and streets between Montgomery Street to the south and East 25th Street to the north. The proposed flood protection system would consist of a combination of floodwalls, levees, and closure structures that, together with other infrastructure improvements, would improve the resiliency of this area to coastal flooding while simultaneously improving access and community connectivity to the waterfront. The proposed project would require the demolition or disturbance of existing structures, excavation,[2] and disturbance and removal of some of the existing fill and soil. Dewatering of groundwater would also be required. A detailed description of the alternatives analyzed in this chapter is provided in Chapter 2, "Project Alternatives."

A detailed assessment of potential effects of hazardous materials during construction is described in Chapter 6.6, "Construction—Hazardous Materials." The assessment below focuses on the potential effects of hazardous materials following construction (i.e., during the operational stage of the proposed project).

PROJECT AREA

The project area for the analysis of hazardous materials is as follows: for Project Area One, an approximately 100- to 300-foot-wide area extending from Montgomery Street on the south to East 13th Street on the north; for Project Area Two, an approximately 100-foot-wide area

[1] "Hazardous waste" is defined in both the U.S. Environmental Protection Agency (USEPA) regulations (40 CFR Part 261) and New York State regulations (6 NYCRR Part 371), and refers to a subset of solid wastes that are either specific wastes listed in the regulations (listed wastes) or solid wastes possessing the characteristic of ignitability, reactivity, corrosivity, or toxicity (characteristic wastes).

[2] Excavation for the proposed project would be more extensive for the construction of flood walls than for both levees and raised landscapes.

(centered approximately on the eastern extent of the FDR Drive) extending from approximately East 18th Street on the south to East 25th Street on the north. The area between approximately East 13th Street and East 15th Street on the west side of the FDR Drive was not investigated since there is no proposed disturbance here. In this area, walls associated with the nearby Consolidated Edison Company of New York (Con Edison) facility already exist and would connect with the proposed alignment. The section of the proposed alignment between approximately East 15th Street and East 18th Street was not investigated since this area contains numerous utilities (associated with the nearby Con Edison facility). As the alignment is now contemplated to be in an area that has not been fully characterized, additional soil and groundwater testing (including in the vicinity of interceptor gate locations) is to be implemented in accordance with a work plan and Health and Safety Plan (HASP) submitted to the New York City Department of Environmental Protection (DEP) for review and approval.

B. PRINCIPAL CONCLUSIONS

During the subsurface investigations of the study area, subsurface contamination consistent with historical MGPs and other sources of petroleum waste were found in both soil and groundwater in the northern portion of Project Area One and throughout the majority of Project Area Two. The contamination included MGP-related free product (also known as non-aqueous phase liquid or NAPL). Three nearby former MGPs (historically known as East 11th Street Works, East 14th Street Works, and East 21st Street Works) have been or are being investigated and, as deemed necessary by the New York State Department of Environmental Conservation (NYSDEC) to protect human health or the environment, remediated by Con Edison. These activities were being conducted under the former NYSDEC Voluntary Cleanup Program (VCP) (Sites V00534, V00535, and V00536) and now, following termination of the VCP statewide by NYSDEC, under an Order on Consent and Administrative Settlement with NYSDEC. In addition, historical fill material of unknown origin was encountered throughout the project area, as expected. Laboratory analysis found, as is typical of historical fill material, variable, and sometimes elevated levels of a range of contaminants especially certain metals and semi-volatile organic compounds (SVOCs).

Within the northern portion of Project Area Two, at the Asser Levy Recreation Center, there is known petroleum contamination from a No. 2 fuel oil release (open-status NYSDEC Spill No. 0814102). Additionally, within the northern portion of Project Area Two, at the Solar One site in Stuyvesant Cove Park, there is known gasoline and No. 6 fuel oil contamination (NYSDEC Spill No. 9506959). In both areas, there are active remediation systems. There are also several projects planned or under construction in the project area that might disturb the subsurface and any hazardous materials present there. These projects, including the Pier 42 project and the Solar One Environmental Education Center project, are independent of the proposed project, but would be subject to applicable regulatory requirements.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, no new comprehensive coastal protection system would be implemented. However, the No Action Alternative assumes that projects planned or currently under construction near the project area are completed by the 2025 analysis year (i.e., No Action projects). These planned projects might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure, but these projects would need to comply with applicable regulatory requirements.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative would involve demolition and excavation activities and would have their potential to disturb hazardous materials in existing structures and the subsurface. However, with the implementation of appropriate protection measures—described further in Section F below, governing the construction phase—the potential for significant adverse effects related to hazardous materials would be avoided. Following construction, with the capping layer in landscaped areas and the implementation of Site Management Plans (SMPs) that address long-term management of residual hazardous materials, there would be no pathways for exposure to park users from remaining subsurface contaminants beneath the project construction areas. Therefore, the Preferred Alternative would not have the potential for significant adverse effects related to hazardous materials during the operational stage of the proposed project. In addition, as the alignment of the Preferred Alternative includes areas that have not been fully characterized (e.g., the line of protection in East River Park and two interceptor gate house locations), additional soil and groundwater testing is also to be implemented in both Project Areas One and Two, in accordance with a work plan and Construction Health and Safety Plan (CHASP) submitted to the DEP for review and approval for the purposes of identifying any soil groundwater contamination at these locations.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in that they all include the potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for operational-phase effects would be avoided in the same manner as described above for the Preferred Alternative.

C. REGULATORY CONTEXT

A hazardous material is any substance that poses a threat to human health or the environment. Substances that may be of concern in the subsurface include heavy metals, volatile organic compounds (VOCs), SVOCs, methane, polychlorinated biphenyls (PCBs), pesticides, and hazardous wastes. Asbestos-containing materials (ACM) and lead-based paint (LBP) or LCP are the most common aboveground (e.g., on or within building materials) hazardous materials. Management of hazardous materials is subject to numerous regulatory programs, including those of the United States Environmental Protection Agency (USEPA), NYSDEC, and DEP. For example, a subset of hazardous materials, when disposed of are considered Hazardous Wastes and are subject to a variety of stringent cradle-to-grave requirements (set out in 40 CFR Parts 261-264 and 268).

This assessment follows the methodology in the 2014 *New York City Environmental Quality Review (CEQR) Technical Manual*. For hazardous materials, the goal for CEQR is to determine whether a proposed project may increase the exposure of people or the environment to hazardous materials, and, if so, whether this increased exposure would result in potentially significant public health or environmental effects. Additionally, the regulatory context for the proposed project includes the following requirements and policies for which each of the

alternatives have been analyzed with respect to in order to make a determination of potential environmental effects associated with project implementation.

EO 13045 – PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks, specifies prioritization of the identification and assessment of potential environmental health and safety risks that may disproportionately affect children (it should be however be noted that in general the regulatory standards and guidelines, used for comparison purposes, already incorporate protection of sensitive individuals, including children). If adverse effects are identified, CEQR requires that the effects be disclosed and mitigated or avoided to the greatest extent practicable.

HUD POLICY – RELATED FEDERAL LAWS AND AUTHORITIES (24 CFR § 58.5)

The United States Department of Housing and Urban Development (HUD) policy (at 24 CFR Part 58.5[i][2]) sets out that properties proposed for use in HUD programs should be free of hazardous materials, where a hazard could affect the health and safety of users of the property, and that particular attention be paid to properties on or near dumps, landfills, industrial sites, etc.

D. METHODOLOGY

Historically, almost the entire study area was within the East River until it was filled in the 19th and 20th centuries. The source and quality of this fill material are unknown. As such, testing of the fill material (especially the shallow fill, since this would be more likely to be disturbed as a result of the proposed project) was performed in the spring of 2015 (Spring 2015) and the summer of 2016 (Summer 2016) via subsurface investigations. Deeper testing was also conducted, since new walls would require relatively deep foundations. In addition, groundwater was tested, since construction would require dewatering. Testing of (off-site) sediments near the shore of the East River was not performed for the environmental review, but sediments (in particular near the former MGP facilities) are known from prior studies, associated with the investigations performed of the former MGPs, to in some locations contain contamination. Sediments in the East River may be disturbed if the proposed project requires dredging to obtain sufficient water depth for barge access during construction. However, based on current design, dredging is not anticipated to be required. If dredging is needed, testing would be performed prior to dredging, both to determine appropriate disposal methods and, if required, as a part of a joint NYSDEC and United States Army Corps of Engineers (USACE) permitting process.

In addition to the initial quality of the fill material itself, migration of contaminants from former MGP facilities, operated by predecessors of Con Edison, inland has occurred primarily between East 11th and East 14th Streets, and East 20th and East 22nd Streets. Petroleum releases in the northern portion of Project Area Two are known to have resulted in some subsurface contamination. Historical piers and bulkheads, including railroad piers that were located along most of the East River shoreline, could also have resulted in subsurface contamination.

POTENTIAL CONTAMINANTS OF CONCERN

Soil and groundwater can become contaminated as a result of past or current activities on a project site or on adjacent areas. Many industrial activities use, store, or generate contaminated

materials that can be spilled, dumped, or buried nearby. Other activities common in mixed-use neighborhoods, such as gas stations and auto repair shops, can also result in contamination due to improper handling/management of raw product and/or waste materials, or inadvertent spills/release.

Of particular concern for the study area are MGPs. These plants existed from the early 1800s to the mid-1900s, before the construction of natural gas pipelines, and converted coal (oven gas) or a combination of coke or coal, oil and water in the form of steam (carbureted water gas) into a gas that could be distributed and used as a fuel for heating, cooking, and lighting. Byproducts of the gas production, such as coal tar (wastes containing volatile and non-volatile organic chemicals) may pose a threat to human health and the environment. Con Edison has conducted investigations to characterize and delineate the nature and extent of contamination from these historic facilities and remediated areas of residual contamination from these facilities where it was determined to be necessary by NYSDEC to protect human health or the environment.

Exposure to contaminants from the former MGP or other sources can potentially occur through direct contact when there is an exposure pathway, e.g., when excavation is occurring. Exposure to contaminated groundwater through ingestion is not expected as Manhattan is served by municipal water systems that rely on upstate reservoirs, but exposure could occur during dewatering. Therefore, if such contaminants are not properly managed, the proposed excavation, earthmoving, dewatering, and other construction activities can introduce potential risk to construction workers and others nearby by providing a pathway of exposure from contaminants. Demolition or disturbance of existing structures that have ACM, LBP/LCP, electrical equipment containing PCBs, or fluorescent lights or older thermostats containing mercury have the potential to release contaminants if these materials are not properly managed.

Based on the types of contaminants that are typically found in New York City, some of the potential contaminants of concern are described below. The list provides a summary of potential categories of contaminants and is not a comprehensive list of all contaminants that may be encountered:

1. **Volatile organic compounds (VOCs)**: These include aromatic compounds—such as benzene, toluene, ethylbenzene, xylene (BTEX), which may be found in MGP wastes and petroleum products (especially gasoline, which can also contain methyl tertiary butyl ether [MTBE])—and chlorinated compounds, such as tetrachloroethene (also known as perchloroethylene or “perc”) and trichloroethene, which are common ingredients in solvents, degreasers, and cleansers. VOCs represent the greatest potential for contamination since, in addition to soil and groundwater contamination, they can generate organic vapors.
2. **Semivolatile organic compounds (SVOCs)**: The most common SVOCs in urban areas are polycyclic aromatic hydrocarbons (PAHs), which are constituents of partially combusted coal- or petroleum-derived products, and some MGP wastes. PAHs are commonly found in New York City urban fill material, which seemingly underlies the entire study area. Petroleum-related SVOCs could be present and are typically associated with buried tanks currently or formerly located in the study area. SVOCs can also be present in creosote-treated timber (e.g., piles from former bulkheads or piers).
3. **Polychlorinated biphenyls (PCBs)**: PCBs and/or PCB-containing materials were once widely used in manufacturing and industrial applications (e.g., hydraulic equipment, plastics manufacturing, as dielectric fluid in transformers, and in some underground high-voltage electric lines). PCBs tend to travel only short distances in soil, except in unusual circumstances (e.g., large spills of PCB-containing oils over many years).

4. **Pesticides, herbicides, and rodenticides**: These are commonly used to control rodents and/or insects and vegetation in vacant structures or in vegetated areas, including parks. Pesticides/herbicides are relatively immobile and tend to be persistent in surface soils.
5. **Metals (including lead, arsenic, cadmium, chromium, mercury and cyanide)**: Metals are often used in smelters, foundries, and metal works and are found as components in MGP wastes, paint, ink, petroleum products, fluorescent lights, older thermostats, and coal ash, and were used in the past (copper, chrome, and arsenic) as wood preservatives (e.g., on piles). These metals tend not to migrate far in soil; therefore, they would be of greater concern at the site where they were generated than at off-site areas. Metals at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.
6. **Fuel oil and gasoline from storage tanks**: Numerous residences and businesses upland of (or less likely in) the project area could have had above-ground storage tanks and/or underground storage tanks for fuels, including heating oil and gasoline. Some of the MGP facilities stored large volumes of oil. Although the MGP-related tanks have been removed, underground storage tanks at other locations, although no longer in use, may remain buried in place. Some of the tanks are known to have leaked, and others have possibly leaked despite no record of a spill reported. Some spills have been cleaned up in accordance with state regulations, but others have not because they have not yet been discovered or because cleanup, which can take several years, is ongoing.
7. **Fill materials of unknown origin**: In the past, waste materials, including coal and incinerator ash, demolition debris (including from demolished cinder blocks), and industrial wastes, were commonly used as fill in urban areas. Even fill material consisting primarily of soil may exhibit elevated levels of PAHs, metals, PCBs, SVOCs, and other contaminants. Such materials are potentially present throughout the project area.
8. **Asbestos**: Asbestos is a common component of building materials, especially insulation, fireproofing, tile flooring, plaster, sheetrock, ceiling tiles, mastic, and roofing materials. In addition to materials within existing structures, subsurface utility lines may be coated with asbestos or encased in "transite," an ACM. Asbestos was widely used before 1980. Because of the age of many of the buildings and bridges in the project area, ACMs are almost certainly present.
9. **Lead-based paint (LBP) and Lead-containing Paint (LCP)**: The use of LBP in New York City residential buildings was banned in 1960. Its use in other buildings and outdoors was severely restricted by the Consumer Products Safety Commission in 1977. Lead-containing paint is regulated under the OSHA Lead Exposure in Construction standard (29 CFR 1926.62). Lead that is released as dust (or as a fume if heated) is potentially hazardous, especially to children. Older buildings, bridges, and other painted structures or elements are likely to include LBP or LCP.

SOIL AND GROUNDWATER INVESTIGATIONS[3]

SOIL AND GROUNDWATER INVESTIGATION (SPRING 2015)

For this investigation, conducted between April and June 2015, both Project Areas One (south of East 14th Street) and Two (north of East 14th Street) were analyzed and further divided into 100-foot grids for analysis purposes. In each grid, one deep boring (up to 40 feet) was conducted as well as four additional shallow borings. The shallow samples were generally analyzed as composites (i.e., mixture) of shallow soil from the five borings within the grid. For Project Areas One and Two, this resulted in 83 deep samples and 98 shallow samples. Ten of the borings were retrofitted with temporary monitoring wells, allowing collection of a groundwater sample from each. Soil samples were analyzed for a suite of parameters (VOCs, SVOCs, metals, pesticides, and PCBs) with certain samples also analyzed for a set of parameters that determine whether the material, if excavated, would be likely to require management as a hazardous waste, as defined by USEPA and NYSDEC regulations. Groundwater samples were analyzed for a similar set of parameters to the soil samples with certain samples also analyzed for a set of parameters that determine whether the water would be likely to require pre-treatment prior to discharge, should dewatering be necessary.

No borings were performed along the waterfront walkway and Captain Patrick J. Brown Walk located between East 13th and East 18th Streets since the area contains numerous subsurface utilities (associated with the nearby Con Edison power plant). As the alignment is now contemplated to be in an area that has not been fully characterized, additional soil and groundwater testing (including in the vicinity of the interceptor gate locations) would be conducted, prior to construction, in accordance with a work plan and HASP submitted to DEP for review and approval. In addition, if portions of the final alignment are within a regulated water body or wetland adjacent area, any necessary NYSDEC/USACE permitting requirements would be followed.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION (SUMMER 2016)

Supplemental soil and groundwater investigations were conducted in July 2016, as follows: (1) in areas where the potential for subsurface soil disturbance was better defined based on the project design; (2) in two shallow soil locations where the Spring 2015 investigation identified elevated levels of lead and/or chromium in composite samples; and (3) to obtain additional groundwater quality data in the northern end of East River Park at depths where contamination from former MGPs was identified during the Spring 2015 investigation.

Under this investigation, seventy borings were advanced for the collection of soil samples. Fifteen of these were retrofitted with temporary monitoring wells allowing collection of groundwater samples. Samples were collected and analyzed for similar parameters as the Spring 2015 investigation, with the exception of soil samples in the area with elevated lead and/or chromium where analysis was limited to these specific metals.

[3] *Subsurface Investigation Report for East Side Coastal Resiliency Project Area 2,* AKRF Inc. July 2015
Subsurface Investigation Report for East Side Coastal Resiliency Project Area 1, AKRF Inc. October 2015
Supplemental Subsurface Investigation Report for East Side Coastal Resiliency, AKRF Inc. November 2016

E. AFFECTED ENVIRONMENT

TOPOGRAPHY, GEOLOGY, AND GROUNDWATER

The topography of the project area is generally level and approximately 5 to 10 feet above mean sea level (NAVD88). The topography of the study area slopes toward the East River, generally in the form of a human-made park and bulkhead. The land typically slopes gently upward inland of the project area.

A comparison of current maps with historical maps of Manhattan shows that essentially all of the land in the project area was formerly underwater (a portion of the area around Corlears Hook Park is the possible exception). More recent filling was associated with construction of the FDR Drive, which began in 1934, and East River Park, which opened between 1939 and 1941. Therefore, soils under and in the vicinity of the project area are expected to include fill material.

Groundwater during the soil and groundwater investigations was first encountered at approximately 5 to 12 feet below grade; however, more precise groundwater measurements obtained from temporary wells identified the water table at between 5 and 16 feet below grade. While groundwater throughout the project area would be expected to flow toward the East River, local variations are possible due to intervening subsurface structures (such as former or current bulkheads), tidal fluctuation, and past filling. Groundwater in Manhattan is not used as a source of drinking water (see **Figures 5.7-1 through 5.7-3**).

SOIL AND GROUNDWATER CONDITIONS

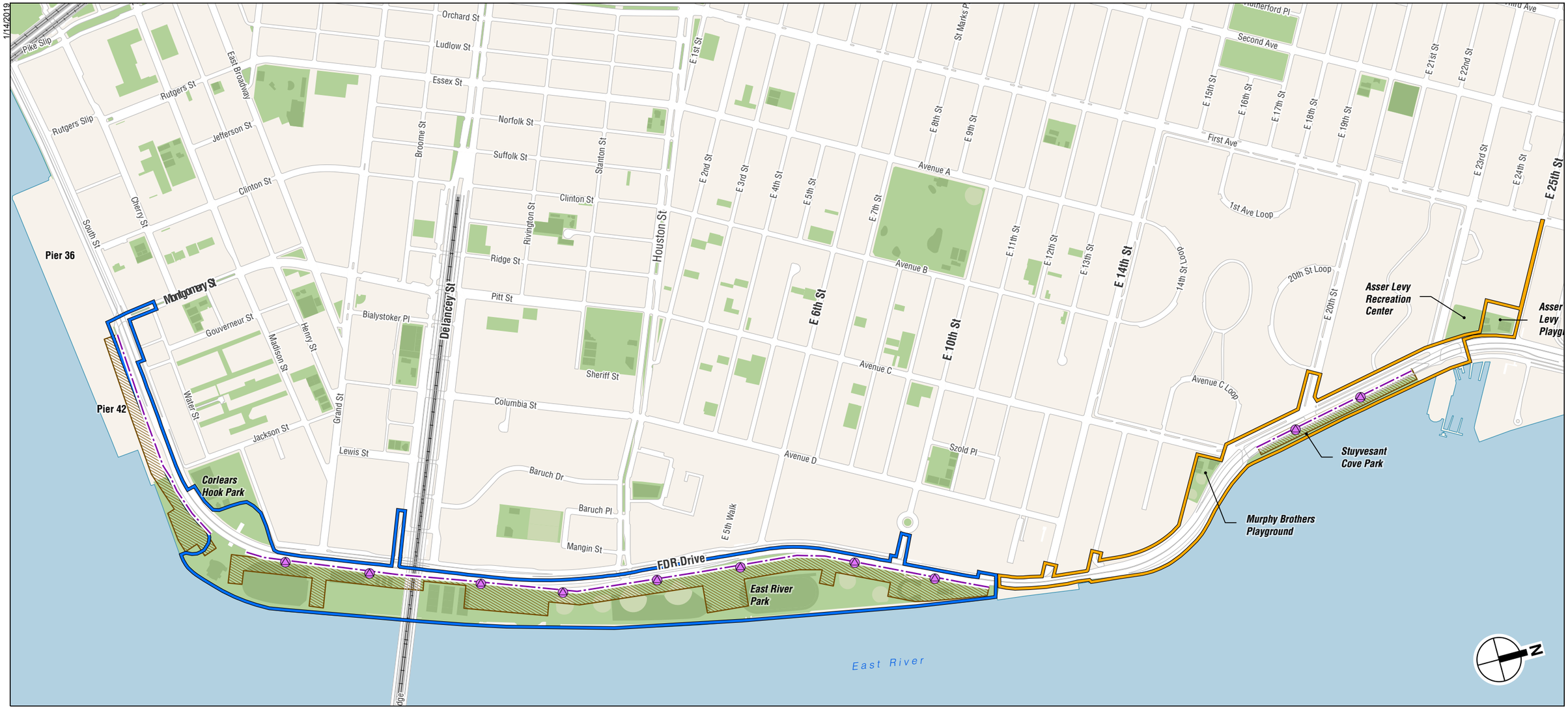
SOIL AND GROUNDWATER INVESTIGATION (SPRING 2015)

Project Area One

Soil Conditions

Soil encountered throughout Project Area One generally included sandy fill materials (including brick and asphalt with gravel and at some locations peat), underlain in some locations by sand and silts with gravel and rock fragments (presumed to also be fill material). Laboratory analysis of shallow soils generally exhibited levels of constituents including metals and SVOCs consistent with urban fill.

Field observations, laboratory data, and historical findings related to the former MGP facilities operated by predecessors of Con Edison at East 11th Street and East 14th Street indicated the potential presence of MGP wastes, including coal tar, in the subsurface soil extending from Captain Patrick J. Brown Walk south to East 13th Street. Contamination was mostly found at and below the water table and in some cases extended to (and is therefore likely located beyond) the bottom of the borings, which extended up to 40 feet. The shallowest contamination potentially consistent with MGP waste was encountered at five feet below grade. Laboratory analysis of these samples identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC Soil Cleanup Objectives (SCOs), though it should be noted these SCOs assume routine public exposure at the surface, so comparison is highly conservative as this material would not be used to form the top layer of a levee, raised landscape or other surface in the park. Although many of these compounds are also present in gasoline and other petroleum products, especially when encountered well below the water table, they may also be indicative of MGP contamination. The data was generally consistent with data generated



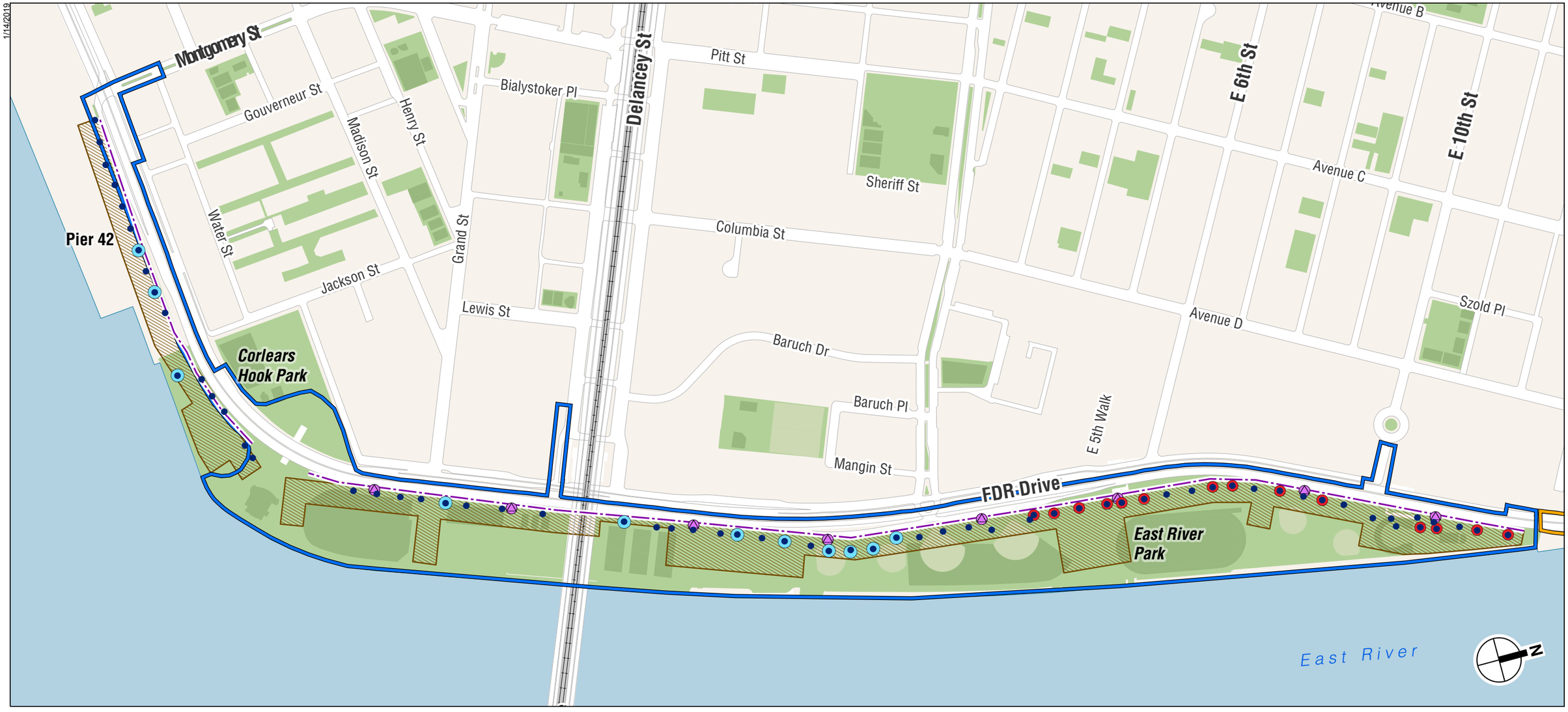
Project Area One
Project Area Two
Deep Boring Alignment
Shallow Boring Areas
Groundwater Sample Locations

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Soil and Groundwater Testing Locations
Figure 5.7-1

1/14/2019



Project Area One
Project Area Two
Deep Boring Alignment
Shallow Boring Areas

Groundwater Sample Locations
Deep Soil Boring Location & Designation
Deep Soil Borings with Petroleum-Like Contamination Encountered at Depths
Deep Soil Borings with Coal Tar-Like Contamination Encountered at Depths

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Soil Boring and Contamination Locations - Project Area One
Figure 5.7-2

1/14/2019

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY

Soil Boring and Contamination Locations - Project Area Two
Figure 5.7-3

during investigations conducted on behalf of Con Edison as a part of their investigations of MGP facilities in the area as part of its Voluntary Cleanup Agreement (VCA) with NYSDEC.[4]

Petroleum-like odors and or low-level photoionization detector (PID) readings, indicating the presence of VOCs, were noted during the field screening of soil from 12 borings as shown on **Figures 5.7-2 and 5.7-3**. However, laboratory data indicated potential petroleum contamination in only three of these borings—one located slightly south of East Houston Street, one just north of the Williamsburg Bridge, and another near the Solar One site.

One deep soil sample across from Gouverneur Slip East had an unusually elevated level of lead and, to a lesser extent, mercury and silver. A shallow soil sample collected just north of Grand Street contained a relatively high level of lead, and another shallow soil sample collected just north of the East River Park Amphitheater (located at the eastern end of the Corlears Hook Park pedestrian bridge) had a relatively high level of chromium. Following sampling, these borings were backfilled in a manner so that there is no potential for exposure to these materials from the surface. These metals are most likely attributable to the fill materials rather than contamination from the former MGP and/or on-site or off-site facilities/uses.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at between approximately 5 and 9 feet below grade in Project Area One. A petroleum-like sheen was observed in a temporary well just north of East Houston Street, but laboratory analytical data identified no significant exceedances of NYSDEC Class GA water quality standards in the shallow water table. Some metals showed exceedances but the levels were typical of waterfront locations and urban areas; Class GA standards were developed assuming use for drinking water supply, a scenario that does not occur in Manhattan. However, based on field observations and chemical data from the soil boring program, and the data contained in the December 2009 Remedial Investigation Report prepared on behalf of Con Edison for the Former East 11th Street Works site (submitted to and publicly available from NYSDEC), deeper groundwater contamination (associated with the Former 11th Street Works) is present between East 14th Street and East 4th Walk (essentially an extension of East 4th Street) and contains elevated levels of VOCs and SVOCs associated with MGP wastes.

The results for the groundwater discharge parameters indicated that the only exceedance of the DEP limitations for effluent to the sanitary/combined sewer system was for total suspended solids (TSS) indicating the potential need for treatment in the form of settling and/or filtration prior to discharge. However, the groundwater samples were collected from shallow temporary wells, and based on the findings of the deep soil samples and Con Edison data for deeper wells located inland of the project area, there is likely more extensive deeper groundwater contamination. Therefore, it is probable that groundwater pumped during construction throughout much of the project area, especially in the vicinity of the former MGP facilities, would require treatment for organic compounds, e.g., by using oil-water separators or absorption on granulated activated carbon, before discharge.

[4] More information on the Con Edison studies for the various sites is available from NYSDEC and online at http://www.coned.com/publicissues/manufactured_gas_plants.asp.

Project Area Two

Soil Conditions

Similar to Project Area One, soil encountered in Project Area generally included sandy fill materials (including brick and asphalt with gravel and at some locations peat), underlain in some locations by sand and silts with gravel and rock fragments (presumed to also be fill material). Laboratory analysis of shallow soils generally exhibited levels of constituents including metals and SVOCs consistent with urban fill. As noted above, no borings were performed between East 13th and East 18th Streets. Similarly, no sampling (in the Spring 2015 investigation) was conducted north of East 23rd Street or west of the FDR Drive.

Field observations, laboratory data, and historical findings related to the former MGP facilities operated by predecessors of Con Edison within the current locations of Stuyvesant Town (former East 14th, East 17th, and East 19th Street Stations) and Peter Cooper Village (formerly East 21st Street Works) indicated the likely presence of MGP wastes, including coal tar, in the subsurface soil in Project Area Two. Contamination was mostly found at and below the water table and in some cases extended to (and is therefore likely located beyond) the bottom of the borings, which extended up to 40 feet. The shallowest contamination potentially consistent with MGP waste was at six feet below grade. Typically, this contamination was first encountered at or below the water table and extended down the remainder of the boring. Laboratory analysis of these samples identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC SCOs, though it should be noted these SCOs assume routine public exposure at the surface so comparison is highly conservative as this material would not be used to form the top layer of a levee, landscaped berm, or other surface in the park. Although many of these compounds are found in gasoline and other petroleum products, especially when encountered well below the water table, they are more likely indicative of MGP contamination. Furthermore, the data were generally consistent with data generated on behalf of Con Edison as a part of their VCA with NYSDEC.[5] The two areas where sampling was not conducted (between East 13th and East 18th Streets, and north of East 23rd Street or west of the FDR Drive) could also have MGP contamination based on data generated on behalf of Con Edison. However, they would be anticipated to be less contaminated than the area directly east of Peter Cooper Village, which was where the majority of wastes were generated/released, based on both historical information and Con Edison investigation data.

Data from the northernmost sample (near Solar One), adjacent to an active gasoline station at the foot of East 23rd Street, indicated likely petroleum-related contamination in the subsurface closer to the soil/water interface. This gasoline station is known to have had spills in the past. Due to the limited nature of the groundwater assessment, it is not clear to what extent groundwater quality has been affected by this gasoline station.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at approximately 7 feet below grade in Project Area Two. Groundwater, consistent with the deep soil samples, appeared to be affected by MGP contamination and had levels of VOCs and naphthalene well above Class GA standards.

[5] More information on the Con Edison studies for the various sites is available from NYSDEC and online at http://www.coned.com/publicissues/manufactured_gas_plants.asp

The results for the groundwater discharge parameters indicate that naphthalene and BTEX were above the DEP limits in the sample collected across from Peter Cooper Village. Based on these results, treatment of groundwater for organic compounds e.g., by using oil-water separators or absorption on granulated activated carbon (as well as TSS) would likely be required prior to discharge to the sewer system, should dewatering be required. The other groundwater samples indicated either compliance with all DEP limits or, in one sample, exceedance only for TSS, which might require treatment in the form of settling or filtration prior to discharge.

SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION – SUMMER 2016

Soil Conditions

Soil encountered during the summer of 2016 supplemental investigation was similar to the Spring 2015 investigation and generally included sandy fill materials underlain (unless the boring encountered refusal) by native sand, clays, and silts with little to trace gravel and rock fragments. Shallow borings mostly consisted of only sandy fill materials. As with the Spring 2015 investigation, laboratory analysis of soil samples generally exhibited levels of constituents including metals and SVOCs consistent with urban fill.

Relating to MGP wastes, field observations, laboratory data, and historical findings were also generally similar to the Spring 2015 investigation, and indicated the presence of MGP wastes, including coal tar, in the deeper soil (at and below the water table) in the northern portion of Project Area One and throughout Project Area Two. Laboratory analysis of these samples again identified BTEX and the SVOC naphthalene in deep soil samples at concentrations above various NYSDEC SCOs and most likely indicative of MGP contamination.

However, suspected MGP-related wastes were identified just north of the Williamsburg Bridge within East River Park, well beyond the southern-extent of MGP effects identified in investigations conducted on behalf of Con Edison under the VCP. This contamination was identified from approximately 10 feet below grade to the bottom of the boring at 30 feet below grade. Forensic fingerprint laboratory analysis (i.e., where an attempt is made to match the mix of compounds in the sample to known mixtures) was performed and confirmed that it was likely related to coal tar. Additionally, hydrocarbon contamination, potentially petroleum, was identified adjacent to this location at depths ranging from approximately 5 to 15 feet below grade. NYSDEC was informed of both the identified coal tar and hydrocarbon contamination and Spill No. 1605942 was assigned.

Groundwater Conditions

Groundwater within the temporary monitoring wells was first encountered at between approximately 6 and 16 feet below grade. Groundwater, consistent with the associated soil samples and/or field observations (and the Spring 2015 investigation), appeared to be affected by MGP-related contamination (and had levels of VOCs and naphthalene well above Class GA standards).

The results for the groundwater discharge parameters indicate that VOCs and/or naphthalene were present above the DEP discharge limits in samples collected adjacent to Peter Cooper Village (located between East 20th Street and East 23rd Street) and Murphy Brothers Playground (located between East 16th Street and Avenue C Loop [approximately in line with extension of East 18th Street]), while TSS were present above the DEP limits in 10 of the 15 samples. Based on these results, treatment of certain groundwater for organic compounds as well

as TSS could well be required in certain areas prior to discharge to the combined or sanitary sewer system, should dewatering be required. The other groundwater samples indicate compliance with the DEP limits.

MANUFACTURED GAS PLANT CONTAMINATION

As noted above, contamination consistent with wastes from historical MGP operation were found in both soil and groundwater in the northern portion of Project Area One and in Project Area Two (and as noted above, it may also be present in the two portions of Project Area Two where testing did not occur). MGPs existed from the early 1800s to the mid-1900s (prior to natural gas production and pipelines), to convert coal (oven gas) or a combination of coke or coal, oil and water in the form of steam (carbureted water gas) into gas for lighting, cooking, and heating. These plants produced byproducts such as coal tar and oils that may be present beneath (and may have migrated away from) these former MGPs. Predecessors of Con Edison operated three MGPs that are in the vicinity of the project area. Decommissioning and dismantling/demolition of these facilities occurred more than 50 years ago.

In 2002, Con Edison entered into a VCA with NYSDEC, and in 2018 when NYSDEC ended the VCP statewide, into an Order on Consent and Administrative Settlement with NYSDEC to investigate and, if necessary to protect human health and the environment as determined by NYSDEC, remediate all of their former MGP and gas holder facilities including those near the project area. The Con Edison documents for the various sites[6] near the project area indicate:

- At the former East 11th Street Works, there is potential subsurface contamination, but the areas are capped and there are no indoor air effects to nearby buildings;
- At the former East 14th Street Works, although there is deeper soil contamination beneath the northernmost end of East River Park, these soils are now covered, which avoids the potential for human exposure;
- At Stuyvesant Town, limited MGP soil contamination was found in three small areas well below the surface. Based on the results of indoor air tests conducted on behalf of Con Edison, indoor air quality has not been affected by MGP contamination; and
- At Peter Cooper Village, while MGP soil contamination was found there is minimal potential for human exposure due to the depth of the contaminated soil and groundwater. Indoor air testing has shown no evidence of MGP-related contamination.

ASBESTOS-CONTAINING MATERIALS AND LEAD-CONTAINING PAINT

ACM and lead-containing paint (LCP) surveys were conducted in 2018 of the East 10th Street Comfort Station, and the East 10th Street and Delancey Street Bridges (*Asbestos and Lead Paint Survey Report for East Side Coastal Resiliency*, AKRF, Inc., revised June 2018).

- No ACM was identified in samples collected within the accessible study areas. It is, however, possible that ACM may be present in areas that were not accessible. Before any demolition or other disturbance, additional testing would be performed once it is possible to obtain samples from the inaccessible areas and contractor specifications would address the contingency that ACM is hidden or will otherwise not be encountered until later.

[6] See http://www.coned.com/publicissues/manufactured_gas_plants.asp.

- Lead was detected in 9 of the 22 paint chip samples. Demolition or other activities with the potential to disturb lead-based paint and lead-containing paint must be performed in accordance with applicable regulations (including OSHA 29 CFR 1926.62-Lead Exposure in Construction). Based on the testing results, all paint on steel components of the East 10th Street Comfort Station and East 10th Street Bridge, and all paint throughout the Delancey Street bridge should be considered to be LCP.

Independent of the environmental review associated with the proposed project, management and/or removal of these materials during construction is subject to a large number of federal, state, and local regulatory requirements that would be incorporated into the project documents and contractor specifications.

F. ENVIRONMENTAL EFFECTS

A detailed assessment of potential effects of hazardous materials during construction is described in Chapter 6.6, "Construction—Hazardous Materials." The assessment presented below focuses on the potential effects of the subsurface hazardous materials following construction (i.e., during the operational stage of the proposed project) and how applicable federal, state and local laws and guidelines will be complied with. A detailed description of the alternatives analyzed in this chapter is provided in Chapter 2.0, "Project Alternatives."

NO ACTION (ALTERNATIVE 1)

The No Active Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). These planned projects might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure. These projects, including the Pier 42 project and the Solar One Environmental Education Center project, would need to comply with applicable regulatory requirements.

PREFERRED ALTERNATIVE: FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK (ALTERNATIVE 4)

A detailed assessment of potential effects of hazardous materials during construction is described in Chapter 6.6, "Construction—Hazardous Materials."

As described in that chapter, the Preferred Alternative would include a final soil cover that would be provided in accordance with a plan approved by DEP and cover soils meeting the criteria included in the Remedial Action Plan (RAP), and or impervious paving (e.g., asphalt or concrete). This final cover and the Site Management Plans (described below) would ensure there would be no pathways for exposure and hence no potential for impacts to park users from subsurface contaminants beneath the project construction areas.

As also discussed in greater detail in Chapter 6.6, "Construction—Hazardous Materials," the Preferred Alternative would also, in an effort to reduce the potential migration of MGP-related contamination associated with the former MGPs, include a series of recovery wells landward (west) of the proposed alignment. Operation and maintenance of these wells would be established in accordance with MGP Site Management Plan (MGP-SMP), discussed below.

The potential for exposure to contaminated material would only occur if planned or emergency repair, utility, or other subsurface work, were to require disturbance beneath the capping layer

the horizontal and vertical extent of which would be documented in two SMPs. One SMP would be developed (subject to DEP approval) to establish procedures for safely performing construction activities beneath the entire capping layer as well as the necessary inspection and maintenance. The required procedures and the areas/depths at which additional safety measures (addressing MGP contamination) would be established in a second SMP, the MGP-SMP, which would be subject to NYSDEC approval. With these measures in place, the Preferred Alternative would not have the potential for significant adverse effects related to hazardous materials during the operational stage of the proposed project.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of their potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for operational-phase effects would be avoided in the same manner as described above for the Preferred Alternative. ✷

Chapter 5.8: Water and Sewer Infrastructure

A. INTRODUCTION

This chapter assesses the potential effects of the proposed project on existing and planned water and sewer infrastructure. It has been prepared in accordance with 2014 *City Environmental Quality Review (CEQR) Technical Manual* methodologies. Implementation of the proposed project would not generate new water or sewer demand. Although construction of the proposed project would require relocation and/or replacement of water lines and hydrants in some areas, water service would not be affected. Existing sewer infrastructure would be altered, and new sewer infrastructure would be installed as part of the proposed project. Therefore, this chapter focuses only on potential significant adverse effects on the sewer system as a result of the proposed project.

STUDY AREA

The potential effects of the proposed project on sewer infrastructure was assessed for the study area, inclusive of the project protected area and the drainage protected area, as shown in **Figure 5.8-1** and described below.

PROJECT PROTECTED AREA

The project protected area is defined as the area proposed to be protected against overland storm surge flooding, as defined by the Federal Emergency Management Agency (FEMA) 100-year Special Flood Hazard Area. In addition, the protected area also takes into consideration the 90th percentile 2050s sea level rise assumptions for the area between Montgomery Street and East 25th Street. In total, the protected area, as outlined in **Figure 5.8-1**, is composed of about 380 acres and is located along approximately 2.4 miles of the southeastern Manhattan waterfront between Montgomery Street and East 25th Street.

DRAINAGE PROTECTED AREA

The drainage protected area encompasses the project protected area as well as the lateral sewers, regulators, outfalls, and other sewer infrastructure that serve or are tributary to those that serve the project protected area. In total, the drainage protected area, as outlined in **Figure 5.8-1**, is composed of about 1,100 acres and is located along the southeastern Manhattan waterfront between Montgomery Street and East 25th Street and extending inland to Broadway. Since the drainage protected area fully encompasses the project protected area, the consolidated sewer area protected by the proposed project will be referred to as the "drainage protected area" for the remainder of the chapter.

STUDY AREA

The drainage protected area is serviced by water mains, storm drains, and combined sewer infrastructure. All sewer flow within the drainage protected area is pumped to the New York City Department of Environmental Protection's (DEP) Newtown Creek Wastewater Treatment Plant (WWTP) located across the East River in Brooklyn, New York. Combined sewer flow is pumped

3/19/2019

Source: NYCDEP

Project Protected Area

Drainage Protected Area

Water & Sewer Study Area: Manhattan Pump Station Service Area

Existing Interceptor

Existing Branch Interceptors

Manhattan Pump Station

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Water and Sewer Study Area

Figure 5.8-1

to the Newtown Creek WWTP via the Manhattan Pump Station, which is located within the drainage protected area at East 13th Street and Avenue D.

The drainage protected area is part of a larger sewershed, the "study area," that is also serviced by the Manhattan Pump Station, and, ultimately, the Newtown Creek WWTP, which extends to approximately East 70th Street on the east side of Broadway and to West 14th Street on the west side of Broadway, as shown in **Figure 5.8-1**. A sewershed typically describes a geographic region in which all stormwater and wastewater is conveyed to a single point, or outlet, before being conveyed to a wastewater treatment plant. All sewers in the Manhattan Pump Station service area are hydraulically connected via the interceptor, which is a large-diameter (up to 108-inch) sewer pipe that collects flows from smaller-diameter pipes that serve DEP's customers and conveys flow to the pump station. The larger sewershed area (the study area) is approximately 4,300 acres, the majority of which is highly developed and covered by impervious surfaces, resulting in higher rainfall volumes entering the sewer system during rainfall events.

Modifications to sewers anywhere within this larger sewershed have the potential to impact other sewers in the study area; therefore, proposed drainage modifications were analyzed for impacts to the study area.

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The No Action Alternative would not change existing water and sewer infrastructure in the study area. The No Action Alternative would not provide comprehensive coastal flood protection for the protected area. Projects independent of the proposed project that are planned or ongoing would continue as planned. During a design storm, the protected area would be subject to overland flooding (which refers to flooding that exceeds the elevation of the coastal topography) from storm surge and rainfall and there would potentially be sewer infrastructure surcharge.[1] Targeted resiliency measures proposed in the protected area may reduce the effects of coastal flooding in specific locations but would not provide comprehensive flood protection. Under this alternative, the combined sewer system within the study area would continue to comply with conditions set by the Newtown Creek WWTP SPDES permit and be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near

[1] Surcharge refers to the condition in which combined sewer flow exceeds the capacity of sewer pipes and/or drainage infrastructure, potentially resulting in backups in sewer pipes and, ultimately, above-grade flooding.

the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area. and reducing the potential for flooding, wave damage, and the resulting scouring and erosion.

The existing sewer system would be modified to isolate the drainage protected area from the larger sewershed during design storm events to prevent coastal floodwaters from inundating the drainage protected area. The existing sewer system would also be modified to increase its capacity to convey wet-weather flows during design storm events with coincident rainfall events, thereby managing flooding within the drainage protected area. By raising the grade of East River Park, the extents of floodproofing needed for the sewer infrastructure would be reduced under this alternative as compared to Alternatives 2 and 3. The Preferred Alternative would also reconstruct and reconfigure the Park's underground sewer and water infrastructure, including outfalls and their tide gates within the park, to withstand the loads of the proposed flood protection system and elevated parkland. The Preferred Alternative would be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of the Preferred Alternative.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would include the same modifications to the sewer system to isolate the drainage protected area and increase hydraulic capacity as the Preferred Alternative. Alternatives 2 and 3 would not include reconstruction of the drainage infrastructure within East River Park and would require more floodproofing of existing sewer infrastructure within the Park compared to the Preferred Alternative. These alternatives would be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of the Other Alternatives.

C. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following federal, state and local laws, programs, rules, legal requirements, and policies for which each of the alternatives have been analyzed to result in a determination of environmental effects with project implementation.

FEDERAL

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

The Federal Water Pollution Control Act, also known as the Clean Water Act, is the primary federal law in the United States governing water pollution. It regulates point sources of water pollution, such as discharges of municipal sewage and industrial wastewater, and the discharge of dredged or fill material into navigable waters and other waters of the United States. The Act also regulates non-point source pollution from sources other than the end of a pipe, such as runoff from streets, agricultural fields, construction sites and mining that enter waterbodies.

Under Section 401 of the Act, any applicant for a federal permit or any license for an activity that may result in a discharge to navigable waters must provide to the federal agency issuing a permit a certificate, either from the state where the discharge would occur or from an interstate water pollution control agency, that the discharge would comply with Sections 301, 302, 303, 306, 307,

and 316 (b) of the Clean Water Act. Applicants for discharges to navigable waters in the State of New York must obtain a Water Quality Certificate from the New York State Department of Environmental Conservation (NYSDEC).

Section 402 of the Act provides guidance on the National Pollutant Discharge Elimination System (NPDES), which governs the issuance of permits to control and prevent water pollution at point sources that discharge pollutants. In the State of New York, the NPDES permit program is administered through NYSDEC's State Pollution Discharge Elimination System (SPDES) permit program. Consistency with the Clean Water Act is evaluated for the proposed project as changes to the sewer system (e.g., outfall locations and capacities) may require modifications to the study area's existing SPDES permit in accordance with the requirements of the Clean Water Act.

COMBINED SEWER OVERFLOW CONTROL POLICY

The objective of the CSO Control Policy (EPA FRL-4732-7, 59 Federal Register 18688) is to provide guidance to help areas served by combined sewer systems meet the objectives of the Clean Water Act. The policy provides site-specific guidance and flexibility to help communities implement appropriate CSO controls to meet appropriate health and environmental objectives. It also ensures that CSOs only occur as a result of wet weather events, and that all discharge points are in compliance with the technological and water quality requirements of the Clean Water Act. It also establishes reporting measures to assess the progress made on federal, state, and local levels in enforcing and implementing the policy. Consistency with the CSO Control Policy is evaluated for the proposed project to confirm that any changes to the combined sewer system meet the study area's CSO control objectives.

NEW YORK STATE

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM

Title 8 of Article 17 of the New York Environmental Conservation Law, Water Pollution Control, authorized the creation of the SPDES to regulate discharges to the state's waters. Activities requiring a SPDES permit include point source discharges of wastewater into surface or ground waters 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 acre or more. Consistency with SPDES is evaluated for the proposed project as changes to the sewer system (e.g., outfall locations and capacities) may require modifications to the study area's existing SPDES permit and because construction activities would disturb an area greater than one acre.

NEW YORK STATE SANITARY CODE

Part 5 of the New York State Sanitary code (10 NYCRR 5) regulates public water supply. It ensures protection of drinking water resources both at the source and throughout water treatment and distribution processes. This code is evaluated for the proposed project to ensure compliance for any modifications to or reconstruction of the existing water distribution system in the study area as a result of the proposed project.

NEW YORK CITY

RULES OF THE CITY OF NEW YORK

Chapter 20 of Title 15 of the Rules of the City of New York establishes guidelines and restrictions regarding the use and supply of water. This rule encompasses all water supply infrastructure in the

city. Chapter 31 of Title 15 of the Rules of the City of New York establishes guidelines for the issuance of permits for the construction, repair, alteration, and inspection of all sewer connections. All permit applications are to be submitted to and reviewed by DEP. The proposed project consists of water and sewer construction. As such, these guidelines were evaluated for the proposed project to confirm that all proposed water and sewer modifications and construction are designed in accordance with the Rules of the City of New York.

COMBINED SEWER OVERFLOW ABATEMENT PROGRAM AND COMBINED SEWER OVERFLOW LONG-TERM CONTROL PLAN (DEP)

Implemented by DEP, the objective of this program and long-term control plan is to reduce pollution in and around the City's waters. The plan provides for field investigations, sewer system and water quality monitoring, and modeling in areas that are heavily impacted by combined sewer overflows (CSO) to determine appropriate mitigation measures. The program aims to establish source controls and stormwater best management practices suited for New York City. The CSO abatement program is under a 2005 Consent Order, which was executed between NYSDEC and DEP and contains milestones for the completion of various projects and planning documents associated with the program. A 2011 modification to the Consent Order contained changes to various planned and ongoing CSO abatement construction projects as well as to long-term control plan (LTCP) milestones, funding for green infrastructure, and fines for any missed LTCP milestones. A Citywide Open Waters LTCP is currently in the early development stage and includes the East River within the study area. Consistency with the long-term control plan is evaluated for the proposed project as changes are proposed to the existing combined sewer system under the With Action Alternatives.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT

Issued by NYSDEC, the Municipal Separate Storm Sewer System (MS4) permit is a Citywide permit under the Clean Water Act intended to manage urban sources of stormwater runoff to reduce pollutants discharging to separate storm sewer systems. The purpose of the permit is to protect and improve water quality in receiving waterbodies. Under this permit, the City is developing a Stormwater Management Program to address issues including runoff from municipal operations and facilities, floatable and settleable trash and debris, construction site stormwater runoff, and post-construction stormwater management. The guidelines of the MS4 permit are considered for the proposed project as they relate to the project's proposed modifications to the storm and combined sewer systems.

D. METHODOLOGY

WATER AND SEWER INFRASTRUCTURE OVERVIEW

The majority of the drainage protected area is serviced by a combined sewer system. In areas serviced by combined sewer infrastructure, sanitary sewer flows and stormwater flows are conveyed together in a single pipe to treatment facilities before the treated effluent is discharged to nearby waterbodies. The City's SPDES permits for each WWTP regulate these discharges. During dry weather, only sanitary flow is conveyed through the combined sewer pipes. However, during and following precipitation events, such as rainfall and snowmelt, the combined sewer pipes convey both sanitary flow and stormwater. In those wet weather conditions, the WWTPs treat the combined sewage at their maximum treatment rates in accordance with the WWTP's SPDES permit, and the excess combined sewage overflows into the City's surrounding waterbodies at designated outfall locations. The flow to the outfalls is controlled by structures known as regulators (see **Figure 5.8-2**).

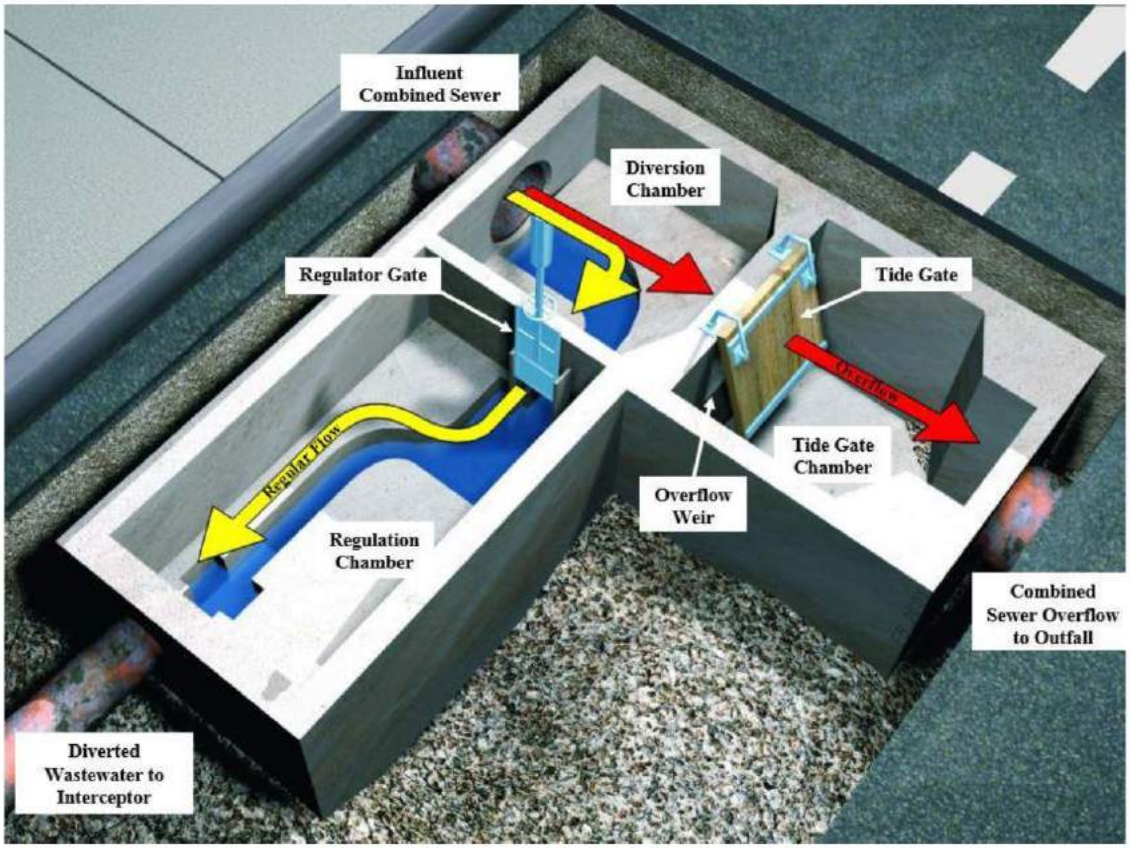


Figure 5.8-2: Combined Sewer Regulators

These regulators prevent overloading of the interceptor and downstream treatment facilities (e.g., WWTPs and pump stations) during high flow events by diverting flow in excess of the system's capacity to CSO outfalls.

DEP employs static regulators, which passively respond to variations in the water level of the combined sewer, to regulate the flow to the interceptor. Regulators typically consist of a diversion chamber, a regulation chamber, and a tide gate chamber, as shown in **Figure 5.8-2**. The incoming flow from lateral sewers (sewers upstream of the regulators) first enters the diversion chamber that directs the sewage to the regulation chamber. The regulation chamber directs flow to the interceptor.

Generally, the regulation chamber and downstream pipes can convey up to twice the dry weather flow rate to the interceptor. In addition to controlling flow into the interceptor via the regulation chamber, the diversion chamber also directs flows that exceed capacity of the system downstream of the regulator to the outfall via the tide gate chamber. If the downstream capacity is exceeded, excess combined sewer flow overtops the overflow weir in the diversion chamber and enters the tide gate chamber. The tide gate chamber outlets this excess volume through the outfall associated with the regulator. When CSOs do occur, per federal, state, and local requirements, DEP monitors the outfalls and publishes advisories when CSO discharges pose a contact risk for the affected waterbodies.

In order to outlet flow to the receiving waterbody, the water elevation, or hydraulic grade line (HGL), in the regulator must be higher than the receiving water body's tide level. In this way, the tide gate also prevents water from the receiving waterbody from entering the combined sewer system. During high tide and storm surges, the tide gate passively shuts and is held closed, so long as the tide level is higher than the HGL in the regulator. If the tide level is equal to or greater than the HGL in the tide gate chamber, any excess sewer flow will back up in the sewer system until the tidal elevation decreases or the sewer system reaches an HGL greater than the tidal level and flow is able to passively exit through the outfall. The backup of flow in the sewer system can result in surcharging of the combined sewer system at the regulators and in the lateral sewers upstream of the regulators, which can result in backups in sewer service connections and possibly above-grade flooding.

Within the project area, there are 23 combined sewer outfalls that discharge directly to the East River. The flow to these outfalls is regulated under the Newtown Creek WWTP SPDES permit and controlled by 20 regulators, some of which have more than one associated outfall, located along the waterfront. Under the With Action Alternatives, a portion of the regulators and sewers that serve the drainage protected area will be on the unprotected side of the proposed flood protection system, though the exact number varies based on the location of the line of protection and therefore varies between alternatives. Each of these regulators is equipped with a set of manholes and vented access hatches. The hatches relieve pressure within the system as water flows through the structures. Similarly, all conveyance pipes within the combined sewer system contain access manholes for periodic maintenance. Any unprotected manholes or hatches could serve as a potential pathway for overland floodwaters to enter the drainage protected area during a design storm event.

IMPACT ASSESSMENT APPROACH

As described above, the wet-weather functionality of the combined sewer system in the drainage protected area is directly affected by tidal conditions at the outfall tide gates. Under the design storm for the proposed project, the 100-year storm surge event is anticipated to passively hold the tide gates closed, preventing excess wet weather flows in the combined sewer system from being released through the outfalls. The drainage protected area is also vulnerable to overland surge waters inundating the sewer system via manholes and regulator hatches on sewer infrastructure on the unprotected side of the flood protection system. As such, the proposed project includes drainage components to hydraulically isolate the drainage protected area from the larger sewershed (unprotected portion of the study area) and from overland surge. The project will also provide sewer capacity for the protected area to offset the loss of capacity during the design storm when the outfalls are closed. The hydraulic isolation prevents surge waters from inundating the drainage protected area through the existing sewer system. The additional sewer capacity reduces the risk of backups within the sewer system that have the potential to result in above-ground flooding. These drainage system improvements are included in the With Action Alternatives.

DRAINAGE DESIGN STORM

To determine the appropriate drainage components required, an InfoWorks Integrated Catchment Model based on data and models previously developed and verified by the U.S. Environmental Protection Agency (USEPA) was developed to evaluate the flooding risk in the drainage protected area without drainage isolation or management components. The flooding risk is dependent on the characteristics of the rainfall event that occurs in conjunction with a storm surge event. In coordination with DEP, potential effects as a result of implementing the proposed project were modeled and evaluated for a 5-year, second quartile National Oceanic and Atmospheric

Administration (NOAA) Atlas 14 24-hour rainfall event coincident with a present-day 100-year surge tide (drainage design storm).[2]

Under the design storm scenario, the 5-year rainfall event was modeled assuming that the rainfall intensity peaked in the middle of a 100-year coastal surge event. This scenario is representative of a coastal storm event in which the combined sewers are conveying wet weather flows and the existing sewer system's drainage capacity is impaired by closed outfalls during elevated tidal conditions. The five-year rainfall and 100-year surge events are defined by their statistical probabilities, a one-in-five and one-in-one hundred chance event in a given year, respectively. Of the hurricanes and tropical storms that strike the New York City area every year, the majority are less severe than 5-year rainfall and 100-year coastal surge events, making the probability of a storm more severe than the drainage design storm unlikely.

MODEL ANALYSIS

The model estimated the predicted sewer surcharge and above-grade flood risk for the drainage protected area under the influence of the coincident design rainfall and design storm conditions described above. The model determines the HGL in the sewers within the drainage protected area, and thus, can identify locations of surcharge within the drainage protected area. Coupled with topography and building footprint data, the model determines whether surcharged sewer depths are sufficient to result in backups and above-grade flooding. The model can then identify flow paths of above-grade surcharged waters and estimate floodwater depth. Similarly, the model can determine the potential for coastal inundation of the sewer system during a surge event if the surge elevation is high enough to enter the system through manholes or access hatches located at grade.

For the drainage protected area, the modeled peak HGL was analyzed at specific locations within the sewer system. The differences in modeled HGL at these locations between the No Action Alternative and the proposed project under storm conditions were then compared to assess flood potential. The modeled results were also used to determine the drainage management requirements to maintain or improve current levels of sewer service within the drainage protected area under design storm conditions.

The outfalls, regulators, and interceptor in the unprotected portion of the study area were modeled as well to assess the potential effects of the proposed project. The overland storm surge is anticipated to be the primary cause of flooding in the unprotected portion of the study area under the storm condition for all alternatives, including the No Action Alternative. Therefore, the model for these areas was not used to determine above-grade flooding, which would be dominated by coastal surge waters. Instead, the model was used to identify and analyze any changes in the interceptor and regulator HGLs and any changes in CSOs in the study area as a result of the proposed project.

E. AFFECTED ENVIRONMENT

As described above, the affected environment for evaluating potential effects of the proposed project on sewer infrastructure consists of the combined sewer system and associated outfalls, regulators, and interceptor in the Manhattan Pump Station service area (study area). All sewers in the study area are hydraulically connected via the interceptor that conveys flow to the Manhattan Pump Station, located at East 13th Street and Avenue C within the drainage protected area. From

[2] National Oceanic and Atmospheric Administration (NOAA) Atlas 14 design rainfall events are based on statistical analysis of historical rainfall records for the northeast region.

there, the sewer flow is pumped to the Newtown Creek WWTP located across the East River in Brooklyn, New York, for treatment before being discharged to the East River. Because all sewer flow from the study area is conveyed by the interceptor to the Manhattan Pump Station, modifications to the sewer infrastructure within the drainage protected area have the potential to affect sewers in the study area.

As noted above, a SPDES permit issued by NYSDEC regulates the effluent from the Newtown Creek WWTP. The largest of New York City's 14 treatment plants, Newtown Creek WWTP is designed to treat up to 700 mgd of flow. Upgrades to the Newtown Creek WWTP, which were completed in 2013, increased the plant's wet weather capacity by an additional 90 mgd (to 700 mgd) and improved the quality of treatment. The plant serves a drainage area of 15,656 acres, which includes the southern and eastern midtown sections of Manhattan as well as the northeast section of Brooklyn and western section of Queens, as shown in **Figure 5.8-3**.

During dry weather, the flow conveyed to Newtown Creek WWTP through the combined sewer pipes is exclusively sanitary flow. In 2014, the average dry weather flow to the Newtown Creek WWTP was 200 mgd, with an estimated 110 mgd of the flow coming from the Manhattan service area through the Manhattan Pump Station. The Manhattan Pump Station has a rated capacity of 400 mgd. The study area, including the drainage protected area, constitutes a portion of Newtown Creek WWTP's Manhattan service area and therefore a portion of the plant's capacity. The average dry weather flow to the Manhattan Pump Station from the drainage protected area is approximately 40 mgd. The remainder of the study area contributes, on average, 41 mgd and 29 mgd of dry weather flow from the areas north and south of the drainage protected area, respectively.

However, during and immediately following precipitation events, such as rainfall and snowmelt, the combined sewer pipes convey both sanitary flow and stormwater, generally up to twice the dry weather flow rate. The study area is approximately 1,100 acres, the majority of which is highly developed and covered by impervious surfaces, resulting in high rainfall volumes entering the sewer system compared to less developed areas where stormwater can infiltrate into the ground via pervious surfaces. Wet weather flow enters the combined sewer system through storm drains, located primarily at the intersections of roadways and along the curb. An exception to this is several storm drains along the FDR Drive in the northern portion of the project area that are operated by the New York State Department of Transportation (NYSDOT) and drain directly to outfalls along the East River. Otherwise, the combined sewer pipes in the drainage protected area are generally located in the right-of-way of existing roadways. These roadways run east-west towards the East River. The regulators are located along these alignments; the outfalls are located at the terminus of these pipes near the shoreline.

The drainage protected area includes combined sewer infrastructure (i.e., sewers and regulators) within East River Park and the FDR, portions of which are not protected from coastal surge by the proposed project, depending on the project alternative. Lateral sewers conveying flow to the regulators from the drainage protected area run generally in a west-to-east alignment, leading to each regulator. Branch interceptor pipelines consolidate the flow from the regulators along the eastern side of the drainage protected area. Outfall piping extends from each regulator to the bulkhead where excess combined flow is released. Each of these regulators is equipped with a set of access manholes and vented access hatches. The hatches relieve pressure within the system as water flows through the structures. This infrastructure requires regular operations and maintenance, which is conducted by DEP.

Approximate Boundaries of
NYC Wastewater
Treatment Plant Service Areas

Figure 5.8-3

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

NON-STORM CONDITIONS

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The build year for the proposed project is 2025 and accordingly, the No Action Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). A list of these planned projects is included in **Appendix A1**. To the extent that any of these projects would involve disturbance, excavation, or minor water or sewer modifications, it is not anticipated to result in adverse effects to water and sewer infrastructure.

As described in Chapter 5.1, "Land Use, Zoning, and Public Policy," several residential developments are currently proposed and underway within the study area, including the drainage protected area. Projected changes in residential units and population in the study area are not expected to significantly increase the dry weather combined sewer flow.

Under non-storm conditions for the No Action Alternative, the sewer infrastructure in the study area would remain unchanged. Dry weather flow in the sewer system can be expected to change with increases in population but these increases would not be expected to compromise the service provided by the existing infrastructure. The combined sewer system within the study area would continue to comply with conditions set by the Newtown Creek WWTP SPDES permit and be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan.

STORM CONDITIONS

In a storm event where the height of the storm surge is insufficient to close the tide gates or limit flow to the outfalls, rainfall would flow to the combined sewers through the catch basins. Combined sewage would be conveyed through existing infrastructure at full capacity to Manhattan Pump Station and Newtown Creek WWTP. Any excess flow would be released to the combined sewer outfalls, and little to no surface flooding or sewer backups would be experienced due to surcharge from the sewers, provided the combined flow does not exceed the capacity of the existing sewer and outfall system. CSOs within the study area would be regulated by the Newtown Creek WWTP SPDES permit and would be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan.

In the event of a design storm under the No Action Alternative, no comprehensive flood protection measures would be implemented. In the event of high storm surge elevation, the existing tide gates regulating flow through the outfall pipes would passively shut to prevent surge waters from entering the system. In this configuration, the release of excess combined sewer flow to the outfalls would be governed by the surge height. Closure of the outfalls increases the potential for the sewer pipelines to surcharge from excess wet weather flows and tidal inundation, potentially resulting in above-grade flooding and sewer backups. Overland flooding can compound capacity limitations and, as a result, sewer system backups: the overland flooding from surge tides can infiltrate into and inundate sewer systems through catch basins, manholes, and vented access hatches on the

regulator chambers and other sewer structures, filling the sewer system with surge waters and limiting its ability to manage combined sewer flow.

If the design storm were to occur under the No Action Alternative, the surge elevation would primarily govern the extent of inland flooding.[3] The design surge elevation exceeds the height of the coastal topography along the project protected area so inland flooding would occur in areas below the design surge elevation. Overland surge flooding would enter the combined sewer system through manholes and vented hatches in the floodplain, limiting the capacity of the sewer to convey combined flow. This sewer inundation has the potential to result in sewer backups beyond the extents of overland surge (the inland boundary of the project protected area). These conditions were confirmed with the InfoWorks model, which then served to define the design parameters for the drainage isolation and management components.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection in East River Park into the park, thereby protecting both the community and the majority of the park from design storm events, as well as protecting it from increased tidal inundation resulting from sea level rise. The Preferred Alternative includes modifications to the existing sewer system to control flow into the drainage protected area from the larger sewershed (i.e., drainage isolation). The Preferred Alternative also includes elements to manage flooding within the drainage protected area (i.e., drainage management). A portion of the park's underground water and drainage infrastructure are reaching the end of their serviceable life and are in need of repair. Therefore, this park infrastructure would be reconstructed and reconfigured to repair it and to ensure that it could withstand the additional loading from the added fill materials once the Park is raised. In addition to these modifications, this alternative would require some limited relocation of existing water and sewer infrastructure within the project area to accommodate proposed project features.

DRAINAGE ISOLATION

Measures to isolate the drainage protected area from the unprotected portions of the study area would be implemented to eliminate potential pathways for storm surge waters to inundate the existing sewer system and flood inland areas. The measures include: (1) installing interceptor gates on the existing 108-inch diameter interceptor at the northern and southern extremes of the drainage protected area sewershed, generally in the vicinity of East 20th Street and Avenue C to the north and between Corlears Hook Park and the FDR Drive to the south; (2) floodproofing the regulators, manholes, and other combined sewer infrastructure on the unprotected side of the flood protection system; (3) replacing existing tide gates on the combined sewer outfall pipes that serve the drainage protected area and rerouting storm drainage; and (4) installing one isolation gate valve in the existing Regulator M-39, located within Asser Levy Playground, to isolate a branch interceptor that crosses the flood protection system alignment at the northern boundary of the drainage protected area. These measures, depicted in **Figure 5.8-4**, would prevent storm surge water from entering the sewer system through existing combined sewers, the outfall pipes, or through at-grade access points (i.e., manholes and hatches) for existing sewer infrastructure on the portion of the drainage protected area that is unprotected from overland coastal surge events. Fewer manholes and

[3] Inland flooding refers to flooding during a coastal flood event as a result of rainfall coincident with a storm surge. This inland flooding occurs due to sewer surcharge and the potential accumulation of rainfall that does not enter the sewer system due to drainage systems at design capacity.

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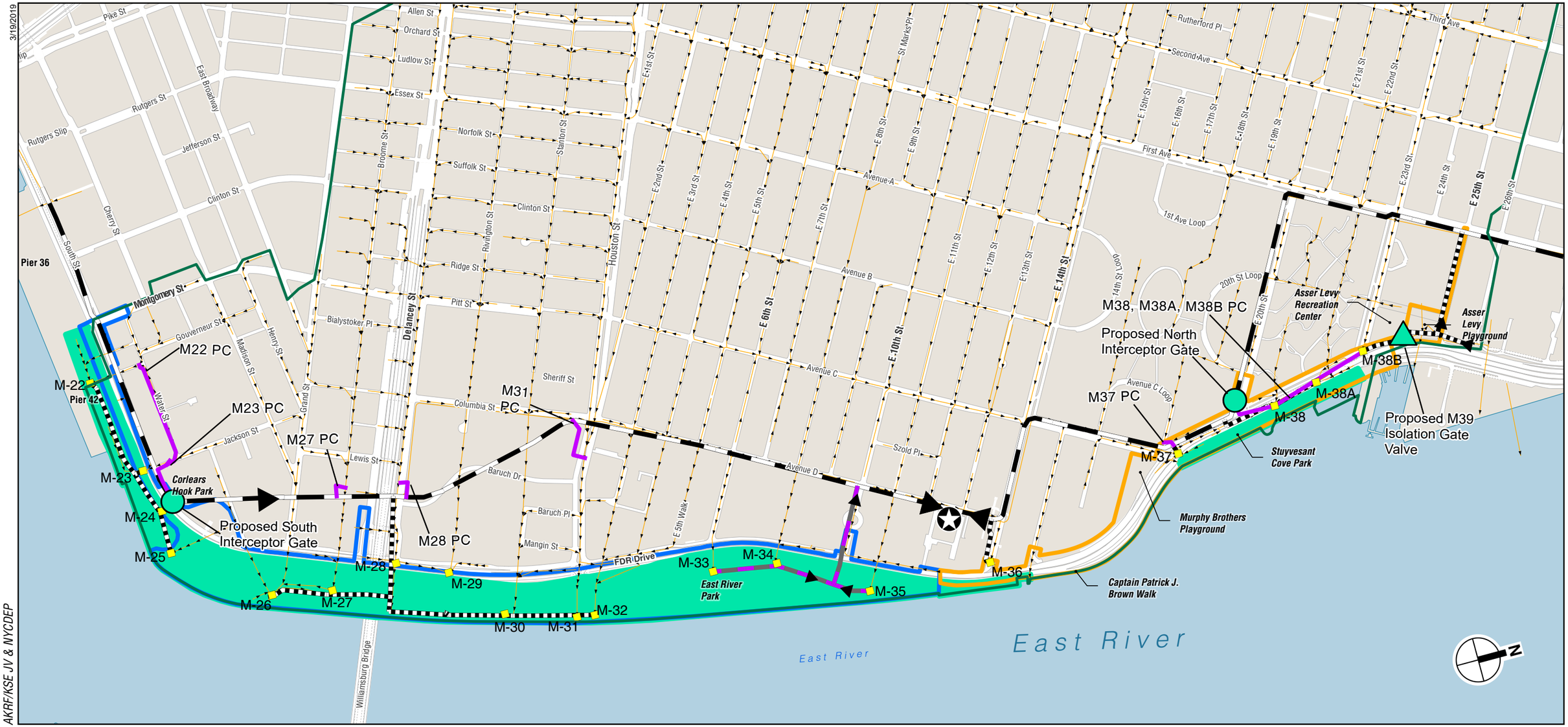

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Drainage Isolation

- *Proposed Isolation Gate Valve at Regulator M-39*
- *Proposed Interceptor Gate*
- *Proposed Floodproofing of Unprotected Sewer Infrastructure*

Drainage Management

- *Proposed Parallel Conveyance (PC)*
- *Proposed Upsized Branch Interceptor*

- *Existing Regulators*
- *Existing Lateral Sewers in Drainage Protected Area*
- *Existing Branch Interceptors*
- *Existing Interceptor*

- *Manhattan Pump Station*
- *Drainage Protected Area*

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EAST SIDE COASTAL RESILIENCY PROJECT

Drainage Isolation and Management Components

Figure 5.8-4

regulators would require floodproofing under this alternative as compared to Alternatives 2 and 3 (described below) due to the more eastward alignment of the line of protection within East River Park.

Interceptor Gates

The proposed interceptor gates are large watertight gates that would be installed within a new chamber in the existing interceptor, as shown in **Figure 5.8-5**. The interceptor gates would require a self-contained and submersible device to open and close the gates (actuator). The actuator would be powered by connection to the existing power grid and a hydraulic system. Backup provisions (i.e., a portable generator) would be provided to operate the gate if power is lost during a design storm.

The interceptor gate and actuator would be installed entirely below grade. At grade, the chamber would be provided with access hatches and/or planks and manholes for maintenance and operation by DEP staff. Above-grade components of the interceptor gates would include a single-story building adjacent to the chamber that contains the controls, electrical, hydraulic, and other ancillary components to operate the interceptor gates. The building would be provided with a water main connection to provide water for periodic flushing of critical interceptor gate components. The interceptor gate locations, shown in **Figure 5.8-4**, were selected for their ability to isolate the portion of the interceptor that serves the drainage protected area's sewers, thereby preventing surge waters in unprotected portions of the study area from entering the drainage protected area through the interceptor.

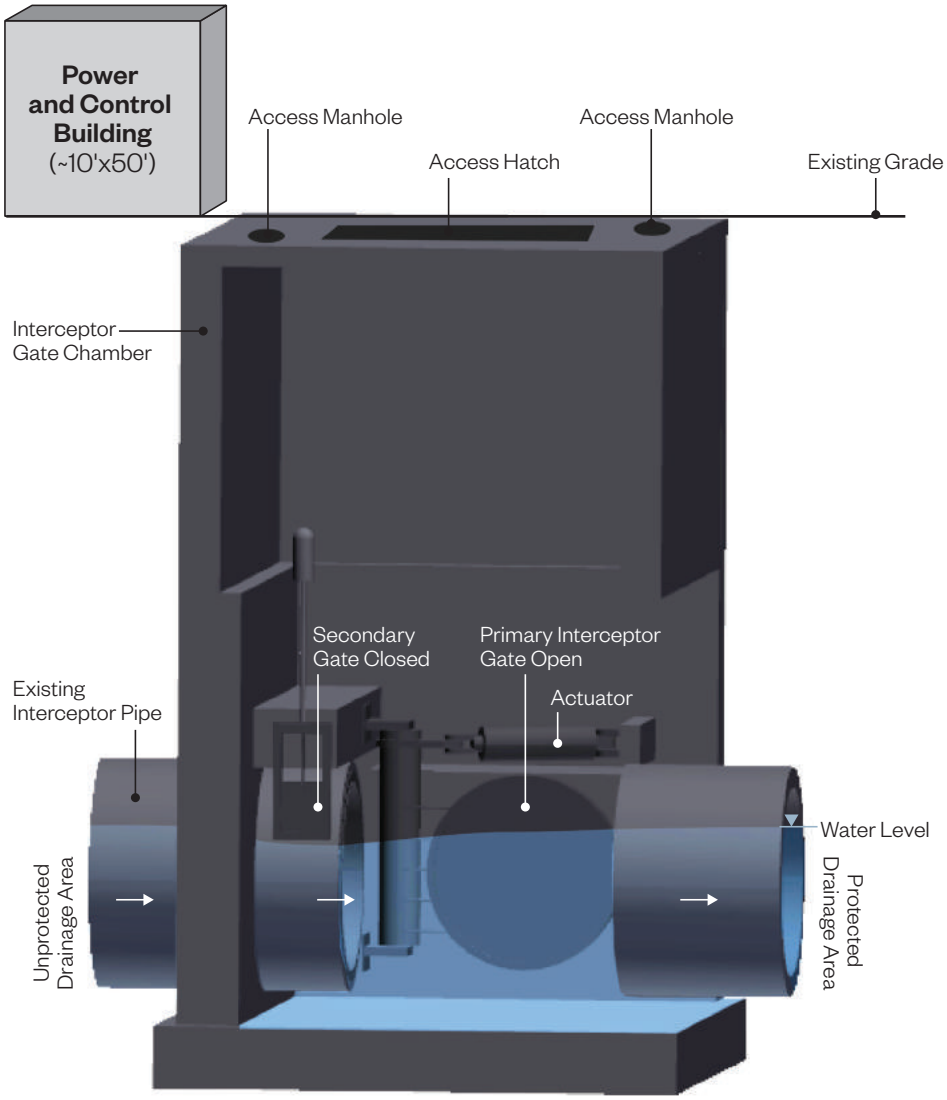
The interceptor gates would be designed to allow for operational flexibility during design storm events to control flow from the upstream areas into the drainage protected area, according to a protocol established by a pre-approved operations and maintenance plan. If required, the gates would be able to close completely to allow for full isolation of the drainage protected area. The gates would remain open under non-storm conditions, except in the case of a forecasted design storm event, during which pre-approved operations procedures would be followed. The gates may also be opened and shut during periodic maintenance in accordance with pre-approved operations procedures while ensuring continued sewer service.

As shown in **Figure 5.8-5**, a smaller, secondary gate would be included as part of each interceptor gate chamber. The secondary gates would allow continued sewer service for areas outside of the protected area when the primary interceptor gates are closed. These smaller openings would convey one to two times the average dry weather flow, depending on the HGL in the interceptor, to maintain normal levels of sewer service for the entire study area.

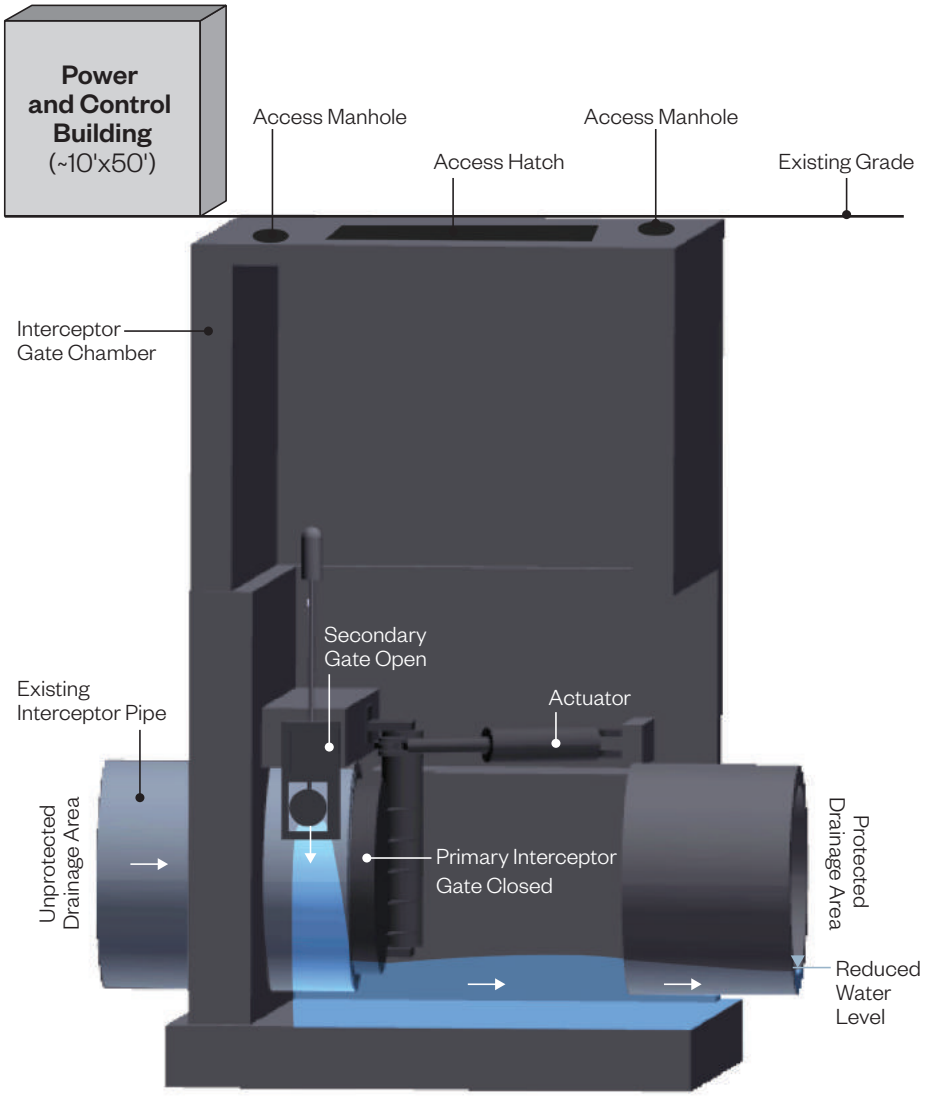
Regulators, Drainage Structures, and Manholes

Drainage isolation for the regulators and other sewer structures in unprotected areas of the drainage protected area would involve replacing each of their existing vented access hatches with lockable vented hatches that could be sealed (i.e., floodproofed) under design storm conditions to prevent water intrusion into the system. In addition, each regulator would be strengthened. External strengthening may include lining, patching, jet-grouting, sheet piling, or excavating to reinforce the existing structure walls. There may also be installation of a reinforced concrete slab above each structure and of low-infiltrating fill around each structure.

Another point of entry to the sewer system for surge waters is through the existing manholes on the unprotected side of the flood protection system. These manholes would be modified to prevent loss of the manhole lid during a surge event, which would otherwise allow large volumes of water into



Non-Storm Condition: Primary Interceptor Gate Open



Storm Condition: Primary Interceptor Gate Closes

Not to Scale

Note: Some interceptor gate chamber components are not shown for clarity.

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY

Interceptor Gate Concept

Figure 5.8-5

the system. Manhole modifications would involve installation of an inner pressure cover and outer traffic cover. The inner cover could be positioned to allow the sewer to vent as under existing conditions. Under normal operation, the inner cover locks of modified manholes would not be engaged and would facilitate system venting. In advance of a design storm, the inner covers would be engaged to effectively seal them to prevent water entry. Following the design storm event, covers that were locked would be unsealed and returned to the venting position. In addition, durable accessways designed for heavy work vehicle loads (H-20 loading) would be installed to allow for future maintenance access. Manholes that are less structurally stable would be either partially or fully replaced in addition to the replacement of the frame and cover. Manholes requiring additional support would follow the methods described above for external strengthening of the regulators.

Tide Gate Replacement and Storm Drainage Rerouting

To ensure proper functioning of the tide gates during the design storm event, it is proposed that the existing tide gates on the combined sewer outfall pipes that serve the drainage protected area be replaced as part of the Preferred Alternative.

Storm drainage that currently connects to the combined sewer system that would be located on the unprotected side of the flood protection system would be rerouted and connected to the outfalls downstream of the tide gates. This would ensure the storm drainage system is isolated from the combined sewer system within the protected area and would eliminate the need for floodproofing of storm drains on the unprotected side of the flood protection system. Storm drainage that currently connects to the combined sewer system that would be located on the protected side of the flood protection system would maintain its current configuration. Storm drainage that currently outlets downstream of the tide gates or to separate storm sewer outfalls that would be located on the protected side of the flood protection system would be rerouted to convey wet weather flow to the combined sewer system or outfitted with a tide gate to prevent against potential backflow into the protected area storm drain system under a design storm event.

Isolation Gate Valve

A sewer crosses from the protected to the unprotected side of the flood protection system alignment at the northern end of the drainage protected area. This conduit has the potential to convey floodwaters from unprotected study area sewers into the drainage protected area under a design storm event. To reduce this risk, an isolation gate valve is proposed to be installed on the sewer within regulator M-39, as shown in **Figure 5.8-4**.

DRAINAGE MANAGEMENT

In addition to the isolation measures outlined above, the Preferred Alternative includes drainage management elements to ameliorate the reduced sewer capacity due to outfall closure during a design storm event. The proposed drainage management would reduce the risk of sewer backups and associated flooding within the drainage protected area during a design storm. These drainage elements include installing additional combined sewers, termed "parallel conveyance," within the drainage protected area to augment the capacity of the existing sewer system. Specifically, nine parallel conveyance connections are proposed, as shown in **Figure 5.8-4** and described below.

The existing branch interceptors—sewers that convey flow from the regulator to the main interceptor—generally define the system's conveyance capacity. As described above, when outfall capacity is limited, sewer surcharge can occur once the capacity of the branch interceptors is met. The parallel conveyance system, so named based on its functional orientation parallel to the existing branch interceptors, leverages the available capacity in the interceptor and Manhattan Pump Station

by augmenting the upstream capacities of the branch interceptors and lateral sewers when the outfalls are closed or limited. The parallel conveyance would connect the lateral sewers to the interceptor in locations with the greatest ability to provide sewer surcharge relief under the design storm conditions as indicated by the model.

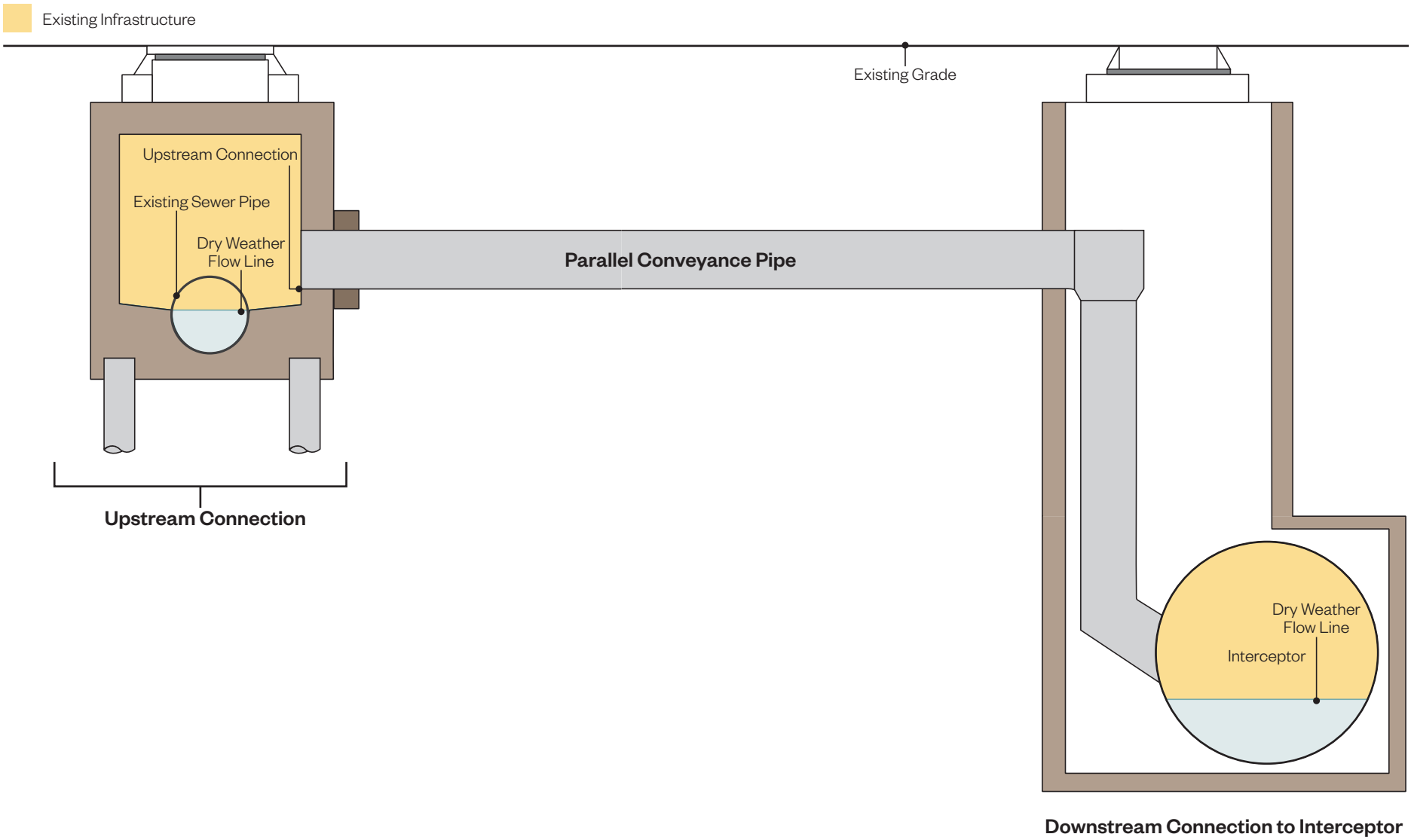
Parallel conveyance pipes are proposed at nine locations, namely for regulators M-22, M-23, M-27, M-28, M-31, M-37, M-38, M-38A, and M-38B. This parallel conveyance infrastructure would convey excess combined sewer flows to the interceptor, as shown in **Figure 5.8-4**. Each parallel conveyance pipe would consist of a new upstream connection to a regulator or lateral sewer, a downstream connection to the interceptor, and a connecting length of pipe. The parallel conveyance pipes would range from 18 to 48 inches in diameter and require no above ground features. The parallel conveyance would be sited within rights-of-way, where possible, similar to existing sewer pipes. Where siting is not possible within rights-of-way, some parallel conveyance infrastructure would be sited in private property. The parallel conveyance pipes and connections would include manholes for access similar to the existing sewer pipes, generally every 200 to 250 feet, at pipe bends, and at all connections to allow access for maintenance and repairs, as needed, and would be sited within roadways and paved pathways, where possible. The parallel conveyance concept is shown in **Figure 5.8-6**. In addition, similar to the parallel conveyance, this alternative also proposes to increase the size of the branch interceptor in order to increase the conveyance capacity to the Manhattan Pump Station for three sub-drainage areas within the protected area: M-33, M-34, and M-35, as shown in **Figure 5.8-4**.

INFRASTRUCTURE RECONSTRUCTION

The Preferred Alternative also includes reconstructing the water and sewer infrastructure within the portion of East River Park that would be elevated, including outfalls, regulators, and sewers and water infrastructure, to withstand the loads of the proposed flood protection system and elevated parkland, as shown in **Figure 5.8-7**. The outfalls and regulators within the portion of East River Park that would be elevated would also be replaced and hardened to account for resiliency. In some cases, the sewer infrastructure will be rebuilt with additional capacity compared to existing conditions. In most cases, the existing infrastructure would be abandoned in place and the new infrastructure would be reconstructed adjacent to the existing locations, although the outfalls would be relocated slightly along the East River Park bulkhead. Of the existing 11 outfalls, two would be combined as part of the outfall reconstruction effort.

NON-STORM CONDITIONS

Under non-storm conditions, implementation of the Preferred Alternative would not alter the normal function and performance of the combined sewer system. The large interceptor gates and the isolation gate valve in regulator M-39 would remain open. However, under rainfall events or periods of high sewer flow, combined sewer flow would be conveyed to the interceptor via both the existing branch interceptors and the parallel conveyance. During rainfall events that result in CSOs, there is a potential for redistribution of overflows in the across the outfalls in the study area due to the modifications described above. However, the overall volume of CSO would not vary substantially from existing conditions and is not anticipated to impact water quality in the East River. A hydraulic model simulation indicated that with the proposed parallel conveyance in place, CSOs from outfalls within the project area would decrease compared to the No Action Alternative, while CSOs from outfalls upstream of the project area would increase by approximately the same volume. While the annual CSO volumes would vary depending on annual rainfall and tidal conditions, this model simulation indicates no anticipated increase in total CSO volume from the



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EAST SIDE COASTAL RESILIENCY

Parallel Conveyance Concept

Figure 5.8-6

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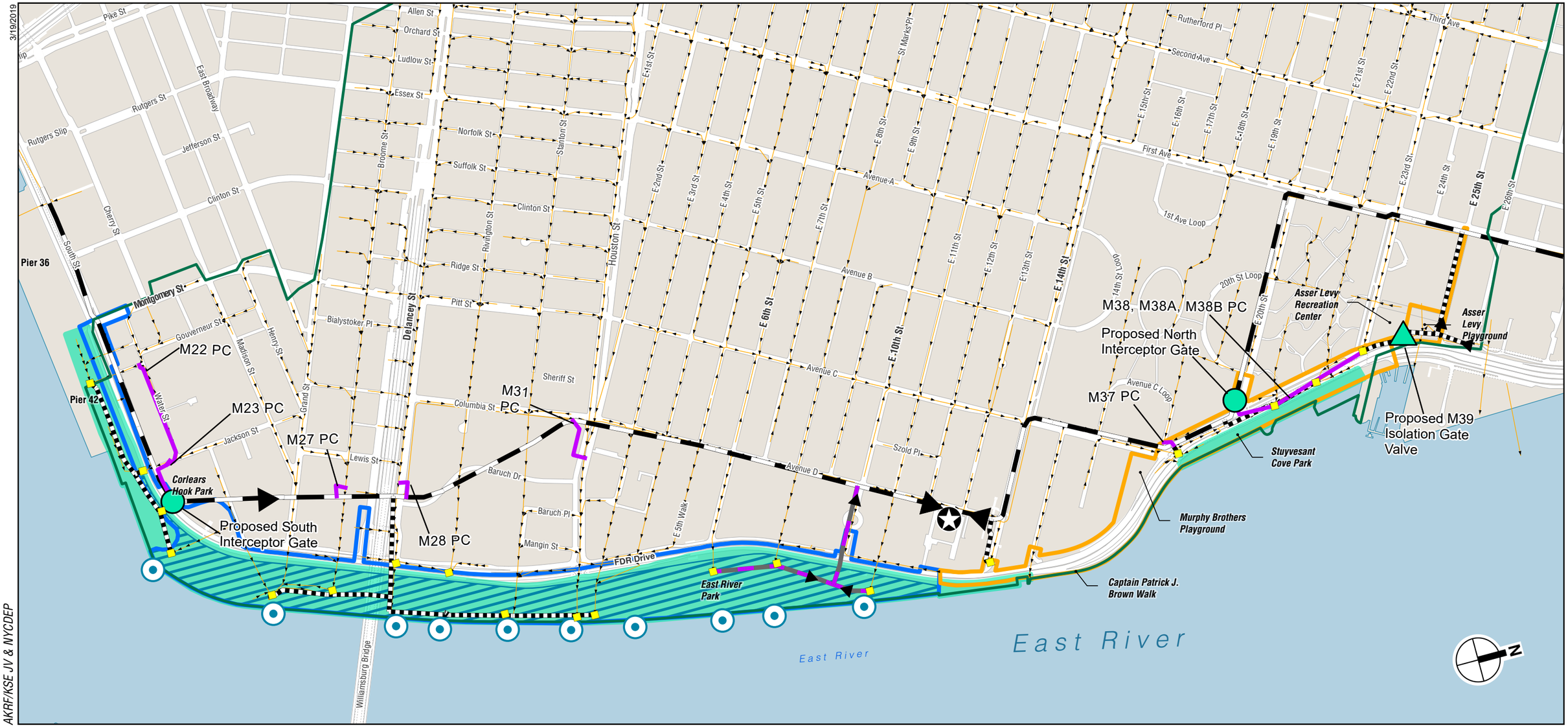

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Drainage Isolation

- *Proposed Isolation Gate Valve at Regulator M-39*
- *Proposed Interceptor Gate*
- *Proposed Floodproofing of Unprotected Sewer Infrastructure*

Drainage Management

- *Proposed Parallel Conveyance (PC)*
- *Proposed Upsized Branch Interceptor*

Infrastructure Reconstruction

- *Proposed Infrastructure Reconstruction*
- *Proposed Reconstructed Outfall Location*

- *Existing Regulators*
- *Existing Lateral Sewers in Drainage Protected Area*
- *Existing Branch Interceptors*
- *Existing Interceptor*
- *Manhattan Pump Station*
- *Drainage Protected Area*

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EAST SIDE COASTAL RESILIENCY PROJECT

Infrastructure Reconstruction, Drainage Isolation, and Drainage Management Components

Figure 5.8-7

study area as a result of constructing the proposed parallel conveyance. During wet weather events, storm water that flows into the reconfigured storm drainage system on the unprotected side of the flood protection system would flow to the outfalls, instead of to the combined sewer system as it does under existing conditions. This increase in storm water flows to the outfalls would not increase the volume of CSO from the outfalls.

STORM CONDITIONS

Sewer operations would differ from the No Action Alternative only when a design storm is forecast. Upon forecast of a design storm event, the proposed drainage infrastructure would be inspected for functionality and cleaned as needed. In accordance with pre-approved operation procedures, all closure structures would be put into place and manholes and regulator hatches on the unprotected side of the flood protection system alignment would be sealed to eliminate potential entryways for surge waters. In addition, the isolation gate valve on the northern lateral sewer in regulator M-39 would be closed.

Before the arrival of the design storm and in accordance with a pre-approved operations and maintenance protocol, the interceptor gates would be operated to isolate the drainage protected area from the study area. The interceptor gates would allow operational flexibility to manage the level of sewer service provided by the Manhattan Pump Station for areas upstream of the interceptor gates (i.e., outside of the protected area) via the smaller, secondary interceptor gates. During the design storm, the primary and secondary interceptor gates may be used to limit the interceptor flow from the areas upstream of the drainage protected area to provide additional capacity for drainage management within the drainage protected area.

If the primary interceptor gates are fully closed, combined flow to the Manhattan Pump Station from the sewershed outside of the drainage protected area would be reduced. Complete closure of both the primary and secondary interceptor gates has the potential to increase the HGL within the main interceptor to the north and the south of the drainage protected area as the combined flow would no longer be conveyed to the Manhattan Pump Station. Since the main interceptor is fed by appurtenant branch interceptor pipes, the increased HGL within the main interceptor has the potential to result in increases in HGL within these branch interceptors and their upstream regulators and lateral sewers. However, whether and to what extent the elevation of HGL within the branch sewers increases depends upon a variety of factors, including the elevation of the branch interceptor connection points to the main interceptor and the outfall capacities at the regulators.

Modeling of the sewer system under the design storm conditions, including operation of the interceptor gates and other isolation measures, showed negligible increases in the HGL in the main interceptor to the north and south of the drainage protected area compared to the No Action Alternative. However, any additional sewer backup due to the interceptor gate closures is anticipated to occur in unprotected portions of the study area which would be affected by the design storm surge. Any minor contribution to this flooding due to sewer surcharge would be indiscernible from the surface flooding experienced as a result of the storm surge. If interceptor gate closure limits flow prior to a surge event, the outfalls to the north and south of the drainage protected area would continue to outlet excess flow through the outfalls until the surge is of sufficient height to close the outfall tide gates. In sum, any flooding experienced upstream of the interceptor gates would be comparable to flooding experienced under the No Action Alternative design storm condition.

During the design storm event, the storm surge would passively hold the tide gates closed, isolating the protected area combined sewer system from surge inundation. Excess combined sewer flow

would be conveyed by the parallel conveyance and upsized branch interceptor to the interceptor, thereby maximizing drainage within the protected area and maximizing flow to the Manhattan Pump Station. Modeling results confirmed that the drainage isolation and management components proposed as part of the Preferred Alternative would address the flooding and sewer surcharge anticipated under the design storm conditions within the drainage protected area. Storm surge could result in overland flooding in areas on the unprotected side of the flood protection system alignment that are below the flood elevation and/or subject to wave action, sea level rise, and sewer surcharge, including portions of East River Park.

Following a design storm event, once the surge waters recede, the interceptor gates and other isolation measures would be returned to their non-storm condition positions. As the surge recedes, and the sewer system gradually equilibrates, the outfall tide gates would permit the release of excess combined flow and flooding in the areas north and south of the drainage protected area would gradually recede via the sewer system or overland flow back to the East River, as under the No Action Alternative.

OPERATION AND MAINTENANCE

The proposed drainage elements of the Preferred Alternative would not alter daily operation of existing sewer infrastructure in the study area under typical dry weather conditions. Operation and maintenance of this infrastructure would require trucks and personnel to access the proposed sewer infrastructure components (i.e., interceptor gates, isolation gate valve, floodproofed manholes, regulators, tide gates, and parallel conveyance manholes and connections). Regular equipment exercising, and inspection would be conducted for the proposed sewer infrastructure, in accordance with operation and maintenance procedures for the City's sewer infrastructure and a pre-approved operations and maintenance protocol developed for the proposed project.

This alternative would provide coastal flood protection for the project protected area and risk reduction benefits to inland flooding and sewer surcharging described above for the drainage protected area. During a storm event, storm surge could result in overland flooding in areas on the unprotected side of the flood protection system alignment that are below the flood elevation and/or subject to wave action, sea level rise, and sewer surcharge. The portions of East River Park that are vulnerable to these effects are significantly reduced under the Preferred Alternative compared to the No Action Alternative and Alternatives 2 and 3, described below.

Floodproofing access manholes and hatches would not affect the performance of the infrastructure under both storm and non-storm conditions. During the design storm event, the storm surge would passively hold the tide gates closed, isolating the protected area combined sewer system from surge inundation. In portions of the storm drainage system that do not connect to the combined sewer system, tide gates on storm outfalls would be held closed by storm surge, potentially resulting in storm sewer backups above the ground elevation. In these cases, wet weather flow would be managed locally without impacts to the protected area landscaping or land uses. The reconstructed outfalls proposed under this alternative would not change the current CSO volumes from the project drainage area.

The Preferred Alternative would be consistent with all Federal, State, and City regulations, including the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Any water relocation or reconstruction associated with the Preferred Alternative will be done in accordance with the New York State Sanitary Code. Therefore, there would be no adverse effects to water and sewer infrastructure as a result of implementation of the Preferred Alternative.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would include the same drainage isolation and drainage management elements as the Preferred Alternative. In Project Area One, the line of flood protection would generally be located on the west side of East River Park instead of along the waterfront, which would require floodproofing more existing sewer infrastructure that would not be protected during design storm events and rerouting more storm drainage on the unprotected side of the flood protection system downstream of the tide gates. Alternative 2 would not require extensive reconstruction of water and sewer infrastructure in East River Park as the load on existing sewers would not significantly differ. However, as the existing infrastructure would not be reconstructed, the existing tide gates on outfalls serving the drainage protected area would be replaced to ensure their ability to prevent East River surge flows from entering the sewer system and inundating the drainage protected area. This would not alter the functionality of the existing systems. Operation of sewer infrastructure during non-storm and storm conditions would be the same as the Preferred Alternative. This alternative would continue to be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of Alternative 2.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 would result in the same effects to sewer infrastructure as described for Alternative 2. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of Alternative 3.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 includes the same resiliency measures, drainage elements, underground park water and sewer infrastructure reconstruction, and park improvements identified under the Preferred Alternative. Fewer combined sewer system regulators and manholes would need to be floodproofed under this alternative, compared to the Preferred Alternative. Operation of sewer infrastructure during non-storm and storm conditions would be the same as the Preferred Alternative. This alternative would continue to be consistent with the Clean Water Act, CSO Control Policy, and the CSO Abatement Program and CSO Long-Term Control Plan. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of Alternative 2. Therefore, there would be no adverse effects to sewer infrastructure as a result of implementation of Alternative 5. ✷

A. INTRODUCTION

This chapter examines the potential effects of the proposed project on the transportation systems (i.e., traffic, transit, pedestrian, and parking conditions) near the project area. The proposed project would not generate any new travel demand during its operations after completion of construction. However, based on a review of the proposed project and the potential modifications of street configurations, the following intersections were selected for more detailed assessment of potential effects on street operations:

- East 10th Street at Avenue D to assess potential changes related to the East 10th Street bridge;
- East 18th Street and East 20th Street at Avenue C to assess the potential effects of the structural elements of the proposed project on street functions; and
- East 23th Street at Avenue C to assess the potential effects of the structural elements of the proposed project on street functions specifically related to waterfront access for vehicles and pedestrians.

Once installed, the proposed closure structures (e.g., swing floodgates and roller floodgates) are proposed to be tested annually. In addition, the closures structures need to be activated during a design storm event.[1] The proposed project's potential effects on transportation systems due to the testing and activation of the closure structures are assessed in this chapter. In addition, an evaluation of vehicular and pedestrian safety was performed for the study area to identify high crash locations.

STUDY AREA

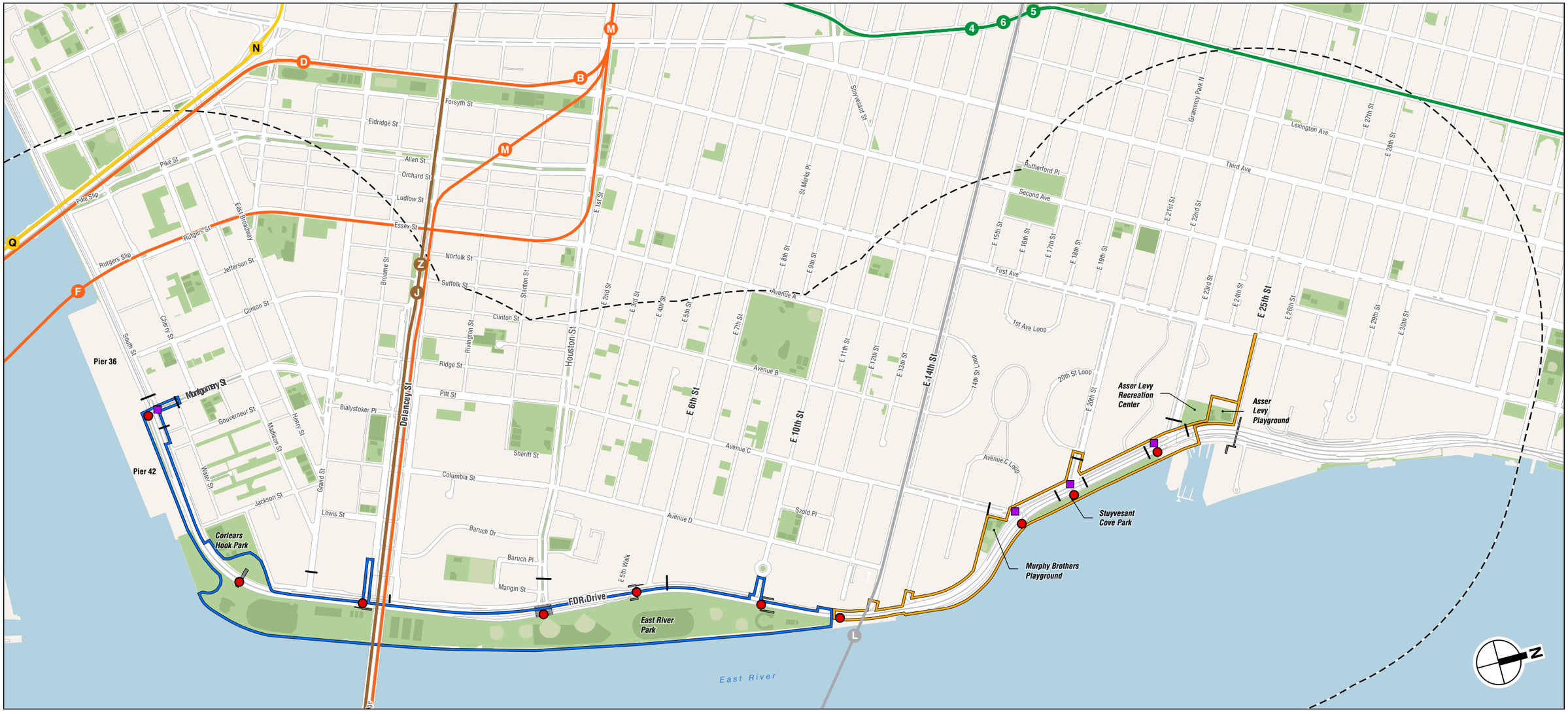
The transportation analysis study area assumed a ½-mile radius from the project areas (see **Figure 5.9-1**). This study area covers the extent of the proposed project with respect to the introduction of physical elements into the street and street closures related to operational deployment and the periodic testing of the flood protection system.

B. PRINCIPAL CONCLUSIONS

As part of the proposed project, East 10th Street between the traffic circle and the FDR Drive service road would be converted from two-way to one-way eastbound and the service road in front of the BP Gas Station would be closed to vehicular traffic at East 23rd Street. These changes would not result in any significant adverse effects on the transportation systems.

A "Traffic Study Report" (Final Report: September 18, 2018; see **Appendix J**) was prepared to assess the potential effects of the structural elements of the proposed project on street functions, including traffic and pedestrian circulation. This study evaluated three intersections along Avenue C: at East 18th Street; at East 20th Street; and at East 23rd Street. It was the conclusion of that

[1] The 100-year flood events with Sea Level Rise projections to the 2050s.



Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Transportation Analysis Study Area

Figure 5.9-1

report that the proposed project would not affect traffic or pedestrian operations at any of these intersections.

Additional principal conclusions for the project alternatives evaluated are summarized below. As discussed above, the proposed project would not generate any new travel demand during its operation for any alternatives.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects). These planned projects include Pier 42, Brookdale Campus, One Manhattan Square/Extell, Alexandria Phase 3, and the Two Bridges Large Scale Residential Development. Since traffic, transit, pedestrian, and parking demand in the study area would increase only as a result of background growth and these proposed developments, the No Action Alternative would not result in any potential significant adverse traffic, transit, pedestrian, and parking effects.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative would raise the majority of East River Park. This plan would reduce the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. In addition to the Delancey Street and 10th Street bridges, the Corlears Hook bridge would be reconstructed to be universally accessible and ADA-compliant and would improve safety and access/egress to East River Park for pedestrians and bicyclists. Furthermore, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk.

Since this is a reconstruction of the existing recreational elements in the park, the proposed project would not generate any new travel demand upon its completion or significantly affect traffic, transit, or pedestrian operations within the project area. Modifications to the streets attributable to the proposed project (e.g., East 10th Street) would also not significantly affect vehicle or pedestrian circulation patterns. Therefore, the Preferred Alternative would not result in any significant adverse traffic, transit, and pedestrian effects during non-storm conditions. The 2014 *City Environmental Quality Review (CEQR) Technical Manual* states that if a quantified traffic analysis is not required, it is likely that a parking assessment is also not warranted. Therefore, a quantified parking analysis is not warranted and the proposed project would similarly not be expected to result in any significant adverse parking effects during non-storm conditions.

During a storm event and the periodic testing and maintenance of closure structures, certain streets, FDR Drive Ramps, and segments of the FDR Drive adjacent to the closure structures would need to be temporarily closed to traffic/pedestrian use. The periodic testing and maintenance of closure structures would be temporary in nature and where feasible, would occur during off-peak hours with the necessary traffic management systems in place and therefore would not result in significant adverse effects on transportation systems. During testing and maintenance of the closure structures or under a design storm condition, access and circulation near the project area, including the Waterside Plaza complex, would be affected. Any testing and maintenance of the closures structures would be coordinated between NYPD, FDNY, and NYC Parks, to ensure emergency access routes are maintained in a coordinated manner using alternate routes.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park Baseline Alternative (Alternative 2) would provide flood protection in Project Areas One and Two using a combination of floodwalls, levees, and closure structures (i.e., deployable gates) from Montgomery Street to East 25th Street. Similar to the Preferred Alternative, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. As with the conclusions presented above for the Preferred Alternative, Alternative 2 would not result in significant adverse traffic, transit, pedestrian, and parking effects.

The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3) provides flood protection using a combination of floodwalls, levees, and closures structures in Project Areas One and Two. Under Alternative 3, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to be American Disability Act (ADA)-compliant, and would improve safety and access/egress to East River Park for pedestrians and bicyclists. Additionally, a new raised and landscaped park-side plaza landing would be created at the entrance to the park from East Houston Street overpass. The improvements at the Delancey Street and East 10th Street bridges and East Houston Street overpass would improve safety and access/egress to East River Park for pedestrians and bicyclists. Furthermore, as with the Preferred Alternative, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. As with the conclusions presented below for the Preferred Alternative, Alternative 3 would not result in significant adverse traffic, transit, pedestrian, and parking effects.

The Flood Protection System East of FDR Drive (Alternative 5) proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property and Murphy Brothers Playground. Furthermore, as with the Preferred Alternative, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk.

Similar to the Preferred Alternative, Alternative 5 would not result in significant adverse traffic, transit, pedestrian, and parking effects.

C. REGULATORY CONTEXT

The transportation modes in the study area are regulated and/or monitored by Federal, state, and local agencies, including U.S. Coast Guard (USCG), New York State Department of Transportation (NYSDOT), New York City Department of Transportation (NYCDOT), New York's Metropolitan Transportation Authority (MTA), and the New York City Economic Development Corporation (EDC).

D. METHODOLOGY

The *CEQR Technical Manual* identifies procedures for evaluating potential impacts on transportation systems. This begins with the preparation of a trip generation analysis (Level 1 screening assessment) to estimate the volume of person and vehicle trips attributable to a proposed project. If a proposed project is expected to result in fewer than 50 peak hour vehicle trips and fewer than 200 peak hour transit or pedestrian trips, a quantified analysis is not needed. When these thresholds are exceeded, detailed trip assignments are performed to estimate the incremental trips at specific transportation elements and to identify potential locations for further analyses (Level 2 screening assessment). As discussed above, the proposed project would not generate any new travel demand upon its completion, and as a result, a Level 2 screening assessments is not needed. The *CEQR Technical Manual* states that if a quantified traffic analysis is not required, it is also likely that a parking assessment is not warranted.

Based on a review of the proposed project and the potential modifications of street configurations, the following intersections were selected for a more detailed assessment of potential effects on street operations:

- East 10th Street at Avenue D to assess potential changes related to the East 10th Street bridge;
- East 18th Street and East 20th Street at Avenue C to assess the potential effects of the structural elements of the proposed project on street functions; and
- East 23th Street at Avenue C to assess the potential effects of the structural elements of the proposed project on street functions specifically related to waterfront access for vehicles and pedestrians.

DATA COLLECTION

Data collection included traffic, pedestrian, and bicycle counts at the East River Park and Stuyvesant Cove Park access/egress locations. The manual traffic intersection counts were conducted during one typical weekday and one typical Saturday and were supplemented with continuous (nine-day) automatic traffic recorder (ATR) counts at key locations in May 2015. Pedestrian and bicycle counts were conducted during two typical weekdays and two typical Saturdays in May 2015. Since the data was collected in 2015, volume comparisons (between 2015 and 2017) at selected study area locations were also prepared to validate the 2015 data. The comparisons showed that the 2017 weekday traffic volumes are lower than the 2015 traffic volumes by approximately 10 percent. Therefore, use of the 2015 data presented below provides a conservative assessment.

Data collection was conducted to capture three weekday peak periods and one Saturday peak period: Weekday 7:00 AM to 10:00 AM, 11:00 AM to 2:00 PM, and 4:00 PM to 8:00 PM, and Saturday 9:00 AM to 5:00 PM at the following locations:

- Montgomery Street and South Street (traffic, pedestrians, and bicycles);
- Corlears Hook bridge (pedestrians and bicycles);
- Delancey Street bridge (pedestrians and bicycles);
- Grand Street and the FDR Drive Service Road (traffic);
- East Houston Street overpass (pedestrians and bicycles);
- East 6th Street bridge (pedestrians and bicycles);
- East 10th Street bridge (pedestrians and bicycles);

- Avenue C Loop and East 18th Street Extension (traffic, pedestrians, and bicycles);
- Avenue C and East 20th Street (traffic, pedestrians, and bicycles);
- Avenue C and East 23rd Street (traffic, pedestrians, and bicycles);
- Bicycle/Pedestrian pathway at Con Edison facility; and
- Bicycle/Pedestrian pathway just north of the East Houston Street overpass.

Table 5.9-1 compares the pedestrian and bicycle counts during the entire count period at each bridge/overpass spanning the FDR Drive to access East River Park (see **Figures 5.9-2a and 5.9-2b**). The volumes range from approximately 1,000 to 2,000 pedestrians and bicyclists. The lowest pedestrian and bicycle counts were collected at the Corlears Hook bridge, while the highest counts were collected at the East 6th Street bridge during the weekday and the East Houston Street overpass during the weekend.

Table 5.9-1
Pedestrian Bridge/Overpass Counts

Location	Weekday	Weekend Day
Corlears Hook Bridge	*1,002*	*1,136*
Delancey Street Bridge	1,426	1,491
East Houston Street Overpass	1,558	**2,092**
East 6th Street Bridge	**1,912**	1,889
East 10th Street Bridge	1,553	1,641

Notes: Includes both bicyclists and pedestrians during the entire count period.
Italic indicates the minimum count; **BOLD** indicates the maximum count.

VEHICULAR AND PEDESTRIAN SAFETY

Per the *CEQR Technical Manual*, an evaluation of vehicular and pedestrian safety is necessary for locations within traffic and pedestrian study areas that have been identified as high-crash locations, where 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclist injury crashes occurred in any consecutive 12 months of the most recent three-year period for which data are available. For these locations, crash trends are identified to determine whether projected vehicular and pedestrian traffic would further impact safety at these locations. The determination of potential significant safety effects depends on the type of area where the project site is located, traffic volumes, crash types and severity, and other contributing factors. Where appropriate, measures to improve traffic and pedestrian safety are identified and coordinated with NYCDOT for their approval.

E. AFFECTED ENVIRONMENT

TRANSPORTATION ELEMENTS

ROADWAY NETWORK

The key roadways in the study area include the FDR Drive, South Street, Avenue C, First Avenue, Montgomery Street, Grand Street, Delancey Street, East Houston Street, East 20th Street, and East 23rd Street. The physical and operational characteristics of the study area roadways are as follows:

- **FDR Drive** is a major two-way northbound-southbound parkway open to passenger cars only and closed to commercial traffic. The FDR Drive starts north of the Battery Park Underpass at South and Broad Streets and runs along the entire length of the East River to the 125th Street/Robert F. Kennedy Bridge exit, where it becomes the Harlem River Drive. The FDR

2015 Existing Pedestrian and Bicycle Volumes: Project Area One
Figure 5.9-2a

1 — E. River Bikeway Promenade Access

	Weekday	Saturday
Total Peds and Bikes	2,215	1,721
Peak Hour	5:45-6:45	10:45-11:45 AM
Peds	204	211
Bikes	188	76

2 — Avenue C & East 18th Street

	Weekday	Saturday
Total Peds and Bikes	1,426	980
Peak Hour	6:45-7:45 PM	11:15 AM - 12:15 PM
Peds	183	143
Bikes	66	37

3 — Avenue C & East 20th Street

	Weekday	Saturday
Total Peds and Bikes	1,227	1,090
Peak Hour	6:30-7:30 PM	11:15 AM - 12:15 PM
Peds	189	141
Bikes	37	29

4 — Avenue C & East 23rd Street

	Weekday	Saturday
Total Peds and Bikes	4,706	3,428
Peak Hour	6:45-7:45 PM	12:15-1:15 PM
Peds	811	423
Bikes	166	125

Project Area Two

Pedestrian / Bicycle Count Locations (w/ Location ID)

0 1,000 FEET

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2015 Existing Pedestrian and Bicycle Volumes: Project Area Two
Figure 5.9-2b

Drive has three lanes in each direction for the majority of its span. It is elevated south of Montgomery Street, between the East 18th Street Extension and East 25th Street, between East 29th Street and East 38th Street, and between East 93rd Street and East 99th Street and is at grade level for the remaining stretch of roadway. The elevated sections of the FDR Drive are within NYSDOT jurisdiction while the local roadways/non-elevated roadways are within NYCDOT jurisdiction. FDR Drive entrance/exit ramps provide access/egress to multiple corridors within the study area, including South Street, East Houston Street, East 18th Street Extension, and East 23rd Street.

- **South Street** is a local two-way northbound-southbound roadway to the south of Montgomery Street and a one-way southbound roadway between Montgomery Street and Jackson Street. South Street is located immediately adjacent to the East River and operates from Whitehall Street to Jackson Street near the Williamsburg Bridge. South Street is approximately 34 feet wide curb-to-curb and is a NYCDOT-designated truck route south of Pike Street. There is a designated two-way bicycle lane along South Street that connects to/from the shared-use pathway within East River Park and Stuyvesant Cove Park. South Street provides vehicular, pedestrian, and bicycle access/egress to the East River Park at Montgomery Street.
- **Avenue C** is a major two-way northbound-southbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 45 feet. South of East Houston Street, Avenue C is known as Pitt Street and operates one-way northbound from north of Grand Street to East Houston Street with a curb-to-curb width ranging from 25 feet to 70 feet. South of Grand Street, Pitt Street becomes Montgomery Street and runs two-way northbound-southbound with a curb-to-curb width of approximately 70 feet. The M9 bus route operates along Avenue C in both directions north of East Houston Street. Curbside parking is provided along both sides of the street for the majority of the roadway. There is a designated two-way bicycle lane along Avenue C to the north of East Houston Street. Avenue C provides pedestrian and bicycle access/egress to the waterfront at East 18th and East 20th Streets and vehicular, pedestrian, and bicycle access/egress at East 23rd Street.
- **First Avenue** is a major one-way northbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 70 feet. South of East Houston Street, First Avenue is known as Allen Street and operates two-way northbound-southbound with a curb-to-curb width of approximately 115 feet. First Avenue/Allen Street is a NYCDOT-designated truck route and the M15 local and Select Bus Service (SBS) bus routes operate along Allen Street in both directions and operates northbound along First Avenue and southbound along Second Avenue. Curbside parking is provided along both sides of the street. There is a designated two-way bicycle lane along Allen Street and a one-way northbound bicycle lane along First Avenue.
- **Second Avenue** is a major one-way southbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 60 feet. South of East Houston Street, Second Avenue is known as Chrystie Street and operates two-way northbound-southbound with a curb-to-curb width of approximately 70 feet. Second Avenue/Chrystie Street is a NYCDOT-designated truck route and the M15 local and SBS bus routes operate southbound along Second Avenue north of East Houston Street. Curbside parking is provided along both sides of the street. There is a designated two-way bicycle lane along Chrystie Street and a one-way southbound bicycle lane along Second Avenue.
- **Grand Street** is a local street that operates two-way eastbound-westbound to the east of Chrystie Street. West of Chrystie Street, Grand Street runs one-way eastbound. Curbside parking is provided along both sides of Grand Street. West of Chrystie Street the curb-to-curb

width is approximately 40 feet and east of Chrystie Street the curb-to-curb width is approximately 65 feet. Grand Street is a NYCDOT-designated truck route between Church Street and Allen Street and the M14A bus route operates along Grand Street in both directions to the east of Essex Street. There is a designated two-way bicycle lane along Grand Street east of Chrystie Street and a one-way eastbound bicycle lane west of Chrystie Street.

- **Delancey Street** is a major two-way eastbound-westbound roadway, west of the Williamsburg Bridge, with pedestrian refuge islands within the roadway's median to separate the two-directional traffic and provide storage for pedestrians. West of the Williamsburg Bridge (the Delancey Street mainline), Delancey Street generally consists of four travel lanes in each direction with curbside parking on both sides of the street with a curb-to-curb width of approximately 110 feet. East of Clinton Street, the Delancey Street mainline leads onto the Williamsburg Bridge and its service roads extend to/from the FDR Drive. The Delancey Street service road operates two-way eastbound–westbound to the east of Clinton Street and the two-directional traffic is separated by a median underneath the Williamsburg Bridge. The Delancey Street service road consists of one travel lane and a shared bicycle lane that connects to/from the FDR Drive service road in each direction with curbside parking on both sides of the street with a curb-to-curb width of approximately 50 feet per direction. The Delancey Street mainline is a NYCDOT-designated truck route and the M14D bus route operates along Delancey Street in the westbound direction only between Columbia Street and the FDR Drive. There is a designated two-way bicycle lane along Delancey Street to the east of Chrystie Street that connects to/from the Williamsburg Bridge. The Delancey Street service road provides access/egress for pedestrians and bicyclists to the East River Park via the existing bridge.
- **Houston Street** is a major two-way east-west roadway with three moving lanes in each direction and provides curbside parking on both sides of the street. East Houston Street is approximately 100 feet wide curb-to-curb and is a NYCDOT-designated truck route west of Allen Street/First Avenue. The M14D bus route operates along Houston Street in the eastbound direction only between Avenue D and the FDR Drive. The M21 bus route operates along Houston Street in both directions. There is a designated two-way bicycle lane along Houston Street. East Houston Street provides access/egress for pedestrians and bicyclists to the East River Park via the existing pedestrian overpass.
- **East 10th Street** is a local roadway that operates one-way eastbound west of Avenue A and two-way eastbound-westbound east of Avenue A and provides curbside parking on both sides of the street. West of Avenue A the curb-to-curb width is approximately 30 feet and east of Avenue A the curb-to-curb width is approximately 45 feet. The M8 bus route operates along East 10th Street in both directions between Avenue A and the traffic circle to the east of Avenue D. There is a designated two-way bicycle lane along East 10th Street east of Avenue A and a one-way eastbound bicycle lane west of Avenue A. East 10th Street provides access/egress for pedestrians and bicyclists to the East River Park via the existing pedestrian bridge.
- **East 20th Street** operates one-way eastbound west of First Avenue and two-way eastbound-westbound east of First Avenue and provides curbside parking on both sides of the street. West of First Avenue the curb-to-curb width is approximately 35 feet and east of First Avenue the curb-to-curb width is approximately 55 feet. The M23 SBS bus route operates westbound along East 20th Street between Avenue C and First Avenue. There is a designated two-way bicycle lane along East 20th Street east of First Avenue and a one-way eastbound bicycle lane west of First Avenue. East 20th Street provides pedestrian and bicycle access/egress to the waterfront at Avenue C.

- **East 23rd Street** is a local two-way east-west roadway with two moving lanes in each direction and provides curbside parking on both sides of the street. East 23rd Street is approximately 65 feet wide curb-to-curb and is a NYCDOT-designated truck route west of First Avenue. The M23 SBS bus route operates along East 23rd Street in both directions. East 23rd Street provides vehicular, pedestrian, and bicycle access/egress to the waterfront at Avenue C.

PEDESTRIAN

Within the study area, the pedestrians would access the waterfront at four at-grade streets and five bridges, as follows:

- Montgomery Street at South Street (East River Park access);
- Corlears Hook bridge (East River Park access);
- Delancey Street bridge (East River Park access);
- East Houston Street overpass (East River Park access);
- East 6th Street bridge (East River Park access);
- East 10th Street bridge (East River Park access);
- Avenue C at East 18th Street (Stuyvesant Cove Park access);
- Avenue C at East 20th Street (Stuyvesant Cove Park access); and
- Avenue C at East 23rd Street (Stuyvesant Cove Park access).

In addition, the waterfront is accessible in the north-south direction via the existing shared-use pathway.

BICYCLE NETWORK

There are designated bicycle lanes along South Street (that connect to/from the shared-use pathway within East River Park and Stuyvesant Cove Park), East Houston Street, Grand Street, Montgomery Street, First Avenue, Second Avenue, East 10th Street, and East 20th Street. These bicycle lanes provide connections to/from the East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground.

TRANSIT

Introduction

Transit service to the study area is provided by New York City Transit (NYCT) and includes the F6 subway lines and the M8, M9, M14A, M14D, M15, M21, M22, M23, and M34A local bus routes (see **Figure 5.9-1**). Both subway and bus systems are described in greater detail below.

Subway Service

Subway service in the area to East River Park is limited as only the F train stops within ½-mile of an East River Park access point, at the East Broadway Station. However, the J, M, Z, L, and No. 6 subway lines make stops approximately 0.60 to 0.75 miles away from the nearest East River Park access points and have been excluded from the discussion below.

- The F subway line (Queens Boulevard Express/Sixth Avenue Local) operates between Stillwell Avenue, Brooklyn and Jamaica, Queens via the 63rd Street connector. The F line runs express along Queens Boulevard.

Bus Service

Table 5.9-2 provides a summary of the NYCT local bus routes that provide regular service to the study area and their weekday AM and PM frequencies of service.

Table 5.9-2
NYCT Local Bus Routes Serving the Study Area

Bus Route	Start Point	End Point	Routing in Study Area	Frequency of Bus Service (in Minutes)	
				Weekday AM	Weekday PM
M8 (EB/WB)	West Village	East Village	E. 8th/E. 9th Street	10/10	15/15
M9 (NB/SB)	Bellevue Hospital Center	Battery Park City	Avenue C	15/9	12/15
M14A (EB/WB)	West Village	Lower East Side	Grand Street	9/8	10/10
M14D (EB/WB)	West Village	Lower East Side	Delancey Street/ E. Houston Street	4/3	6/6
M21 (EB/WB)	West Village	Lower East Side	E. Houston Street	15/12	20/20
M22 (EB/WB)	Battery Park City	Lower East Side	Madison Street/ Grand Street	12/12	15/15
M23 (EB/WB)	Peter Cooper Village	Chelsea Piers	E. 23rd Street	9/15	7/7
M34A (EB/WB)	Waterside Plaza	Port Authority Bus Terminal	FDR Drive Service Road/E. 23rd Street	9/9	10/10

Source: Metropolitan Transportation Authority NYCT Bus Time Tables (2018)

PARKING

Inventories of off-street parking facilities within ¼-mile of the project area were conducted in June 2015. There are 9 off-street parking facilities, with a total capacity of approximately 4,050 spaces. Throughout the weekday peak periods, these parking facilities are approximately 70 to 80 percent utilized, with 800 to 1,200 spaces available within ¼-mile of the project area. As part of the reconstruction of the East 10th Street and Delancey Street bridges, approximately 12 and 7 on-street parking spaces would be removed, respectively. Vehicles currently using these 19 parking spaces would have to park at other off-street facilities. Based on the off-street parking survey, the 12 on-street parking spaces that would be removed adjacent to the East 10th Street pedestrian bridge could be accommodated at off-street parking facilities within ¼-mile where capacity was observed. However, the 7 on-street parking spaces that would be removed adjacent to the Delancey Street pedestrian bridge could result in a parking shortfall within ¼-mile. It is expected that excess parking demand adjacent to the Delancey Street pedestrian bridge would need to be accommodated by on-street parking or off-street parking beyond a ¼-mile walk. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Additionally, as part of the installation of the north interceptor gate, up to 11 parking spaces could be removed on East 20th Street to the west of Avenue C. Vehicles currently using these parking spaces would park on-street or at off-street parking facilities within ¼-mile where capacity was observed and would not result in a parking shortfall. Therefore, the proposed project would not result in any significant adverse parking effects..

VEHICULAR AND PEDESTRIAN SAFETY EVALUATION

Crash data for the study area intersections were obtained from NYSDOT for the time period between January 1, 2015 and December 31, 2017. The data obtained quantify the total number of reportable crashes (involving fatality, injury, or more than $1,000 in property damage), fatalities,

and injuries during the study period, as well as a yearly breakdown of vehicular crashes with pedestrians and bicycles at each location.

During the January 1, 2015 and December 31, 2017 three-year period, a total of 236 reportable and non-reportable crashes, 1 fatality, 214 injuries, and 41 pedestrian/bicyclist-related crashes occurred at the study area intersections. A rolling total of crash data identifies one study area intersection, First Avenue at East 23rd Street, as a high crash location in the 2015 to 2017 period. **Table 5.9-3** depicts total crash characteristics by intersection during the study period, as well as a breakdown of pedestrian and bicycle crashes by year and location.

FIRST AVENUE AND EAST 23RD STREET

Based on the review of the crash history at the intersection of First Avenue and East 23rd Street, no prevailing trends with regard to geometric deficiencies were identified as the primary causes of recorded crashes. With respect to geometric deficiencies that could potentially cause safety hazards, the intersection of First Avenue and East 23rd Street is signalized and provides four high visibility crosswalks. In addition, countdown timers are posted on all crosswalks. There is a designated bike lane along the northbound approach and a bicycle signal head that regulates northbound bicycle flow. Absent the proposed project, additional safety measures, such as the installation of signage warning vehicles to yield to pedestrians in the crosswalk, could be installed on the north, east, and west approaches to improve pedestrian safety at this intersection.

Table 5.9-4 shows a detailed description of each pedestrian/bicyclist-related crash at the high-crash location listed above during the three-year period.

VISION ZERO INITIATIVE

Approximately 4,000 New Yorkers are seriously injured and more than 250 are killed each year in vehicle crashes. In 2014, Mayor Bill De Blasio announced the launch of the Vision Zero Initiative in the five boroughs of New York City. The goal of Vision Zero is to increase pedestrian and vehicle safety through a variety of measures, such as traffic calming, narrower travel lanes, raised crosswalks, and increasing the number of school crossing guards. As part of the Vision Zero Initiative, the speed limit on local roadways and arterials was lowered from 30 to 25 miles per hour across all five boroughs. The Vision Zero Action Plan establishes the City's commitment to improving street safety in every neighborhood and borough through expanded enforcement against dangerous moving violations, new street designs to improve safety, broad public outreach and communications and a legislative agenda to increase penalties for dangerous drivers. As documented within the "2019 Borough Pedestrian Safety Action Plans Update," within Project Areas One and Two, the following have been identified as Vision Zero priority corridors: 23rd Street, 14th Street, First Avenue, Second Avenue, Third Avenue, Houston Street, and Canal Street.

Table 5.9-3
Crash Summary

Intersection		Study Period					Crashes by Year					
		All Crashes by Year			Total	Total	Pedestrian			Bicycle		
North-South Roadway	East-West Roadway	2015	2016	2017	Fatalities	Injuries	2015	2016	2017	2015	2016	2017
South Street	Montgomery Street	1	3	1	0	3	0	1	1	0	0	0
Water Street	Montgomery Street	0	0	0	0	0	0	0	0	0	0	0
Cherry Street	Montgomery Street	1	0	0	0	0	0	0	0	0	0	0
Monroe Street	Montgomery Street	0	0	0	0	0	0	0	0	0	0	0
Madison Street	Montgomery Street	2	2	0	0	3	1	0	0	0	0	0
Henry Street	Montgomery Street	1	0	1	0	2	1	0	0	0	0	1
South Street	Gouverneur Slip W	0	0	0	0	0	0	0	0	0	0	0
Water Street	Gouverneur Slip W	0	1	0	0	0	0	0	0	0	0	0
South Street	Gouverneur Slip E	0	1	0	0	1	0	0	0	0	0	0
Water Street	Gouverneur Slip E	0	0	0	0	0	0	0	0	0	0	0
South Street	Jackson Street	0	0	0	0	0	0	0	0	0	0	0
Water Street	Jackson Street	0	1	0	0	1	0	0	0	0	0	0
FDR Drive	Grand Street	6	5	2	0	11	0	0	1	0	0	0
Madison Street	Grand Street	1	0	1	0	2	0	0	0	0	0	1
Lewis Street	Grand Street	0	0	0	0	0	0	0	0	0	0	0
Jackson/Henry St	Grand Street	1	0	3	0	4	0	0	1	0	0	1
FDR Drive	Delancey Street	6	2	4	0	13	0	0	0	0	0	0
Lewis Street	Delancey Street	0	0	0	0	0	0	0	0	0	0	0
Mangin Street	Delancey Street	0	0	0	0	0	0	0	0	0	0	0
Cannon Street	Delancey Street	0	0	0	0	0	0	0	0	0	0	0
Abraham Kazan St	Delancey Street	0	0	0	0	0	0	0	0	0	0	0
FDR Drive	Delancey Street N	0	0	0	0	0	0	0	0	0	0	0
Baruch Drive	Delancey Street N	0	0	0	0	0	0	0	0	0	0	0
Columbia Street	Delancey Street N	0	2	3	0	5	0	1	1	0	1	0
FDR Drive	E Houston Street	7	7	7	0	21	0	0	0	0	0	1
Mangin Street	E Houston Street	0	2	0	0	4	0	0	0	0	0	0
Baruch Place	E Houston Street	0	1	5	0	8	0	0	0	0	0	1
Baruch Drive	E Houston Street	2	1	2	0	2	0	1	0	0	0	0
Lillian Wald Drive	E Houston Street	1	0	0	0	1	0	0	0	0	0	0
Columbia Street/ Avenue D	E Houston Street	6	8	8	1	16	0	1	1	0	1	0
FDR Drive	E 6th Street	4	2	6	0	10	0	0	0	0	0	0
Avenue D	E 6th Street	1	2	1	0	4	0	0	1	1	0	0
FDR Drive	E 10th Street	0	2	1	0	2	0	0	0	0	0	0
Avenue D	E 10th Street	2	1	2	0	6	0	0	0	0	0	1
Avenue C	E 16th Street/Avenue C Loop	4	4	4	0	14	0	0	0	1	0	0
Avenue C	E 20th Street	5	6	6	0	21	2	0	2	0	0	1
Avenue C	E 23rd Street	1	1	0	0	2	0	0	0	0	0	0
20th Street Loop	E 20th Street	0	0	0	0	0	0	0	0	0	0	0
First Avenue	E 21st Street	3	1	1	0	3	2	0	0	0	0	0
First Avenue	E 22nd Street	2	0	1	0	3	1	0	0	0	0	0
Asser Levy Place	E 23rd Street	1	1	1	0	3	1	0	0	0	0	0
First Avenue	**E 23rd Street**	11	18	8	0	33	4	3	1	0	2	0
Second Avenue	E Houston Street	0	0	3	0	3	0	0	0	0	0	0
FDR Drive	E 23rd Street	4	7	11	0	13	0	0	0	0	0	0

Source: NYSDOT January 1, 2015, through December 31, 2017, crash data.
Bold intersections are high pedestrian crash locations, where 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclist injury crashes occurred in any consecutive 12 months of the most recent three year period for which data are available.

Table 5.9-4
Vehicle and Pedestrian Crash Details

Intersection	Year	Date	Time	Crash Class		Action of Vehicle	Action of Pedestrian	Cause of Crash			
				Injured	Killed			Left / Right Turns	Pedestrian Error/ Confusion	Driver Inattention	Other
First Avenue at East 23rd Street	2015	4/11	12:10am	x		Going straight – North	Not in roadway				Alcohol involvement
		5/12	10:05am	x		Making right turn – West	Crossing with signal	x			Reaction to other uninvolved vehicle
		5/20	12:44pm	x		Making right turn – North	Crossing with signal	x			Failure to yield R.o.W.
		6/30	8:45am	x		Going straight – East	Crossing/No signal or crosswalk		x		
	2016	4/8	6:15am	x		Making right turn – West	Crossing with signal	x			
		7/16	2:25am	x		Going straight – East	Crossing with signal		x		
		7/27	12:00am	X		Going straight – East	Crossing with signal				Failure to yield R.o.W.
		10/5	10:50pm	x		Making right turn – North	Unknown	x	X		
		12/7	3:00pm	x		Unknown	Unknown				Not entered
	2017	1/31	7:15pm	x		Unknown – North	Crossing with signal			x	

F. ENVIRONMENTAL EFFECTS

The alternatives described below and analyzed in this chapter are described in greater detail in Chapter 2.0, "Project Alternatives." The following section evaluates the alternatives based on their potential transportation related effects, whether traffic, transit, or pedestrian and bicycle related.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Many of the planned projects would result in modest pedestrian and bicycle generators near the waterfront, and would be accounted for as part of the background growth. As per *CEQR Technical Manual* guidelines, 2015 existing pedestrian and bicycle volumes are assumed to increase by an annual background growth rate of 0.25 percent for the first five years and 0.125 percent for each additional year in Manhattan. However, as per information received from NYCDOT based on recent growth trends at similar facilities in Manhattan, bicycle volumes are assumed to increase by an annual background growth rate of 5 percent and pedestrian volumes would increase by an annual background growth rate of 6 percent within East River Park.

Projects planned or under construction near the waterfront that are expected to generate a greater magnitude of pedestrian and bicycle trips along the waterfront in the future are described in more detail below.

PIER 42 (2021)

At the southern end of Project Area One, NYC Parks plans to reconstruct a portion of Pier 42 as a public recreational resource. There will be access to the new open space from the bikeway/walkway along the FDR service road or from Montgomery Street under the elevated FDR Drive on the west and from East River Park on the east. This project will enhance the pedestrian experience by activating the site with new, public uses, and reestablishing public access to the waterfront at this location. The Pier 42 project will generate additional pedestrian and bicycle trips

along the East River Park shared-use pedestrian and bicycle path, the Montgomery Street corridor, and the bridges that provide access/egress for pedestrians and bicyclists to East River Park.

BROOKDALE CAMPUS (2022)

The City of New York proposes to redevelop the block generally bounded by First Avenue, East 25th Street, the FDR Drive, and a private drive (formerly East 26th Street). The Brookdale Campus of Hunter College of the City University of New York is currently vacating the property, and the New York City Department of Sanitation (DSNY) proposes to use a portion of the site to construct a four-story garage complex to store equipment and provide personnel support services and operational space. The remainder of the block would be redeveloped pursuant to a request for proposals managed by NYCEDC. This project is undergoing City environmental review, and two development scenarios are proposed for a reasonable worst-case development scenario analysis: a commercial scenario consisting of 82,980 square feet of retail, 82,980 square feet of community facility space, 1,175,640 square feet of office, and 450,000 square feet of manufacturing space; and a mixed-use scenario consisting of 1,176 dwelling units, 82,980 square feet of retail, 82,980 square feet of community facility space, and 450,000 square feet of manufacturing space. This proposed development will generate additional trips along the East 23rd Street corridor.

ONE MANHATTAN SQUARE/EXTELL (2019)

A large, mixed-use development of approximately 1,020 dwelling units and 48,683 square feet of retail on the block bounded by Pike Street, Cherry Street, South Street, and Essex Street is under development. The development will generate additional trips along the Pike Street corridor, the South Street corridor, and the Montgomery Street corridor.

TWO BRIDGES DEVELOPMENT (2021)

Located south of the proposed project area, this is a large, mixed-use development of approximately 2,775 dwelling units and 28,000 square feet of retail and community facility space bounded by the midblock area between Clinton Street and Montgomery Street; Cherry, Clinton, and South Streets; and midblock between Rutgers Slip and Pike Slip. The development will generate additional trips along the Pike Street corridor, the South Street corridor, and the Montgomery Street corridor.

ALEXANDRIA PHASE 3 (2022)

A large development including approximately 1.3 million square feet of mixed-use commercial, academic, and community facility space on the block bounded by East 29th Street, the FDR Drive, East 28th Street, and First Avenue is under development. The development will generate additional trips along the East 28th Street, East 25th Street corridor, and the First Avenue corridor.

CONCLUSION

Under the No Action Alternative, due to background growth and the above described projects that are expected to be constructed and occupied, there would be growth in traffic, transit, pedestrian, and parking volumes and demands in the study area.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED PARK ALTERNATIVE

NON-STORM CONDITIONS

Components of the proposed project have the potential to result in different effects under the two future operational conditions: storm and non-storm, and so the transportation analysis presented below is evaluated under both operational conditions. Storm conditions are defined as flood events that meet the criteria of the design storm event (the 100-year flood events with sea level rise to 2050s) for when the protection system would be fully deployed and engaged. Non-storm conditions are defined as typical day-to-day conditions without the occurrence of a design storm event.

Traffic

As part of the proposed project, East 10th Street between the traffic circle and the FDR Drive service road would be converted from two-way to one-way eastbound and the service road in front of the BP Gas Station would be closed to vehicular traffic at East 23rd Street the Preferred Alternative. Assessments were prepared below to determine if the East 10th Street conversion or closing the service road in front of the BP Gas Station to vehicular traffic would result in any significant adverse effects.

East 10th Street Conversion to One-Way[2]

As described above, in association with the relocation of the East 10th Street pedestrian/bicycle bridge, it has been proposed to convert the east end segment of East 10th Street between a traffic circle and the FDR Drive service road from a 40 foot wide two-way roadway to an 18 foot wide one-way eastbound roadway. There is an existing traffic circle on East 10th Street located midblock between Avenue D and the FDR Drive service road that provides two-way (eastbound and westbound) vehicular access to the buildings on the north and south sides of East 10th Street. However, east of the traffic circle, there is no turnaround, and the only outlet for eastbound traffic on this segment is to proceed on the one-way southbound FDR Drive service road. Therefore, the only vehicles traveling westbound on this segment of East 10th Street between the traffic circle and the FDR Drive service road are eastbound vehicles that have performed a multi-point turn at the east end of East 10th Street to U-turn westbound. In addition, the East 10th Street bridge would be modified to improve visibility of the bridge and enhance pedestrian circulation and access to the East River Park by widening the pedestrian ramp and shifting the entrance further inland to allow pedestrians to access the bridge earlier than the existing condition. All 12 on-street parking spaces would be also be removed in this section.

Based on data collected in 2017, the existing hourly background traffic volumes traveling westbound along the East 10th Street segment are low, with an average of 15 vehicles per hour between 6:00 AM and 8:00 PM and a maximum of 35 vehicles in an hour within that same period. It is estimated that a portion of these vehicles would use the traffic circle to return to Avenue D, which is not a diversion from East 10th Street, and a portion would divert to the southbound FDR Drive service road; those existing vehicles would be diverted to surrounding intersections. Since the number of diverted vehicles in any hour would be fewer than 50 vehicle trips, which is the *CEQR Technical Manual* minimum threshold for further traffic analysis, it is anticipated that the conversion of East 10th Street between the traffic circle and the FDR Drive service road from two-

[2] Both the East 10th Street Conversion to One Way and the East 23rd Street and Avenue C Service Road Closure would be implemented with the proposed project.

way to one-way eastbound would not result in any significant adverse traffic effects. Although pedestrian and bicycle traffic from the East 10th Street bridge over the FDR Drive would be diverted from the north side to the south side of East 10th Street, existing pedestrian and bicycle traffic on East 10th Street would not be diverted by the proposed street modifications.

East 23rd Street and Avenue C Service Road Closure[1]

As described above, it has been proposed to close the service road in front of the BP Gas Station east of East 23rd Street and Avenue C to vehicular traffic. Currently the service road operates one-way southbound and connects vehicles to the parking lot underneath the FDR Drive where they can exit onto Avenue C and travel northbound back towards East 23rd Street. According to observations, however, two-way traffic has been observed on this segment. With the service road closed to vehicular traffic, the existing roadway would be able to be used solely by pedestrians and bicyclists, which would provide more width than the existing sidewalk between the BP Gas Station and the service road, and better align with the multi-use path segments to the north and south. The closure of the service road to vehicular traffic would not affect the two existing Avenue C access points to the parking lot. As with the existing conditions, vehicles traveling northbound on Avenue C would access the parking area underneath the FDR Drive at the East 20th Street and Avenue C intersection or on Avenue C between East 20th and East 23rd Streets. Similarly, vehicles traveling southbound on Avenue C would access the parking area at the intersection of East 20th Street and Avenue C.

Based on data collected in 2017, the existing hourly traffic volumes traveling southbound along the service road are low, with an average of 10 vehicles per hour between 6:00 AM and 8:00 PM and a maximum of 22 vehicles in an hour within that same period. These existing vehicles would be diverted to the westbound approach of the intersection as part of the closure. Since the number of diverted vehicles in a peak hour would be fewer than 50 vehicle trips, which is the *CEQR Technical Manual* minimum threshold for further traffic analysis, it is anticipated that closing the service road to vehicular traffic would not result in any significant adverse traffic effects.

Pedestrian and Bicycles

As currently contemplated, the proposed flyover bridge would be a steel thru-truss superstructure supported on footings placed adjacent to the eastern edge of the northbound FDR Drive lanes, within the limits of the existing East River Bikeway. The proposed flyover bridge would be cantilevered over the northbound FDR Drive. The thru truss bridge would be approximately 1,000 feet long and 15 feet wide and approximately 19 feet tall from the surface of the bridge deck to the top of the truss. The bridge would have a 16-foot minimum clearance above the elevated roadway between East 13th and East 15th Streets adjacent to the Con Edison pier. The total height of the flyover bridge would be approximately 40 feet above grade. The flyover bridge would slope down to connect to East River Park on the south and to Captain Patrick J. Brown Walk around East 16th Street on the north.

With the implementation of the new comprehensive coastal flood protection systems described above, existing sidewalk/shared-use pedestrian and bicycle path widths would be narrowed at the following locations (see also the schematic figures presented in **Appendices B2 and C**):

- Based on the current conceptual design (January 2019), sidewalk widths at the northwest corner of Montgomery and South Streets would be reduced by approximately three feet along each corridor for a distance of approximately 60 to 100 feet. As a result, the sidewalk width on Montgomery Street would be narrowed from 9.5 feet to 6.5 feet and the sidewalk width on South Street would be narrowed from 14.5 feet to 12 feet. Since the pedestrian volumes at this

intersection are low, with less than 100 pedestrians per element per hour, and only a short segment of Montgomery and South Streets would be affected and no significant adverse pedestrian effects on pedestrian movements are anticipated. Given the narrowing of the sidewalks, during final design it will be determined if street trees can be maintained in these segments and that the designs and clearances are ADA-compliant. If the street trees here cannot be replaced, then replacement street trees would be provided elsewhere in the proposed project area.

- Based on the current conceptual design (January 2019), the proposed flood protection system would be aligned along the FDR Drive westerly curbline for a distance of approximately 220 feet between about East 13th Street and East 14th Street. This would reduce the sidewalk width in this segment by approximately three feet, from 8 feet to 5.5 feet. Currently, the sidewalk at this location is fenced off from public use north of East 13th Street and is not used by any pedestrians. Therefore, since no pedestrian movements would be affected, there would be no significant adverse pedestrian effects on pedestrian flows.
- Based on the current conceptual design (January 2019), the sidewalk width along the west side of the FDR Drive service road north of East 15th Street would reduce by approximately three feet, from 8.5 feet to 6 feet. Since the pedestrian volumes along this segment are also limited, with fewer than 20 pedestrians per hour, there would be no significant adverse effects on pedestrians at this location.
- Based on the current conceptual design (January 2019), the sidewalk width along the west side of the FDR Drive service road north of East 23rd Street would reduce by approximately two feet, from 7.5 feet to 5.5 feet. Since the pedestrian volumes along this segment are also limited, with fewer than 20 pedestrians per hour, there would be no significant adverse effects on pedestrians at this location.
- The Delancey Street bridge would be modified to enhance pedestrian circulation and access to East River Park for pedestrians. The modifications are not anticipated to impact vehicular or transit operations.

The improvements at the Delancey Street and East 10th Street bridges and East Houston Street overpass would improve safety and access/egress to East River Park for pedestrians and bicyclists. In addition, the Corlears Hook Bridge would be reconstructed to be universally accessible and ADA-compliant and would similarly improve safety and access/egress for pedestrians and bicyclists. A shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. The proposed project would include the installation of interceptor gates so that flood waters would not back up into the upland neighborhood underneath the flood protection equipment through combined sewer outfalls in the East River. Two interceptor gates would be installed; these would each consist of a below-ground interceptor chamber and above-ground interceptor house. One gate would be installed along the service road in Corlears Hook Park just west of the FDR Drive between Jackson and Cherry Streets, and another along the eastbound approach of East 20th Street just west of Avenue C. These are referred to as the "south gate" and "north gate," respectively, in the subsequent description. The south gate chamber and house would be just off the service road on the west side of the FDR Drive and would not occupy any part of the service road, sidewalks, or nearby streets. The north gate chamber would be located below the street on the eastbound service road of East 20th Street just west of Avenue C and north of the south sidewalk. This gate chamber would be accessed via manholes in the street.

As discussed in Chapter 6.9, "Construction—Transportation," up to 11 parking spaces could be removed along East 20th Street during the construction of the north gate. The parking removal would continue after construction is completed and would affect both construction and operational conditions.

System Testing and Maintenance

Testing and maintenance of the closure structures along the project area during non-storm conditions will be required annually at a minimum, to ensure the floodgates remain in working condition. During these periods, certain streets, FDR Drive Ramps, and segments of the FDR Drive adjacent to the closure structures would need to be temporarily closed to traffic/pedestrian use. The periodic testing and maintenance of closure structures would not result in significant adverse effects on transportation systems because the testing and maintenance would be temporary in nature and would occur rarely each year; would occur during off-peak commuter hours, when possible; and be subject to a traffic management plan in place during these periods, which will be coordinated amongst the different relevant agencies. During testing and maintenance of the closure structures, access and circulation near the project area, including the Waterside Plaza complex, would be affected. Any testing and maintenance of the closures structures would be coordinated between NYCDOT, NYPD, and FDNY, to ensure safe access is coordinated and maintained with alternate access routes, as needed.

Storm Conditions

The extent of effects on transportation systems during storm deployment conditions would also be managed in coordination with a plan to be developed with input from City's Emergency Management Department (NYCEM), NYCDOT, NYPD, FDNY, NYC Parks, and other City and state agencies including the MTA for coordination with respect to transit management. Once a design storm impact on the City is determined to be increasingly likely, NYCEM would begin its emergency preparedness actions to ensure that transportation routes critical to evacuation are managed in coordinated manner. Should evacuations be required as a result of an impending design storm event, closure of the proposed closure structures will require management of traffic circulation patterns in coordination with NYCDOT, NYPD, and FDNY. Under these conditions, access/egress to Waterside Plaza, once actuated, the closure structures at East 23rd Street and the west service road will affect access/egress to Waterside Plaza. Traffic management to allow for circulation of emergency vehicles and local Waterside Plaza traffic will be implemented and maintained by NYPD, FDNY, and NYCDOT.

ALTERNATIVE 2 – FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would not introduce any changes to the transportation network that would result in adverse effects. It is also expected that the transportation assessments prepared for the Preferred Alternative 4 (see above) would also apply to Alternative 2 during non-storm conditions and storm event conditions during the testing and activation of the closure structures (referred to as "storm conditions" below). As described below, it is not expected that Alternative 2 would result in any significant adverse effects on transportation systems.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 would not introduce any changes to the transportation network that would result in additional effects beyond those described below for the Preferred Alternative. Therefore, the

detailed traffic, transit, pedestrian, and parking assessments prepared for the Preferred Alternative and those effects would also be applicable for Alternative 3 during non-storm and storm conditions. Therefore, it is not expected that Alternative 3 would result in any significant adverse effects on transportation systems.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 proposes a flood protection alignment similar to Alternative 4, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property, and Murphy Brothers Playground.

This alternative would include drainage components to reduce the risk of interior flooding, carbon fiber wrapping of Con Edison transmission lines, and construction of the shared-use flyover bridge to address the Con Edison pinch point.

NON-STORM CONDITIONS

As described above under the Preferred Alternative, the proposed flood protection systems would not impact traffic, parking, transit, or pedestrian operations and would not result in any significant adverse traffic, transit, pedestrian, and parking effects.

STORM CONDITIONS

The operation and management during a storm event and the testing and activation of the closure structures under Alternative 5 would be the same as the Preferred Alternative, other than the removal of closure structures across the FDR Drive (between East 13th and East 18th Streets), across East 15th Street, and across East 18th Street. ✷

Chapter 5.10: Neighborhood Character

A. INTRODUCTION

This chapter considers the effects of the proposed project on neighborhood character. As defined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, neighborhood character is an amalgam of various elements that give neighborhoods their distinct "personality." These elements may include a neighborhood's land use, socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, shadows, transportation, and/or noise. According to the *CEQR Technical Manual*, neighborhood character effects are rare, and it would be under unusual circumstances that, in the absence of an effect in any of the relevant technical areas, a combination of moderate effects to the neighborhood would result in an effect to neighborhood character. Moreover, a significant effect identified in one of the technical areas that contributes to a neighborhood's character is not automatically equivalent to a significant effect on neighborhood character. Rather, it serves as an indication that neighborhood character may be significantly affected.

This examination focuses on whether a defining feature of the neighborhood's character may be significantly affected by the proposed project. Since many of the relevant components of neighborhood character are considered in other sections of this Environmental Impact Statement (EIS), this chapter has been coordinated with those analyses.

STUDY AREA

The neighborhood character study area (study area) mirrors the study area used for the socioeconomic analysis, shown on Figure 5.2-1. The northern boundary of the study area is East 34th Street between First Avenue and the East River. The western boundary of the study area is First Avenue between East 29th and East 34th Streets; Third Avenue between East 3rd and East 29th Streets; and Allen, Clinton, Norfolk, Essex, and Pike Streets between East 3rd Street and South Street. The East River is the eastern and southern boundary of the study area. The study area includes portions of Manhattan Community Districts 3 and 6, and the following neighborhoods: Lower East Side, East Village, Alphabet City, Stuyvesant Town, Peter Cooper Village, Gramercy Park, and Kips Bay.

B. PRINCIPAL CONCLUSIONS

Principal conclusions for each of the alternatives evaluated are summarized below. Additional details on these alternatives are provided in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. As described in **Appendix A1**, there are a number of projects planned or currently under construction in the project area, including the Pier 42 project and the Solar One Environmental Education Center project in Stuyvesant Cove Park (No Action projects). During a coastal storm event similar to the design storm, the protected area could experience

effects similar to Hurricane Sandy. Targeted resiliency measures may reduce the effects of storms in certain locations, but they would not provide protection for the larger protected area.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would reduce the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

This alternative would not result in significant adverse effects to neighborhood character within the study area. The Preferred Alternative would provide flood protection, increased access, and enhanced and reconfigured open spaces. The Preferred Alternative would provide additional resiliency measures necessary to protect the majority of East River Park from coastal surge events and periodic inundation as a result of sea level rise. These resiliency measures would enhance park public access, operations, functionality, and usability during pre- and post-storm periods. These additional resiliency measures would not negatively alter or affect current uses or other features that define the character of neighborhoods within the study area but would enhance the long-term resiliency of a critical neighborhood asset. Therefore, the Preferred Alternative is not expected to result in substantial changes to neighborhood character.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), the Flood Protection System on the West Side of East River – Enhanced Park and Access Alternative (Alternative 3), and the Flood Protection System East of FDR Drive Alternative (Alternative 5) would similarly not result in significant adverse effects to neighborhood character within the study area. These alternatives deviate from the Preferred Alternative in the extent to which they enhance open space and access to open spaces and in the exact alignment of the flood protection, but none of these alternatives would significantly adversely affect any of the various elements that contribute to the character of the neighborhood.

C. REGULATORY CONTEXT

Per the *CEQR Technical Manual*, there are no special statutes, regulations, or standards that control the study of neighborhood character. Regulations and standards for each of the technical areas that may contribute to neighborhood character are discussed in Section 700 of the appropriate *CEQR Technical Manual* chapters.

D. METHODOLOGY

According to the *CEQR Technical Manual*, an analysis of neighborhood character evaluates whether a proposed project has the potential to result in significant adverse effects in any relevant technical area (land use, socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, shadows, transportation, and/or noise), or if a proposed project would result in a combination of moderate effects to several elements that could cumulatively

affect neighborhood character. If so, a preliminary assessment is undertaken. The preliminary assessment first identifies the defining features of the neighborhood that comprises the study area, followed by an assessment of the potential for the proposed project to affect the defining features of the neighborhood, either through the potential for significant adverse impacts or a combination of moderate effects in relevant technical areas. If the preliminary assessment concludes that the proposed action has the potential to affect defining features of a neighborhood, a detailed assessment of neighborhood character may be warranted. If needed, the detailed assessment would use the information from the preliminary assessment as a baseline and then project and compare the future No Action and With Action conditions.

Since the EIS includes analyses of several environmental impact categories that are relevant to neighborhood character, a preliminary assessment of neighborhood character has been prepared. The preliminary assessment describes the defining features of the neighborhood and then assesses the potential for the proposed project to impact these defining features.

E. AFFECTED ENVIRONMENT

PROJECT AREA ONE

Project Area One consists primarily of the FDR Drive right-of-way and East River Park. Additionally, the Montgomery Street (South Street to Water Street) right-of-way is located within Project Area One. The FDR Drive, a multi-lane roadway, traverses the full extent of Project Area One through its western edge. South of the project area, the FDR Drive runs on an elevated viaduct. Within Project Area One, the FDR Drive crosses above Montgomery Street (this provides access to Pier 42 and the southern end of East River Park), and then returns to grade at approximately Gouverneur Slip East. East River Park, which is operated by New York City Department of Parks and Recreation (NYC Parks), is approximately 45.88 acres and is located between the FDR Drive to the west and the East River to the east, Jackson Street to the south, and East 13th Street to the north. Neighborhoods in or adjacent to Project Area One include the Lower East Side, East Village, and Alphabet City. Large residential developments that include New York City Housing Authority (NYCHA) and private housing developments are located adjacent to Project Area One's west side. East River Park contains a variety of passive and active recreation spaces, including a waterfront esplanade and athletic fields, and is accessible via several bridges along the western side of the park. See Chapter 5.3, "Open Space," for a detailed description of East River Park amenities. At Cherry Street, a wide bridge connects Corlears Hook Park to East River Park. Moving northward, a bridge at Delancey Street provides access from the Lower East Side neighborhood to East River Park. At East Houston Street, pedestrians can access East River Park from ramps at the overpass over the FDR Drive. Bridges over the FDR Drive at East 6th Street and East 10th Street provide access to East River Park for residents of the East Village and Alphabet City neighborhoods.

Throughout the week, community members utilize picnic and barbecue areas of East River Park for various social gatherings. Fields and courts are available for permitted games, and when unoccupied, may be used for informal (pick up) games. The East River Greenway runs north to south along the eastern side of the FDR Drive, and is utilized daily by joggers and cyclists for commuting and recreation. The Lower East Side Ecology Center utilizes a former Fireboat House near the Williamsburg Bridge for programming activities and has a composting center at the southern end of the park. East River Park also contains an amphitheater used for various events (e.g., City Parks Foundation SummerStage) near the bridge leading to Corlears Hook Park.

Corlears Hook Park was closed to the public following Hurricane Sandy due to tree damage within the park.

PROJECT AREA TWO

Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two also includes Asser Levy Playground and East 25th Street from the FDR Drive to First Avenue. The FDR Drive runs at grade in the southern portion of Project Area Two to just east of Avenue C, where it rises to run on a viaduct before declining back at-grade on East 25th Street. South of Avenue C and west of the FDR Drive is Murphy Brothers Playground.

Neighborhoods in or adjacent to Project Area Two include the East Village, Stuyvesant Town, Peter Cooper Village, Gramercy Park, and Kips Bay neighborhoods. At the southernmost point of Project Area Two, the Captain Patrick J. Brown Walk runs for 0.5 miles, serving as a combined walkway and bikeway. The walkway is adjacent to the Consolidated Edison Head House, which is located east of the walkway on the East River's edge. The Consolidated Edison Head House is used for fuel and oil deliveries for the Con Edison East River Generating Facility located on the west side of the FDR Drive between East 13th Street and approximately East 17th Street. At this location, the combined bikeway and walkway narrow, with the FDR Drive barrier wall on the west, and fencing belonging to the Consolidated Edison Head House on the east. The Captain Patrick J. Brown Walk provides expansive river views that include the Queens waterfront, Roosevelt Island and the Ed Koch Queensboro Bridge, and Midtown Manhattan. At the northern end of the Captain Patrick J. Brown Walk, the walkway/bikeway continues into Stuyvesant Cove Park, under the jurisdiction of the New York City Department of Small Business Services (SBS).

Stuyvesant Cove Park is a small and narrow waterfront park located on the east side of the elevated FDR Drive between East 20th and East 23rd Streets. Pedestrian ingress and egress locations to the park are via crosswalks at East 20th and East 23rd Streets across Avenue C and underneath the elevated FDR Drive. The park contains a waterfront esplanade and a landscaped interior section with soft-surfaced paths, benches and fixed tables, vegetation, and pergolas adjacent to the East River Bikeway that runs along the western side of the park. The northern end of the park consists of a large, paved area with a small building used for performances and educational programs. North of Stuyvesant Cove Park, a gas station is located at the waterfront, and a landscaped Greenstreets median is located on the west side of the FDR Drive at East 23rd Street. At the foot of East 23rd Street and adjacent to Project Area Two is the Marine and Aviation Building, which contains a parking garage, a landing base for seaplanes, and berthing spots for pleasure boats. North of East 23rd Street between East 23rd and East 25th Streets is the Asser Levy Playground. Between the FDR Drive and First Avenue, East 25th Street is lined on the north by Hunter College and City University of New York (CUNY) buildings and on the south by the Veterans Affairs New York Harbor Health Care Center (VA Medical Center).

Project Area One and Project Area Two contain a total of four known architectural historic resources that have been determined eligible for listing on the State and National Registers of Historic Places (S/NR): the FDR Drive, Williamsburg Bridge, and the Former Marine Engine Co. 66 Fireboat House. With the exception of the FDR Drive, which runs through both Project Area One and Project Area Two, these resources are all located in Project Area One.

STUDY AREA

The study area, which extends inland from Project Area One and Project Area Two, includes portions of Manhattan Community Districts 3 and 6. The Lower East Side, East Village, and

Alphabet City neighborhoods, which are located within the study area, are located in Manhattan Community District 3; the Stuyvesant Town, Peter Cooper Village, Gramercy Park, and Kips Bay neighborhoods, also within the study area, are located in Manhattan Community District 6.

According to the U.S. Census Bureau, the study area had a population of 161,342 residents and contained 77,552 households in 2010. Between 2000 and 2010, the growth rate of both population and number of households was lower for the study area as compared with Manhattan. According to 2012–2016 American Community Survey (ACS) data, the median household income for the study area was $62,326, which was lower than the median household income in Manhattan of $76,792. Between 1999 and 2012–2016, the median household income in the study area decreased by 1.4 percent, which contrasts with Manhattan (7.9 percent increase), although the change is smaller than the decrease for New York City as whole during that period (-3.1 percent). The study area includes predominantly multifamily mid-rise buildings and tower-in-the-park developments. In 2010, there were approximately 81,929 housing units in the socioeconomic study area, of which approximately 15.5 percent were in NYCHA developments[1] and 10.0 percent were in privately owned subsidized rental developments. The percentage of renters in the study area's residential units was 79.9 percent in 2012–2016, compared with 66.8 percent and 61.9 percent in Manhattan and New York City, respectively.

Lower East Side

A portion of the Lower East Side neighborhood is in the southern section of the study area between East Houston Street to the north, and Clinton, Norfolk, Essex, and Pike Streets between East 3rd Street and South Street to the west. This neighborhood is predominantly residential and is characterized by higher-density residential and multifamily buildings. Higher density buildings in the Lower East Side include public housing complexes such as NYCHA's Baruch Houses, Vladeck Houses I and II, LaGuardia Houses, Rutgers Houses, as well as several smaller NYCHA developments. Privately owned housing complexes include the East River Housing Cooperative Village, and the Gouverneur Gardens Housing Cooperative complex. The neighborhood's largest commercial concentrations are located along Grand Street from Pitt Street to Madison Street, and along Clinton Street between East Broadway and Henry Street. Many of the stores are in mixed-use residential buildings that consist of commercial uses on the ground floor, and residential uses above, which include eating and drinking establishments, grocery stores, hair/nail salons, delis, laundromats, bike shops, and banks.

Major eastbound-westbound roadways in the Lower East Side that provide direct access into and out of the neighborhood are Montgomery Street, Grand Street, Delancey Street and East Houston Street. Major northbound-southbound roadways that run through the neighborhood include South Street, Montgomery Street (which turns into Pitt Street north of Grand Street), and the FDR Drive. The Williamsburg Bridge, which is a steel suspension bridge that traverses East River Park at Delancey Street and spans the East River, connects Delancey Street on the Lower East Side of Manhattan to Marcy Avenue in Williamsburg, Brooklyn. In many parts of the Lower East Side, including Montgomery Street, South Street, Gouverneur Slips East and West, and the linear parks of the Vladeck Houses, views toward the waterfront are limited by the FDR Drive and the pier shed structure on Pier 42, although the Pier 42 shed is being demolished as part of the redevelopment of Pier 42 as an open space. Views of the waterfront are found in the Lower East

[1] NYCHA website (www.nyc.gov/nycha; accessed September 2015).

Side around Corlears Hook Park and on Grand Street, as this area is slightly elevated compared to the FDR Drive and the waterfront.

Throughout the Lower East Side, there are public facilities and institutions, religious facilities, open spaces, parking, and commercial and office space. Located between East Houston Street and Stanton Street, Hamilton Fish Park provides the Lower East Side community with active recreation amenities that include fitness equipment, basketball courts, handball courts, outdoor pools, playgrounds, and spray showers, as well as educational programming. Corlears Hook Park, which is located at the intersection of Jackson and Cherry Streets along the FDR Drive, provides expansive views and active recreation park amenities that include baseball fields, playgrounds, a dog park, and spray showers. The largest open space resource in the Lower East Side is East River Park, which is located east of the FDR Drive and outside of residential areas in the Lower East Side. East River Park provides the neighborhood with a variety of active and passive recreation park amenities and is accessible to the Lower East Side community via the Corlears Hook bridge, Delancey Street bridge, and the Houston Street overpass.

East Village and Alphabet City

Located in the center of the study area north of East Houston Street is the East Village neighborhood. The Alphabet City neighborhood is located within the East Village, and is identifiable by its streets, which are the only ones in Manhattan with single letter names. The East Village and Alphabet City neighborhoods are largely residential. Except for a few large developments (e.g., NYCHA Lillian Ward Houses and Jacob Riis Houses), residential buildings in these two neighborhoods are typically four to six stories. The East Village and Alphabet City also contain a variety of commercial establishments, many of which are located on the ground floor of residential buildings. These businesses are largely concentrated along Avenue C and Avenue D, and include delis, grocery stores, restaurants, pharmacies, laundromats, and hair/nail salons.

Waterfront views are varied in the East Village and Alphabet City. There are limited view corridors from within the Lillian Wald Houses in the southeast portion of the East Village, but more expansive views of East River Park and Brooklyn available at East 6th Street and East 10th Street. Major eastbound-westbound roadways in the East Village and Alphabet City that provide direct access to and from Project Area One and Project Area Two include East Houston Street, East 10th Street and East 14th Street. Major northbound-southbound roadways that run through the neighborhood include First Avenue, Avenue C, and the FDR Drive.

Open spaces within the East Village and Alphabet City neighborhoods consist of a number of community gardens managed by neighborhood residents, and three NYC Parks-managed parks, including Tompkins Square Park. Located approximately three blocks west of the northern portion of East River Park, Tompkins Square Park provides programming opportunities, passive recreation spaces, and active recreation spaces that include basketball courts, a dog park, handball courts, playgrounds, fitness equipment, outdoor pools, and spray showers. Similar to the Lower East Side, the East Village and Alphabet City neighborhoods are separated from East River Park by the FDR Drive. East Village and Alphabet City residents can access the park via the Houston Street overpass, the East 6th Street bridge, and the East 10th Street bridge.

Stuyvesant Town and Peter Cooper Village

Stuyvesant Town and Peter Cooper Village are large private residential developments located from First Avenue to Avenue C, and East 14th to 23rd Streets. The Stuyvesant Town–Peter Cooper Village neighborhood is characterized by residential housing, with playgrounds and lawns that are

interspersed throughout, and a few street-level commercial uses. The majority of commercial establishments are located along First Avenue, where delis, restaurants, laundromats, hair/nail salons, banks, clothing stores, and grocery stores cater to Stuyvesant Town and Peter Cooper Village residents. The neighborhood is adjacent to Stuyvesant Cove Park, which is accessible via crosswalks at East 20th and East 23rd Streets across Avenue C and underneath the elevated FDR Drive.

At this end of the study area, wide view corridors along East 20th and East 23rd Streets provide views of Stuyvesant Cove Park and Brooklyn. However, views are partially obscured by the elevated FDR Drive, and the East River is not visible. Major eastbound-westbound roadways in the East Village and Alphabet City neighborhoods providing direct access to and from Project Area Two include East 14th Street, East 20th Street, and East 23rd Street. Major northbound-southbound roadways that run through the neighborhood include First Avenue, Avenue C, and the FDR Drive.

Gramercy Park

A portion of the Gramercy Park neighborhood, between First and Third Avenues and East 14th and East 23rd Streets, is located within the study area. Gramercy Park is defined as the neighborhood surrounding Gramercy Park, which is a small, private park bordered by East 21st Street, East 20th Street, and Gramercy Park East and West (and between Third Avenue and Park Avenue). The neighborhood is bound by Stuyvesant Town-Peter Cooper Village to the east, the Flatiron District to the west, Union Square to the southwest, Stuyvesant Square to the south, Rose Hill to the northwest, and Kips Bay to the northeast. Gramercy Park is primarily a residential neighborhood, consisting of mixed residential and commercial buildings, one- and two-family buildings, and multifamily elevator/walk-ups. Commercial establishments within the neighborhood are concentrated along First Avenue and Second Avenue, and the Beth Israel Medical Center constitutes a major public facility and institutional use within this neighborhood. Open spaces within this neighborhood include Augustus St. Gaudens Playground and Peter's Field. Major eastbound-westbound roadways in the Gramercy Park neighborhood that provide direct access to and from Project Area One and Project Area Two include East 14th Street, East 20th Street, and East 23rd Street. Major northbound-southbound roadways that run through the neighborhood include First Avenue and Second Avenue.

Kips Bay

A portion of the Kips Bay neighborhood, located between East 23rd Street and East 34th Street, is located within the study area. Part of Manhattan Community Board 6, Kips Bay is bordered on the north by Murray Hill; on the west by Madison Square; on the south by the Gramercy Park neighborhood and the Peter Cooper Village apartment complex; and on the east by the East River. The portion of the Kips Bay neighborhood located in the study area is primarily characterized by the VA Medical Center, and Asser Levy Playground, which is located along the FDR Drive between East 23rd Street and East 25th Street. Asser Levy Playground provides year-round programming, and a variety of active recreational park amenities that consist of basketball courts, football fields, indoor and outdoor pools, playgrounds, fitness equipment, a recreation center, and a running track.

F. ENVIRONMENTAL EFFECTS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. As described in **Appendix A1**, there are a number of projects planned or currently under consideration in the project area, including the Pier 42 project and the Solar One Environmental Education Center project (No Action projects).

At the southern end of Project Area One, NYC Parks plans to reconstruct Pier 42 by converting a former industrial maritime site on the East River into new waterfront open space. Phase 1 of the project, which is anticipated to be complete by 2020, would include demolition of a pier shed and replacement of the existing upland parking area with a new public park, introducing approximately 2.93 acres of new passive open space to the study area. This landscaped open space would feature an entry garden in the western section of the open space, a grassy knoll, solar powered safety lighting, and access from the shared use path along the FDR Drive service road or Montgomery Street. The Pier 42 project would enhance the pedestrian experience by activating the site with new, public uses, and reestablishing public access to the waterfront at this location. Additional planned projects in Project Area One include the Lower East Side Ecology Center compost facility and renovation of the Fireboat House.

To help prevent damage due to flooding, NYCHA has proposed site-specific resiliency measures at its Bernard Baruch, Lillian Wald, Campos Plaza II, and Jacob Riis and Jacob Riis II Houses, which are located within the Lower East Side and East Village neighborhoods. At the Bernard Baruch Houses, NYCHA proposes to install a floodwall along the west side of Baruch Drive, individually floodproof the buildings east of Baruch Drive, construct an electrical annex to each building east of Baruch Drive, and construct a new boiler plant in the center of the housing complex. At the Lillian Wald and Jacob Riis and Jacob Riis II Houses, NYCHA proposes to floodproof each building and construct an electrical annex to each building. At Campos Plaza II, NYCHA proposes to floodproof the building and install stand-by generators. Site restoration would also be undertaken at each housing complex.

Improvements to open spaces are proposed at P.S. 184 Shuang Wen School, located at Cherry Street and Montgomery Street, and P.S. 2 Meyer London, located at Madison Street and Pike Street. These improvements would include installation of a mini soccer field and new playgrounds as well as green infrastructure to absorb stormwater runoff and reduce heat island impacts. Playground and green infrastructure improvements at these sites would be administered through The Trust for Public Lands and the NYC Department of Environmental Protection (NYCDEP) with funding from the Housing and Urban Development's Natural Disaster Resilience Grant. Installation of the mini soccer field would be funded through a public-private partnership between the Mayor's Fund to Advance NYC, the U.S. Soccer Foundation, the New York City Football Club, Etihad Airways, and adidas as part of the New York City Soccer Initiative.

In Project Area Two, which includes the East Village, Stuyvesant Town, Peter Cooper Village, Stuyvesant Square, Gramercy Park, and Kips Bay neighborhoods, one of the planned projects is the development of the new Solar One facility in Stuyvesant Cove Park. Located at the northern end of Stuyvesant Cove Park, the Solar One Environmental Education Center is proposed to be rebuilt.

Collectively, these planned projects to enhance open space resources, provide targeted neighborhood resiliency measures, and improve access to parkland and other parts of the City are consistent with the current neighborhood uses, and are not expected to create any substantial change in neighborhood character. However, the neighborhoods within the study area would continue to be susceptible to coastal flooding during storm events, and the potential for adverse socioeconomic effects within these neighborhoods due to a storm surge would remain.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection in East River Park into the park, thereby protecting both the community and the park from design storm events, as well as protecting the Park from increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park and limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

With the addition of the resiliency features included in Preferred Alternative, open space within Project Area One would be improved beyond the enhancements included in Alternatives 2 and Alternative 3. The proposed resiliency features would allow for use of East River Park to resume more quickly following a storm event, which would benefit residents of neighborhoods within the study area that frequent the park.

The open space enhancements within Stuyvesant Cove Park are not anticipated to affect the Solar One Environmental Education Center. The shared use pedestrian bridge proposed between the northern portion of East River Park and Captain Patrick J. Brown Walk would improve connectivity and improve its use as a space for passive and active recreation. Flood protection measures proposed under the Preferred Alternative involve changes to park elements and minor changes to streets where floodgates are proposed. These changes would be located east of the FDR Drive and outside of residential areas and would not be expected to alter or disrupt elements within the surrounding neighborhoods themselves. Open spaces within Project Area One and Project Area Two, including East River Park, would remain as key resources for the surrounding communities.

Since the proposed flood protection system may result in some modifications of the existing street widths and directions, sidewalks, and crosswalks, a detailed traffic and pedestrian analysis of potential effects was conducted at those affected locations. The analysis concludes that significant adverse transportation effects are not anticipated with the Preferred Alternative. Additionally, the Preferred Alternative would be consistent with existing and planned land use, zoning, and public policies applicable to the study area.

Similarly, it is not expected that the flood protection features associated with the Preferred Alternative would have adverse urban design effects in the study area. Under this alternative, the majority of East River Park would be raised and some existing features in East River Park would be reconfigured and replaced, such as the amphitheater, a picnic area, soccer field, basketball courts at Delancey Street, the water play area at Grand Street, tennis courts north of the Williamsburg Bridge, and the existing grill and picnic area at the northern end of the park.

However, the reconstructed park, including replacement of these key active and passive recreation components and an improved, integrated park landscape would ensure that these changes do not result in adverse urban design effects to East River Park. In addition, the completely reconstructed bridges at Corlears Hook, Delancey, and East 10th Streets would provide improved park access. Additionally, adverse effects due to tree removal throughout the East River Park and Stuyvesant Cove Park would be lessened by new tree plantings included in the landscape plan for this alternative. Although the proposed floodwalls and closure structures would constitute new urban design features, they would largely be strategically located in areas where there are existing fences and walls, and where the FDR Drive is elevated on a viaduct.

The construction of floodwalls and closure structures would directly affect the FDR Drive, which is identified as an S/NR-eligible historic resource. However, these alterations are not expected to adversely affect the historical integrity of the FDR Drive, which has been continually modified over time, or result in a change in scale, visual prominence, or visual context to the structure.

Potential environmental effects related to noise are anticipated during the construction period; however, long-term operation of the proposed project both during storm and non-storm conditions would have no effect on noise and therefore would not change the long-term character of the neighborhood.

As described in Chapter 5.2, "Socioeconomic Conditions," while the flood protection and open space enhancements provided by the Preferred Alternative could result in increases in market-rate residential and commercial rents within the study area, potential increases in property value attributable to this alternative are not expected to cause significant residential or commercial displacement pressures within the study area. A significant portion of housing units in the study area and within the flood zone are forms of rent-protected housing and would be protected from local market forces. This rent-protected housing includes NYCHA housing developments, and some units within Peter Cooper Village and Stuyvesant Town, as well as affordable residential units in privately owned subsidized developments. For housing in the study area and within the flood zone that is not rent-protected, recent market trends show this housing to already be well above rents affordable to low- and moderate-income households. Rents for this housing are increasing at a higher rate compared to all of Manhattan, and this trend is expected to continue with or without the Preferred Alternative.

Since the Preferred Alternative would not introduce a wholly new use that would have the potential to fundamentally alter real estate values, no adverse effects to socioeconomic conditions are expected in study area neighborhoods due to this alternative. As a result of the flood protection provided by the Preferred Alternative, businesses located in the study area may experience enhanced property values. This effect would be limited to businesses located within the flood zone and would not have the potential for significant effects to neighborhood businesses throughout the study area. As discussed in Chapter 5.2, "Socioeconomic Conditions," of this DEIS, most commercial uses within the study area are located outside of or on the outskirts of the protected area. Also, there is an existing trend toward market-rate commercial development in the study area. Therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the protected area and would not have the potential for significant effects throughout the overall study area. Even in a future without flood protection scenario, potential flooding is not expected to dissuade the food service and retail establishments that compose the majority of neighborhood businesses within the flood zone from operating, given the infrequency of major storm events. Since businesses are expected to continue to locate in the study area regardless of flood protection, a scenario in which implementation of the Preferred

Alternative would attract the volume of new business necessary to substantively affect neighborhood character is not anticipated.

The Preferred Alternative would not be expected to alter or disrupt elements within the adjacent neighborhoods themselves. Thus, the flood protection measures, open space enhancements, and improved park resiliency measures proposed under the Preferred Alternative would not be expected to create any substantial change in neighborhood character.

OTHER ALTERNATIVE (ALTERNATIVE 2): BASELINE FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would not introduce any changes to land use, zoning, open space, socioeconomic conditions, historic and cultural resources, urban design and visual resources, and transportation that would result in effects to neighborhood character not described above for the Preferred Alternative. Alternative 2 would not be expected to alter or disrupt elements within the adjacent neighborhoods themselves. Open spaces within Project Area One and Project Area Two, including East River Park, would remain as key resources for the surrounding communities. Alternative 2 would not change the amount of open space in the study area, although it would affect some East River Park and Stuyvesant Cove Park features, and it would include only minimal provisions for open space improvements. This alternative would moderately enhance passive recreation and landscaped spaces within East River Park and Stuyvesant Cove Park.

Some features of this alternative would likely block existing views of the waterfront and East River potentially resulting in significant adverse view corridor effects at distinct locations. While potentially significantly adverse, these likely blocked views would not be expected to result in any adverse effects to neighborhood character. Additionally, construction would directly affect the FDR Drive, which is identified as an S/NR-eligible historic resource. However, these alterations are not expected to adversely affect the historical integrity of the FDR Drive, which has been continually modified over time, or result in a change in scale, visual prominence, or visual context to the structure.

Alternative 2 would introduce flood protection elements designed to integrate into the existing parkland and streets of Project Area One and Project Area Two, while modestly enhancing open space and access to open space for residents of neighborhoods within the study area. These flood protection measures and open space enhancements would be primarily located at the waterfront, separated from the edge of the surrounding neighborhoods by the FDR Drive, and would not result in disruption that would disconnect or alter the neighborhood fabric. Thus, Alternative 2 would not be expected to create any substantial change in neighborhood character.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 would not introduce any changes to land use, zoning, open space, socioeconomic conditions, historic and cultural resources, urban design and visual resources, and transportation that would result in effects to neighborhood character not described above for The Preferred Alternative. Alternative 3 would not be expected to alter or disrupt elements within the adjacent neighborhoods themselves. Open spaces within Project Area One and Project Area Two, including East River Park, would remain as key resources for the surrounding communities. Specifically, under Alternative 3, the total amount of open space in Project Area One and Project Area Two would remain the same, but passive recreation and landscaped spaces would be improved within East River Park and Stuyvesant Cove Park beyond what is proposed with Alternative 2. Some amenities within East River Park would be relocated or reconfigured to facilitate enhanced

neighborhood connections and operations and maintenance, and certain park features would be rebuilt and expanded, including the playground and picnic and barbecue areas near East 10th Street. Thus, the flood protection measures, open space enhancements, and improved park resiliency measures proposed under Alternative 3 would not be expected to create any substantial change in neighborhood character.

As with the Preferred Alternative, Alternative 3 would affect urban design features and existing waterfront views; however, these effects would not significantly alter the existing neighborhood character.

Alternative 3 would introduce flood protection elements designed to integrate into the existing parkland and streets within the project area and would provide enhancements to open space and access to open space for residents of neighborhoods within the study area. These flood protection measures and open space enhancements would be primarily located at the waterfront and along the edge of the surrounding neighborhoods and would not result in disruption that would disconnect or alter the neighborhood fabric. Thus, Alternative 3 would not be expected to create any substantial change in neighborhood character.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 would improve emergency access during storm events and allow for use of the roadway to resume more quickly following a storm event, lessening the storm-related effects to local infrastructure in neighborhoods within the study area. As described in Chapter 5.5, "Urban Design and Visual Resources," the floodwall along the east side of the raised portion of the FDR Drive would obscure some existing views to the East River from the FDR Drive between East 13th and East 18th Streets. However, there are no view corridors to the waterfront between East 13th and East 18th Streets, therefore, the elevated northbound FDR Drive and the flyover bridge would not block any views for residents within the study area. Otherwise, Alternative 5 would not introduce any changes to land use, zoning, open space, socioeconomic conditions, historic and cultural resources, urban design and visual resources, and transportation that would result in effects to neighborhood character not already described above for the Preferred Alternative. Alternative 5 would not be expected to alter or disrupt elements within the surrounding neighborhoods themselves, and open spaces within Project Area One and Project Area Two, including East River Park, would remain as key resources for the surrounding communities. Thus, the open space enhancements and flood protection measures proposed under Alternative 5 would not be expected create any substantial change in neighborhood character. ✷

A. INTRODUCTION

This environmental justice analysis assesses the potential for the proposed project to result in environmental and health effects on minority and low-income populations. As described in greater detail below, this analysis has been prepared to meet both federal requirements found at Executive Order 12898—*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and Executive Order 13045—*Protection of Children from Environmental Health Risks and Safety Risks*—and also the state requirements found at New York State Department of Environmental Conservation (NYSDEC) requirements found in Commissioner Policy 29 (CP-29).

B. PRINCIPAL CONCLUSIONS

Based on the environmental analyses performed for the proposed project, no minority or low-income communities or children would be disproportionately or adversely impacted for any of the analyzed alternatives. In addition, residents in the project area, including minority and low-income populations would benefit from the proposed coastal flood protection. Therefore, it is concluded that the proposed project would not result in adverse effects with respect to environmental justice.

C. REGULATORY CONTEXT

This environmental justice analysis of the proposed project follows the guidance and methodologies recommended in the federal CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (December 1997) as summarized below.

EXECUTIVE ORDER 12898: COUNCIL ON ENVIRONMENTAL QUALITY GUIDANCE

As stated above, Executive Order (EO) 12898—*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*—requires federal agencies to consider whether a proposed federal action may result in disproportionately adverse environmental or human health effects on low-income or minority populations. Since the proposed project requires federal approval from the U.S. Department of Housing and Urban Development (HUD) is subject to review under the National Environmental Policy Act (NEPA), this chapter considers the proposed project's potential to disproportionately impact minority and low-income populations in accordance with the guidance and methodologies outlined in the Council on Environmental Quality's (CEQ) Environmental Justice Guidance under NEPA (December 1997). In addition, EO 12898 requires federal agencies to work to ensure greater public participation by low-income and minority populations in the decision-making process. Public outreach and coordination with the proposed project has been ongoing since its inception

and is described in greater detail in Chapter 3.0, "Process, Coordination, and Public Participation," and in accordance with 24 CFR Parts 50 and 58 and EO 11988.

The CEQ, which has oversight of the federal government's implementation and compliance with EO 12898 and NEPA, developed its guidance to assist federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed.

The CEQ methodology involves collecting demographic information for the geographical area where the proposed project may cause significant adverse effects; identifying low-income and minority populations in that area using census data; and identifying whether the project's adverse effects are disproportionately high on the low-income or minority populations in comparison with those of other populations. Mitigation measures should be developed and implemented for any disproportionately high and adverse effects. Under NEPA, the potential for disproportionately high and adverse effects on minority and/or low-income populations should then be one of the factors the federal agency considers in making its finding on a project and issuing a Record of Decision.

EO 13045-PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

As outlined in Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks 62 Federal Register 19885, (April 21, 1997)—Federal agencies are directed, as appropriate and consistent with the agency's mission, to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The FAA is encouraged to identify and assess environmental health risks and safety risks that the agency has reason to believe could disproportionately affect children. Environmental health risks and safety risks include risks to health or to safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to.

NYSDEC COMMISSIONER POLICY 29 GUIDANCE

This environmental justice analysis must also comply with Commissioner Policy 29 (CP-29), "Environmental Justice and Permitting," which requires an environmental justice analysis to identify and address effects on minority and low-income communities. The analysis relies on the other technical analyses included in the Environmental Impact Statement (EIS) for a determination of effects, recognizing that the effects within minority or low-income populations may be different from effects on the general population.

Like the CEQ methodology, the methodology set forth in CP-29 involves the following steps: (1) identifying potential adverse environmental effects and the area to be affected (i.e., establishing a study area); (2) determining whether potential adverse environmental effects are likely to affect a potential environmental justice area (i.e., whether low-income and/or minority populations are present in the study area); and (3) identifying whether potential adverse environmental effects of the proposed action would disproportionately affect low-income and minority populations. In accordance with CP-29 guidance, the environmental justice analysis will also (4) identify the potential for cumulative environmental burdens in the study area; and (5) seek public participation from the affected community.

D. METHODOLOGY

The assessment of environmental justice for the proposed project is based on CEQ and CP-29 guidance, as described above. It involves four basic steps:

1. Identify the area where the proposed project may cause significant and adverse effects (i.e., the study area);
2. Compile race and ethnicity and poverty status data for the study area and identify minority or low-income communities;
3. Identify the proposed project's potential significant adverse effects on minority and low-income communities; and
4. Evaluate the proposed project's potential significant adverse effects on minority and low-income communities relative to its overall effects to determine whether any potential significant adverse effects on those communities would be disproportionate and, therefore, disproportionately high and adverse.

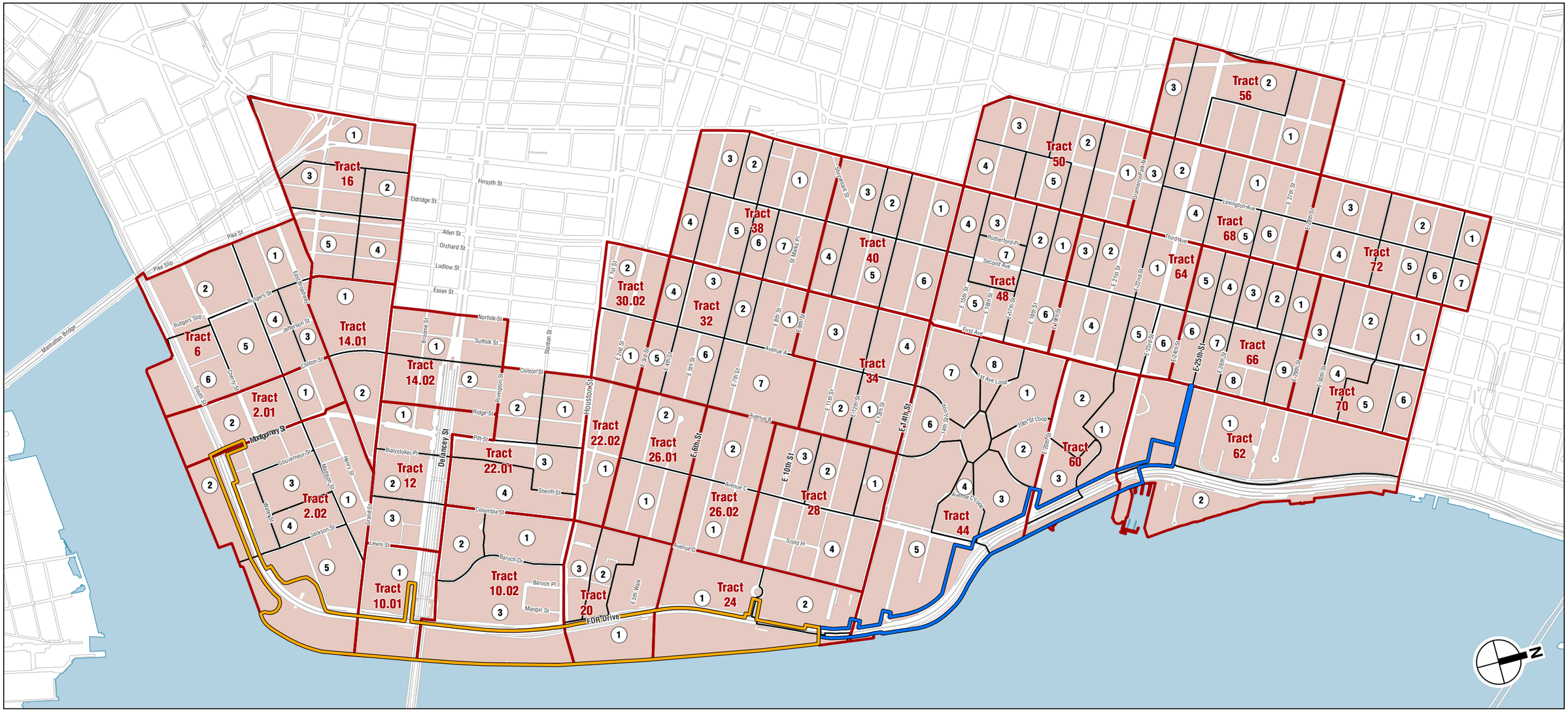
STUDY AREA

As illustrated in Figure 1.0-2, the proposed project encompasses two project areas. Together, the project areas begin at Montgomery Street to the south and extends north along the waterfront to East 25th Street and is composed of two sub-areas: Project Area One and Project Area Two. Project Area One extends from Montgomery Street on the south to the north end of John V. Lindsay East River Park (East River Park) at about East 13th Street. Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. The environmental justice study area encompasses any area potentially affected by the proposed project and, therefore, includes the combined extent of all study areas from all chapters within this EIS. The environmental justice study area covers 135 census block groups, the majority of which are located within a ½ mile from Project Areas One and Two (see **Figure 5.11-1**).

IDENTIFICATION OF MINORITY AND LOW-INCOME POPULATIONS

For this analysis, data on race, ethnicity, and poverty status was gathered from the *American Community Survey (ACS) 2012–2016 5-Year Estimates*. For comparison purposes, data were also compiled for the study area as a whole, for Manhattan, and for New York City. Based on census data and CEQ/CP-29 guidance (described above), potential environmental justice areas are identified as follows (see also **Table 5.11-1**):

- *Minority communities:* CEQ and CP-29 guidance defines minorities to include American Indians or Alaskan Natives, Asian and Pacific Islanders, African Americans or Black persons, and Hispanic persons. This environmental justice analysis also considers minority populations to include persons who identified themselves as being either "some other race" or "two or more races." CEQ guidance requires minority communities to be identified either where the minority population exceeds 50 percent, or where the minority population percentage is meaningfully greater than the minority population in the comparison areas. In Manhattan, the minority population is approximately 52.9 percent of the total population. According to CP-29 guidance, a "minority community" is present when 51.1 percent or more of the population is minority. This analysis conservatively considers any study area block group with a minority population of greater than 50.0 percent to be a minority community.



Project Area One

Project Area Two

Environmental Justice Study Area

10 *Census Tract Boundary*

(1) *Census Block Group Boundary*

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Environmental Justice Study Area

Figure 5.11-1

- *Low-income communities:* The percent of individuals living below the poverty level in each census block group is used to identify low-income communities. CEQ guidance does not specify a threshold to be used for identifying clusters of low-income populations. CP-29 defines a low-income community to be any area where the low-income population (i.e., percent living below the poverty threshold) is equal to or greater than 23.59 percent of the total. However, the *ACS 2012–2016 5-Year Estimates* reports a 17.62 percent Manhattan poverty rate. Therefore, this analysis conservatively considers any census block group with a low-income population percentage that is greater than in Manhattan (i.e., exceeds 17.62 percent) to be a low-income community.

Table 5.11-1
Study Area Race and Ethnicity and Poverty

Census Tract	Block Group	Total Population	Race and Ethnicity*										Total Minority (%)	Poverty Status)
			White	%	Black	%	Asian	%	Hispanic	%	Other	%		
2.01	1	1,052	374	35.6	9	0.9	664	63.1	5	0.5	0	0	64.4	59.41%
2.01	2	1,618	65	4.0	115	7.1	648	40.1	790	48.8	0	0	96.0	46.79%
2.02	1	534	59	11.1	24	4.5	296	55.4	155	29.0	0	0	88.9	12.92%
2.02	2	2,245	364	16.2	568	25.3	507	22.6	781	34.8	25	1.1	83.8	28.02%
2.02	3	1,547	16	1.0	144	9.3	313	20.2	903	58.4	171	11.1	99.0	39.88%
2.02	4	1,888	29	1.5	458	24.3	278	14.7	1,123	59.5	0	0	98.5	9.59%
2.02	5	1,802	673	37.4	17	0.9	661	36.7	272	15.1	179	9.9	62.6	10.27%
6	1	1,650	109	6.6	98	5.9	1,443	87.5	0	0	0	0	93.4	35.88%
6	2	2,962	25	0.8	331	11.2	1,273	43.0	1,263	42.6	70	2.4	99.2	29.17%
6	3	646	54	8.4	0	0	547	84.7	0	0	45	7.0	91.6	33.90%
6	4	608	112	18.4	50	8.2	330	54.3	116	19.1	0	0	81.6	68.60%
6	5	2,807	0	0	413	14.7	1,086	38.7	1,294	46.1	14	0.5	100.0	62.45%
6	6	2,092	172	8.2	26	1.2	1,194	57.1	623	29.8	77	3.7	91.8	20.75%
10.01	1	1,485	996	67.1	23	1.6	98	6.6	338	22.8	30	2.0	32.9	5.72%
10.02	1	1,861	120	6.5	430	23.1	35	1.9	1,276	68.6	0	0	93.5	42.56%
10.02	2	1,443	12	0.8	130	9.0	412	28.6	889	61.6	0	0	99.2	30.42%
10.02	3	2,605	89	3.4	420	16.1	262	10.1	1,790	68.7	44	1.7	96.6	34.31%
12	1	1,819	263	14.5	29	1.6	575	31.6	925	50.9	27	1.5	85.5	31.69%
12	2	772	668	86.5	37	4.8	53	6.9	14	1.8	0	0	13.5	22.67%
12	3	1,135	796	70.1	10	0.9	145	12.8	119	10.5	65	5.7	29.9	0.00%
14.01	1	1,630	1,046	64.2	0	0	229	14.1	270	16.6	85	5.2	35.8	7.24%
14.01	2	1,569	1,056	67.3	20	1.3	316	20.1	165	10.5	12	0.8	32.7	8.78%
14.02	1	1,556	647	41.6	13	0.8	528	33.9	256	16.5	112	7.2	58.4	27.25%
14.02	2	1,346	342	25.4	113	8.4	329	24.4	456	33.9	106	7.9	74.6	31.20%
16	1	2.596	66	2.5	0	0	2,404	92.6	74	2.9	52	2.0	97.5	37.48%
16	2	871	114	13.1	44	5.1	520	59.7	193	22.2	0	0	86.9	18.83%
16	3	1,348	73	5.4	0	0	1,203	89.2	57	4.2	15	1.1	94.6	49.78%
16	4	1,392	446	32.0	25	1.8	863	62.0	20	1.4	38	0	68.0	37.93%
16	5	1,012	302	29.8	17	1.7	528	52.2	149	14.7	16	1.6	70.2	6.94%
20	1	2,255	0	0	238	10.6	545	24.2	1,472	65.3	0	0	100.0	55.52%
20	2	1,664	77	4.6	452	27.2	191	11.5	944	56.7	0	0	95.4	47.12%
20	3	801	10	1.3	179	22.4	101	12.6	511	63.8	0	0	98.7	18.10%
22.01	1	1,702	371	21.8	170	10.0	311	18.3	799	46.9	51	3.0	78.2	52.06%
22.01	2	945	348	36.8	160	16.9	197	20.9	156	16.5	84	8.9	63.2	19.78%
22.01	3	1,346	8	0.6	457	34.0	199	14.8	682	50.7	0	0	99.4	49.33%
22.01	4	2,553	242	9.5	334	13.1	817	32.0	1,160	45.4	0	0	90.5	6.50%
22.02	1	1,937	1,054	54.4	101	5.2	303	15.6	412	21.3	67	3.5	45.6	17.60%
24	1	3,742	628	16.8	397	10.6	321	8.6	1,844	49.3	552	14.8	83.2	49.01%
24	2	1,384	0	0	338	24.4	142	10.3	886	64.0	18	1.3	100.0	35.98%
26.01	1	2,025	669	33.0	169	8.4	275	13.6	842	41.6	70	3.5	67.0	23.95%
26.01	2	2,114	388	18.4	254	12.0	285	13.5	1,145	54.2	42	2.0	81.6	25.26%
26.02	1	1,590	694	43.7	32	2.0	290	18.2	455	28.6	119	7.5	56.3	13.08%
26.02	2	2,699	1,538	57.0	128	4.7	536	19.9	272	10.1	225	8.3	43.0	16.39%
28	1	1,240	197	15.9	249	20.1	89	7.2	688	55.5	17	1.4	84.1	23.47%

Table 5.11-1 (cont'd)
Study Area Race and Ethnicity and Poverty

Census Tract	Block Group	Total Population	Race and Ethnicity*										Total Minority (%)	Poverty Status (%)
			White	%	Black	%	Asian	%	Hispanic	%	Other	%		
28	2	1,338	447	33.4	76	5.7	357	26.7	458	34.2	0	0	66.6	24.85%
28	3	2,248	728	32.4	298	13.3	61	2.7	1,161	51.7	0	0	67.6	37.59%
28	4	2,534	510	20.1	497	19.6	349	13.8	1,095	43.2	83	3.3	79.9	28.26%
30.02	1	1,739	985	56.6	170	9.8	201	11.6	344	19.8	39	2.3	43.4	10.64%
30.02	2	1,109	480	43.3	82	7.4	241	21.7	290	26.2	16	1.4	56.7	33.18%
32	1	1,738	1,517	87.3	52	3.0	119	6.9	12	0.7	38	2.2	12.7	8.11%
32	2	619	481	77.7	0	0	83	13.4	55	8.9	0	0	22.3	3.23%
32	3	1,412	861	61.0	25	1.8	344	24.4	182	12.9	0	0	39.0	12.54%
32	4	713	682	95.7	0	0	31	4.4	0	0	0	0	4.3	11.64%
32	5	579	438	75.7	0	0	140	24.2	1	0.2	0	0	24.3	8.46%
32	6	2,121	1,575	74.3	52	2.5	360	17.0	92	4.3	42	1.9	25.7	23.84%
32	7	738	470	63.7	111	15.0	64	8.7	93	12.6	0	0	36.3	19.78%
34	1	1,796	1,114	62.0	0	0	541	30.1	125	7.0	16	0.9	38.0	31.57%
34	2	1,444	1,053	72.9	0	0	152	10.5	239	16.6	0	0	27.1	25.55%
34	3	1,494	882	59.0	119	8.0	108	7.2	334	22.4	51	3.4	41.0	24.83%
34	4	1,488	908	61.0	25	1.7	143	9.6	384	25.8	28	1.9	39.0	19.35%
38	1	1,643	1,360	82.8	17	1.0	197	12.0	64	3.9	5	0.3	17.2	22.40%
38	2	667	415	62.2	0	0	114	17.1	138	20.7	0	0	37.8	0.00%
38	3	1,580	249	15.8	138	8.7	439	27.8	754	47.7	0	0	84.2	18.22%
38	4	1,123	978	87.1	116	10.3	0	0	29	2.6	0	0	12.9	1.16%
38	5	1,313	1,098	83.6	0	0	91	6.9	51	3.9	73	5.6	16.4	10.13%
38	6	715	524	73.3	44	6.2	29	4.1	84	11.8	34	4.8	26.7	19.20%
38	7	1,388	1,100	79.3	51	3.7	186	13.4	18	1.3	33	2.4	20.7	20.04%
40	1	2,687	2,012	74.9	289	10.8	141	5.3	192	7.2	53	2.0	25.1	7.37%
40	2	1,538	1,179	76.7	56	3.6	208	13.5	87	5.7	8	0.5	23.3	23.54%
40	3	1,251	848	67.8	68	5.4	114	9.1	133	10.6	88	7.0	32.2	8.80%
40	4	589	452	76.7	0	0	137	23.3	0	0	0	0	23.3	23.26%
40	5	1,768	1,143	64.7	37	2.1	250	14.1	161	9.1	177	10.1	35.3	9.45%
40	6	1,596	1,115	69.9	100	6.3	276	17.3	91	5.7	14	0.9	30.1	12.29%
44	1	2,759	2,199	79.7	262	9.5	64	2.3	234	8.5	0	0	20.3	13.81%
44	2	794	628	79.1	0	0	103	13.0	63	7.9	0	0	20.9	9.70%
44	3	2,424	1,533	63.2	41	1.7	274	11.3	533	22.0	43	1.8	36.8	4.62%
44	4	1,235	885	71.7	0	0	282	22.8	68	5.5	0	0	28.3	12.63%
44	5	3,440	2,216	64.4	201	5.8	423	12.3	256	7.4	344	10.0	35.6	3.49%
44	6	743	611	82.2	0	0	69	9.3	63	8.5	0	0	17.8	10.77%
44	7	2,378	1,931	81.2	0	0	372	15.6	75	3.2	0	0	18.8	24.26%
44	8	2,266	1,818	80.2	94	4.2	115	5.1	83	3.7	156	6.9	19.8	7.28%
48	1	1,190	1,001	84.1	0	0	189	15.9	0	0	0	0	15.9	2.18%
48	2	999	813	81.4	0	0	59	5.9	115	11.5	12	1.2	18.6	1.50%
48	3	430	367	85.4	28	6.5	18	4.2	17	4.0	0	0	14.6	10.47%
48	4	1,480	1,012	68.4	99	6.7	275	18.6	85	5.7	9	0.6	31.6	15.35%
48	5	1,796	725	40.4	132	7.4	523	29.1	256	14.3	160	8.9	59.6	14.72%
48	6	1,252	840	67.1	63	5.0	217	17.3	90	7.2	42	3.4	32.9	9.95%
48	7	0	-	-	-	-	-	-	-	-	-	-	-	-
50	1	883	797	90.3	0	0	58	6.6	28	3.2	0	0	9.7	3.65%
50	2	719	673	93.6	0	0	46	6.4	0	0	0	0	6.4	6.26%
50	3	957	482	50.4	0	0	401	41.9	54	5.6	20	2.1	49.6	9.30%
50	4	954	788	82.6	0	0	109	11.4	57	6.0	0	0	17.4	16.46%
50	5	1,661	1,377	82.9	0	0	100	6.0	170	10.2	14	0.8	17.1	6.68%
56	1	1,446	814	56.3	178	12.3	243	16.8	179	12.4	32	2.2	43.7	26.34%
56	2	814	647	79.5	0	0	136	16.7	31	3.8	0	0	20.5	8.48%
56	3	723	532	73.6	0	0	167	23.1	24	3.3	0	0	26.4	12.86%
60	1	2,059	1,604	77.9	28	1.4	339	16.5	71	3.5	17	0.8	22.1	14.86%
60	2	1,888	1,411	74.7	72	3.8	233	12.3	153	8.1	19	1.0	25.3	10.49%
60	3	1,476	1,038	70.3	30	2.0	182	12.3	179	12.1	47	3.2	29.7	7.93%
62	1	2,252	916	40.7	564	25.0	362	16.1	366	16.3	44	2.0	59.3	54.10%
62	2	2,165	1,062	49.1	195	9.0	511	23.6	265	12.2	132	6.1	50.9	17.09%
64	1	1,911	1,365	71.4	41	2.2	404	21.1	32	1.7	69	3.6	28.6	9.71%

Table 5.11-1 (cont'd)
Study Area Race and Ethnicity and Poverty

Census Tract	Block Group	Total Population	Race and Ethnicity*										Total Minority (%)	Poverty Status (%)
			White	%	Black	%	Asian	%	Hispanic	%	Other	%		
64	2	1,249	953	76.3	35	2.8	168	13.5	57	4.6	36	2.9	23.7	7.93%
64	3	686	686	100.0	0	0	0	0	0	0	0	0	0	0.00%
64	4	1,417	1,136	80.2	0	0	121	8.5	87	6.1	73	5.2	19.8	9.53%
64	5	1,597	910	57.0	131	8.2	252	15.8	160	10.0	144	9.0	43.0	2.22%
64	6	1,069	514	48.1	89	8.3	75	7.0	129	12.1	262	24.5	51.9	11.41%
66	1	1,200	1,022	85.2	0	0	178	14.8	0	0	0	0	14.8	0.00%
66	2	2,021	546	27.0	0	0	201	10.0	1,238	61.3	36	1.8	73.0	9.80%
66	3	870	770	88.5	0	0	46	5.3	54	6.2	0	0	11.5	18.51%
66	4	1,300	943	72.5	97	7.5	46	3.5	174	13.4	40	3.1	27.5	0.00%
66	5	2,652	1,546	58.3	0	0	187	7.1	919	34.7	0	0	41.7	0.00%
66	6	968	687	71.0	9	0.9	47	4.9	193	19.9	32	3.3	29.0	5.40%
66	7	682	5	0.7	59	8.7	107	15.7	510	74.8	1	0.2	99.3	74.29%
66	8	564	290	51.4	45	8.0	1	0.2	106	18.8	122	21.6	48.6	46.63%
66	9	1,289	476	36.9	56	4.3	601	46.6	156	12.1	0	0	63.1	35.63%
68	1	595	390	65.6	87	14.6	118	19.8	0	0	0	0	34.4	15.29%
68	2	809	557	68.9	38	4.7	176	21.8	38	4.7	0	0	31.1	21.01%
68	3	1,075	912	84.8	89	8.3	28	2.6	46	4.3	0	0	15.2	5.12%
68	4	2,061	1,376	66.8	181	8.8	247	12.0	243	11.8	14	0.6	33.2	9.68%
68	5	1,354	702	51.9	45	3.3	224	16.5	383	28.3	0	0	48.1	3.32%
68	6	1,742	1,428	82.0	40	2.3	194	11.1	44	2.5	36	2.1	18.0	6.95%
70	1	2,159	1,074	49.8	287	13.3	614	28.4	83	3.8	101	4.7	50.2	4.72%
70	2	822	679	82.6	0	0	47	5.7	96	11.7	0	0	17.4	0.00%
70	3	1,608	1,086	67.5	0	0	323	20.1	44	2.7	155	09.6	32.5	14.12%
70	4	740	476	64.3	39	5.3	146	19.7	46	6.2	33	4.5	35.7	0.00%
70	5	1,771	1,138	64.3	6	0.3	540	30.5	31	1.8	56	3.2	35.7	17.55%
70	6	1,297	899	69.3	21	1.6	377	29.1	0	0	0	0	30.7	15.88%
72	1	824	584	70.9	0	0	119	14.4	0	0	121	14.7	29.1	3.03%
72	2	1,142	503	44.1	0	0	522	45.7	30	2.6	87	7.6	55.9	33.63%
72	3	1,054	930	88.2	0	0	32	3.0	92	8.7	0	0	11.8	0.00%
72	4	1,122	680	60.6	10	0.9	432	38.5	0	0	0	0	39.4	21.66%
72	5	1,724	1,060	61.5	0	0	608	35.3	0	0	56	3.3	38.5	5.97%
72	6	340	259	76.2	0	0	23	6.8	29	8.5	29	8.5	23.8	8.53%
72	7	796	619	77.8	5	0.6	118	14.8	50	6.3	4	0.5	22.2	5.37%
Study Area		198,549	96,837	48.8	13,042	6.6	41,010	20.7	41,836	21.1	5,824	2.9	51.2	20.26%
Manhattan		1,634,989	769,598	47.1	206,008	12.6	190,648	11.7	423,526	25.9	45,209	2.7	52.9	17.62%
New York City		8,461,961	2,729,973	32.3	1,879,364	22.2	1,150,513	13.6	2,457,945	29.1	244,166	2.9	67.7	20.30%

Notes:
Purple shading indicates low-income community. Orange shading indicates minority community. Green Shading indicates both minority and low-income communities
* The racial and ethnic categories provided are further defined as: White (White alone, not Hispanic or Latino); Black (Black or African American alone, not Hispanic or Latino); Asian (Asian alone, not Hispanic or Latino); Other (American Indian and Alaska Native alone, not Hispanic or Latino; Native Hawaiian and Other Pacific Islander alone, not Hispanic or Latino; Some other race alone, not Hispanic or Latino; Two or more races, not Hispanic or Latino); Hispanic (Hispanic or Latino; Persons of Hispanic origin may be of any race).
Source: U.S. Census Bureau, 2012–2016 American Community Survey 5-year Estimates.

E. AFFECTED ENVIRONMENT

MINORITY AND LOW-INCOME POPULATIONS IN THE STUDY AREA – OVERVIEW OF STUDY AREA DEMOGRAPHICS

The environmental justice study area, illustrated in **Figure 5.11-1**, includes 135 census block groups and has a total population of 198,549 persons and a population density of approximately 95,000 persons per square mile. The study area extends north to West 35th Street and south to Pike Street. Moving inland, the study area reaches The Bowery at the approach of the Manhattan Bridge and Broadway at Madison Square Park and includes portions of the neighborhoods of the

East Village, Chinatown, Lower East Side, Gramercy Park, and Murray Hill. The study area also includes large residential developments such as Stuyvesant Town, Peter Cooper Village, Co-op Village, and 27 New York City Housing Authority (NYCHA) developments. The NYCHA developments within the study area are concentrated to the south and east near the sections of the project area south of East 14th Street. According to NYCHA, in 2010 about 28,000 people lived in these developments, accounting for approximately 14 percent of the study area's total population. Complete data for individual study area block groups is included in **Table 5.11-1**.

MINORITY STATUS

Of the 135 block groups within the environmental justice study area, 51 are considered minority areas (about 38 percent of the block groups) (see **Figure 5.11-2**). Many of these block groups are concentrated in the southern section of the environmental justice study area below East 14th Street near Project Area One. Individual block group's minority population percentages range from 0 to 100 percent. There are a total of 20 block groups (approximately 15 percent of the block groups) in the study area with minority populations over 90 percent. Most of these block groups are located in the southernmost section of the study area within Chinatown and nearby NYCHA developments. Overall, 51.2 percent of the study area is minority. Comparatively, the minority rates for both Manhattan (52.6 percent) and New York City (67.7 percent) are higher than that of the study area (51.2 percent) (see **Table 5.11-1**).

LOW-INCOME STATUS

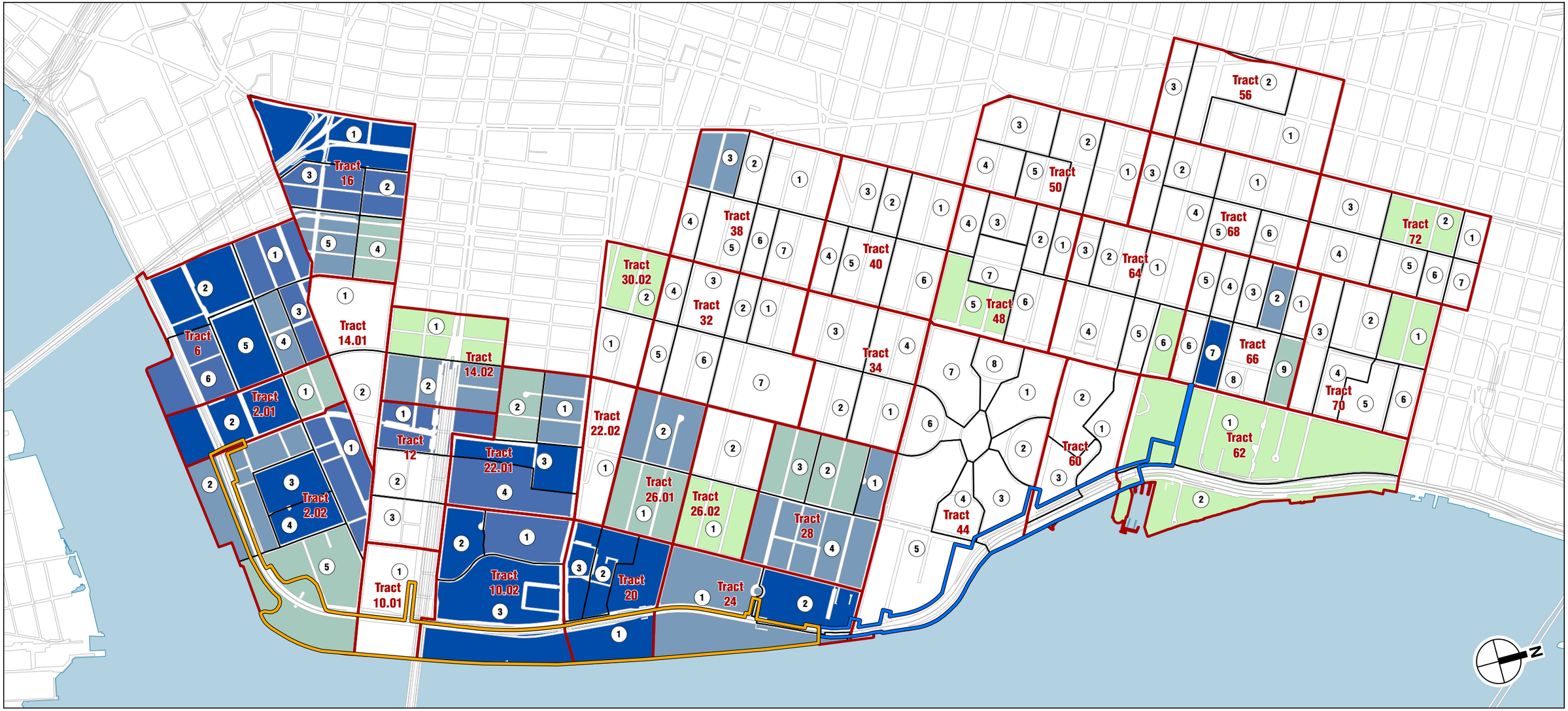
Of the 135 block groups within the environmental justice study area, 58 (approximately 43 percent of the block groups) are considered low-income areas (see **Figure 5.11-3**). Many of the low-income community block groups are also minority community block groups. Of the 58 low-income block groups, 40 (or approximately 69 percent) are also minority block groups (see **Table 5.11-1**). Like the minority communities identified in the section above, the majority of low-income block groups are concentrated in the southern section of the environmental justice study area below East 14th Street. Individual block groups have low-income population percentages ranging from approximately 0 to 74 percent. Several of the block groups with the highest poverty rates are in the southernmost section of the study area in the vicinity of Chinatown and NYCHA's LaGuardia Houses. Overall, over 20 percent of the study area lives below the poverty level. Furthermore, the poverty rate of the study area (20.26 percent) is higher than that of Manhattan (17.62 percent), but slightly below the rate for all of New York City (20.30 percent) (see **Table 5.11-1**).

CHILDREN

According to 2012–2016 ACS data, approximately 11.3 percent of the residents in the socioeconomic study area were children (between 0-17)—this is lower than in Manhattan (14.6 percent) and New York City (21.2 percent) (see Chapter 5.2, "Socioeconomic Conditions").

PUBLIC PARTICIPATION

EO 12898 requires federal agencies to work to ensure greater public participation in the decision-making process. In addition, CEQ guidance suggests that federal agencies should acknowledge and seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation.



Project Area One

Project Area Two

10 *Census Tract Boundary*

1 *Census Block Group Boundary*

Minority (percent)

50% - 60%

61% - 70%

71% - 85%

86% - 95%

96% - 100%

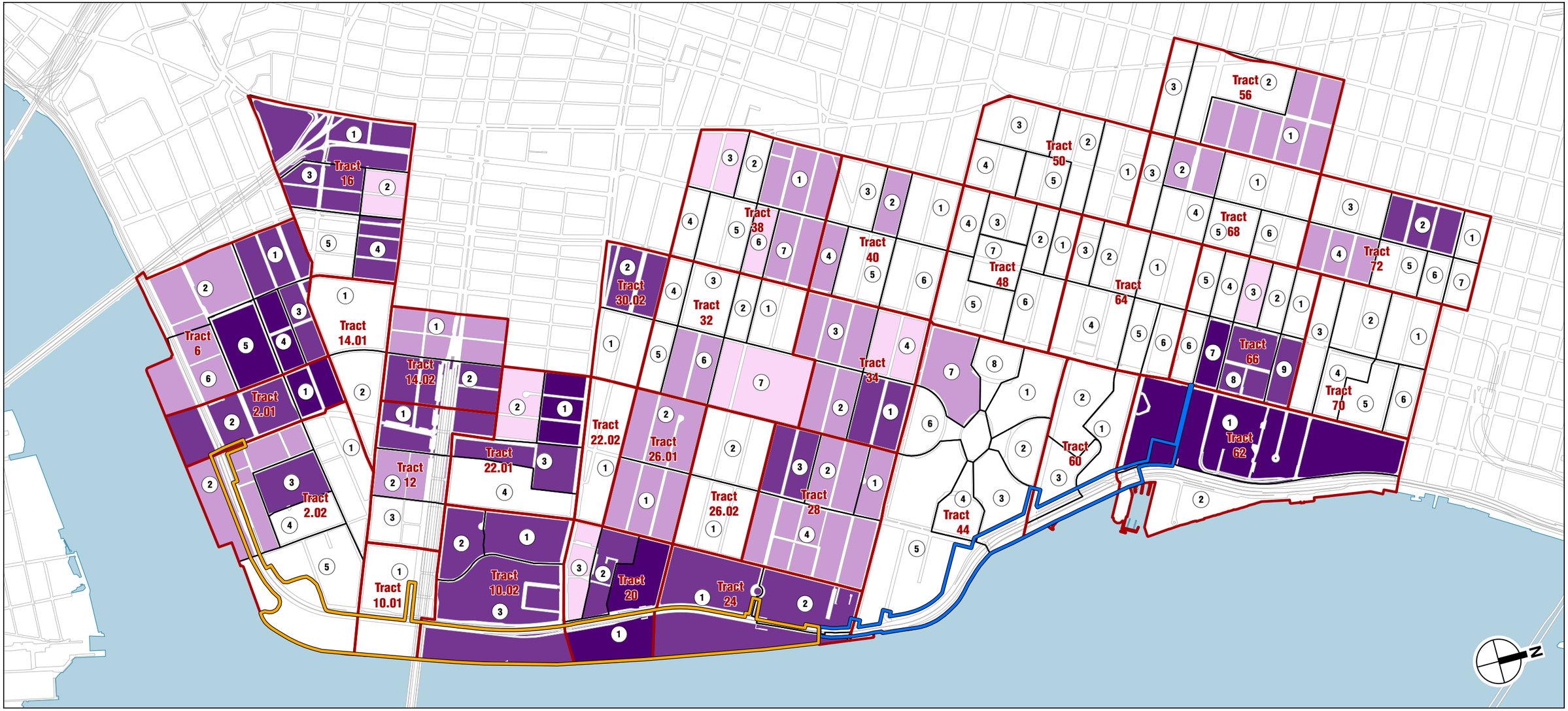
0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Environmental Justice Minority Areas

Figure 5.11-2



Project Area One

Project Area Two

10 *Census Tract Boundary*

1 *Census Block Group Boundary*

Low-Income Communities (percent living in poverty)

17.62% - 20%

21% - 30%

31% - 40%

41% - 50%

51% - 74%

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Environmental Justice Low-Income Areas

Figure 5.11-3

The public involvement activities for the proposed project have been guided by the Community Engagement Plan (CEP), which was originally developed during the conceptual design for this project as a "living" document and has continued through preparation of this EIS. The key goal of the community outreach during the design phase was to inform interested parties about the proposed project and seek input on a wide range of issues. The specific details of the proposed project's public participation process is presented in Chapter 3.0, "Process, Coordination, and Public Participation."

F. ENVIRONMENTAL EFFECTS

SUMMARY OF BENEFITS

As discussed throughout the EIS, the proposed project would produce beneficial effects for the local community (equally on minority and non-minority, and low-income and non-low-income populations) by reducing flooding potential and enhancing waterfront open spaces and access to the waterfront. Further, by providing reliable coastal flood risk reduction, including for those in NYCHA housing, the proposed project would result in positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during future storm events. In addition, the proposed project would provide Section 3 employment opportunities during construction, which would be a positive benefit to the community.

The No Action Alternative (Alternative 1) is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. In the absence of this system, the existing neighborhoods (comprising minority and non-minority, and low-income and non-low-income populations) in the protected area (area within the Federal Emergency Management Agency [FEMA] 100-year special flood hazard area [SFHA]) would remain at risk of flooding during a design storm event. Although some resiliency measures are expected to be completed at NYCHA's Bernard Baruch Houses, Lillian Wald Houses, Jacob Riis Houses, Jacob Riis II Houses, Campos Plaza II, and other developments in the No Action Alternative, these measures would not provide the type of comprehensive neighborhood protection from potential future storm-related flooding events that would be provided by the flood protection systems presented in the other alternatives, and these NYCHA developments will continue to be vulnerable to flood damage during future storm events. Further, responders' access to the dwellings would continue to be compromised during flood events. Additionally, residents in market rate and affordable units in Stuyvesant Town and Peter Cooper Village, and many other dwellings in the protection area, will remain vulnerable to design storm events.

SUMMARY OF ADVERSE EFFECTS

As discussed throughout this EIS, the proposed project could result in adverse effects. The potential effects from the proposed project for key technical areas are summarized below. An analysis of the proposed project's potential for disproportionately high and adverse effects on environmental justice populations is provided in the next section.

- ***Socioeconomic Conditions.*** Under Alternative 1, no new comprehensive coastal protection system would be installed in the project area; the portion of the study area within the protected area would continue to be susceptible to flooding during design storm events. The proposed build alternatives would not result in significant adverse socioeconomic effects on residential and commercial conditions. There would be positive socioeconomic benefits due

to the avoided costs associated with flood damage that would otherwise be incurred during future design storm events.

- ***Urban Design and Visual Resources***. The proposed project would likely block existing waterfront and/or East River views from certain locations, potentially resulting in significant adverse effects.
- ***Natural Resources***. The proposed project would result in temporary adverse effects to trees within the study area as well as both temporary and permanent adverse effects to New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands and U.S. Army Corps of Engineers (USACE) designated Waters of the United States. However, a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). In addition, adverse effects to wetland resources would be mitigated for with the creation of approximately 26,000 square feet new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements, and would not be considered significant.
- ***Transportation***. The proposed project would not generate any new travel demand during its operations and would therefore have no adverse effects on the local transportation systems.
- ***Air Quality/Noise***. The proposed project would not generate any new air or noise emission sources that would impact the community.
- ***Hazardous Materials***. The proposed project would disturb subsurface hazardous materials from demolition and excavation activities. However, with the implementation of appropriate measures governing the construction (such as air monitoring, proper storage and handling of materials, and, if required, odor suppression), the potential for significant adverse effects related to hazardous materials would be avoided.
- ***Construction***. Potential construction-related adverse effects to open space, traffic, and noise would occur with the proposed project. To the extent feasible, construction activities would incorporate measures to minimize these adverse effects.
  - The proposed project would result in decreases in the open space ratios between the With Action and No Action conditions during construction, exceeding the 2014 *City Environmental Quality Review (CEQR) Technical Manual* threshold of 5 percent. Temporary displacement of open space for construction over the 5 percent threshold is considered significant since it could result in the overburdening of existing facilities within the study area. Measures would be developed and implemented to minimize the effects of construction on open space.
  - Construction of the proposed project would have the potential to result in significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour. These effects could be fully mitigated with the implementation of standard traffic mitigation measures (e.g., signal timing changes). In addition, Alternative 5 would result in, additional significant adverse traffic effects due to the temporary lane closures that are required along the FDR Drive to accommodate construction activities associated with the raised FDR Drive under this alternative.

- Noise control measures would be implemented during construction of the proposed project as required by the *New York City Noise Control Code*. However, even with these measures, the cumulative analysis of construction vehicle trips and operation of on-site construction equipment indicated the potential for significant adverse noise at a number of residential buildings and the Asser Levy Recreation Center near the project area. Additional measures would be developed and implemented to minimize the effects of construction noise.

- ***Public Health***. The proposed project would not significantly affect the public health environment with respect to air quality, water quality, noise, and hazardous materials. In addition there would be measures implemented during construction to ensure there would be no significant adverse effects to public health.

ANALYSIS OF POTENTIAL FOR DISPROPORTIONATELY HIGH AND ADVERSE EFFECTS

In accordance with CEQ guidance, the determination of a proposed project's potential to result in disproportionately high and adverse effects involves consideration of whether a proposed project would result in any adverse effects that are considered significant (as defined by NEPA) and that would affect a minority or low-income population; whether any significant adverse effects on minority or low-income populations would appreciably exceed or would be likely to appreciably exceed those on the general population or other appropriate comparison group; and whether the minority or low-income population would be affected by cumulative or multiple adverse exposures from environmental hazards. In making this determination, following CEQ guidance, it is recognized that effects to minority or low-income populations may be different from effects on the general population due to a community's distinct cultural practices, for example. The determination of disproportionately high and adverse effects also involves consideration of proposed mitigation measures and offsetting benefits. Based on these considerations, the assessment below concludes that the proposed project would not result in any disproportionately high and adverse effects on environmental justice populations. Moreover, this the proposed project is not expected to result in any disproportionate health and safety impacts on children and would be in compliance with Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks.

URBAN DESIGN AND VISUAL RESOURCES

The levees, elevated infrastructure of park areas, and/or floodwalls constructed for the proposed project would likely block existing waterfront and/or East River views in the Cherry Street, Grand Street, East 6th Street, and East 10th Street view corridors and from within the Bernard Baruch, Lillian Wald, and Jacob Riis Houses, and from portions of the FDR Drive and FDR Drive Service Road, potentially resulting in significant adverse effects. Under Alternatives 4 and 5, the absence of floodwalls along the western frontage and the design of the park to slope down to the level of the FDR Drive would preserve views of the park, although views of the East River itself would be blocked as under the other Alternatives. While certain views from within and adjacent to three NYCHA developments would likely be blocked, the expected visual effects would also occur in non-minority and non-low-income areas. Therefore, no disproportionately high or adverse effects on environmental justice populations would occur from the proposed project's visual adverse effects.

NATURAL RESOURCES

The With Action Alternatives would result in temporary adverse effects to terrestrial resources, namely trees, within the study area. Replacement for the lost trees would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. The Preferred Alternative would require a NYC Parks approved tree mitigation plan to address the tree removal proposed. Trees and other landscaped areas that are planted as a result of a NYC Parks approved tree mitigation plan for construction of the flood protection system would include salt tolerant native species, among a diverse selection of 52 tree species. The planting plan will also aim to improve ecological habitat and be resistant to the effects of salt spray and wind using the concept of different types of groves. The removal of trees would occur principally within the waterfront parks and is not expected to result in any disproportionately high and adverse effects on minority and low-income populations within the inland neighborhoods.

These alternatives would also result in permanent adverse effects to New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands and U.S. Army Corps of Engineers (USACE) Waters of the United States within the East River as a result of installation of support structures for the shared use flyover bridge. The tidal wetland area to be affected would be approximately 650 square feet and the support structures would be placed largely beneath the East River Bikeway in a heavily urbanized area with existing piles and other infrastructure. This adverse effect would be considered minor and would not be expected to result in any disproportionately high and adverse effects on minority and low-income populations within the inland neighborhoods.

The Preferred Alternative and Alternative 5 also include reconstruction and relocation of two existing embayments. Placement of fill in the existing embayments would result in an additional 20,600 square feet of permanent adverse effects to littoral zone tidal wetlands beyond Alternatives 2 and 3. However, the embayments would be reconstructed at least at the same size as the existing embayments along the East River shoreline. In addition, permanent adverse effects would be mitigated through a wetland restoration design that meets all NYSDEC and USACE permit conditions. Adverse effects to threatened, endangered, and special concern aquatic species and essential fish habitat would be minimized or avoided as a result of implementation of mitigation measures confirmed through ongoing consultation with NOAA NMFS. Due to these mitigatory measures in addition to the limited extent of impact within East River, the Preferred Alternative and 5 are unlikely to adversely affect threatened and endangered species. Therefore, no disproportionately high or adverse effects on environmental justice populations would occur from the adverse effects on natural resources.

CONSTRUCTION—OPEN SPACE

During construction of the proposed project, the open space resources within the project area, including East River Park, Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground, would be partially or fully closed for a portion of the approximately 3.5 to five-year-long construction duration (depending on the alternative) to accommodate the construction of the proposed project. However, when complete, the overall quality in the rebuilt portion of the open space resources would be enhanced, including landscaping and circulation improvements.

The proposed project would result in decreases in the open space ratios between the With Action and No Action conditions during construction, exceeding the *CEQR Technical Manual* threshold of 5 percent change. Temporary displacement of open space for construction over the 5 percent

threshold is considered significant since it could result in the overburdening of existing facilities within the study area. Therefore, the analysis concluded that there would be potential significant adverse indirect effects on open space during the 3.5 to five-year construction period across all alternatives.

The potentially significant adverse indirect effects due to open space displacement would not disproportionately affect minority and low income populations. Therefore, there would be no disproportionate adverse effects on environmental justice populations with the proposed project.

CONSTRUCTION—TRANSPORTATION

The proposed project would have the potential for significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during construction of the proposed project. At the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C, the significant adverse traffic effects could be fully mitigated with the implementation of standard traffic mitigation measures (e.g., signal timing) No significant adverse effects were identified for transit, pedestrians, and parking.

Under Alternative 5, there is a possibility that the FDR Drive would temporarily require a full closure in the northbound direction and one-lane closure in the southbound direction for two months during construction activities under Alternative 5. If a full closure in any direction is required, it would most likely occur during the summer months when the magnitudes of traffic volumes along the FDR Drive are lower than the rest of the year. Depending on the type of closure and the duration, vehicular traffic from the FDR Drive would need to be diverted to the local roadways in the study area, the result of which would most likely be significant adverse traffic effects in addition to those identified under Alternative 4. The potential FDR Drive closure would require the use of Traffic Enforcement Agents (TEAs) to regulate traffic and pedestrian circulation within the study area. The use of TEAs would help mitigate any additional significant adverse traffic effects that could occur due to the closure of the FDR Drive. The potential traffic effects during construction would not disproportionately affect minority and low income populations. Therefore, there would not be disproportionate adverse effects on environmental justice populations with the proposed project.

CONSTRUCTION—NOISE

During, construction of the proposed project, noise control measures would be implemented as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods). Even with these measures, the cumulative analysis of construction vehicle trips and operation of on-site construction equipment indicated the potential for significant adverse noise effects as a result of construction at some receptors under each of the build alternatives.

Under Alternative 4, construction of the proposed project is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 425 East 25th Street, 10 Waterside Plaza, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street, 123 Mangin Street, and the Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of

limited duration and would be up to the mid 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to CEQR criteria. Therefore, additional receptor controls (i.e., façade attenuation (improvements) to further reduce interior noise levels at these locations are not proposed to further reduce interior noise levels at these locations. The buildings at 621 Water Street, 605 Water Street, 765 FDR Drive, 819 FDR Drive, 132 Avenue D, 465 Avenue D, 123 Mangin Street, and the Asser Levy Recreation Center appear to have monolithic glass (i.e., non-insulating) and would consequently be expected to experience interior $L_{10(1)}$ values up to the high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

Under Alternatives 2, 3, and 5, significant adverse construction noise effects are expected to be the same as or less than those under Alternative 4.

However, these effects would not be expected to result in disproportionate effects on minority and low-income communities since the construction effects would affect all populations surrounding the project area. The buildings listed above where significant adverse construction noise effects are predicted to occur are distributed approximately evenly between minority or low-income communities and non-minority and non-low-income communities. Furthermore, the duration of construction noise and the likelihood of night-time construction, which can be more intrusive in residential areas because of the additional sensitivity to noise during night time, are comparable in areas adjacent to minority or low-income communities and non-minority and non-low-income communities. As a result, construction of the proposed project would not result in a disproportionate amount of noise at minority or low-income communities compared to the full study area. ✷

Chapter 6.0: Construction Overview

A. INTRODUCTION

Hurricane Sandy underscored the City's need to bolster its resiliency efforts to protect property, vulnerable populations, and critical infrastructure during major storm events. To address this need, the City is proposing the East Side Coastal Resiliency (ESCR) Project (the proposed project), which would construct a coastal flood protection system along a portion of the east side of Manhattan and make related improvements to City infrastructure. Depending on the project alternatives, this flood protection system would include a combination of floodwalls, levees, elevated infrastructure or park areas, and/or closure structures, along with other infrastructure improvements to reduce flooding.

This chapter establishes the framework used to assess potential effects from construction of the proposed project. The preliminary construction schedule is described along with construction activities and practices likely to occur.

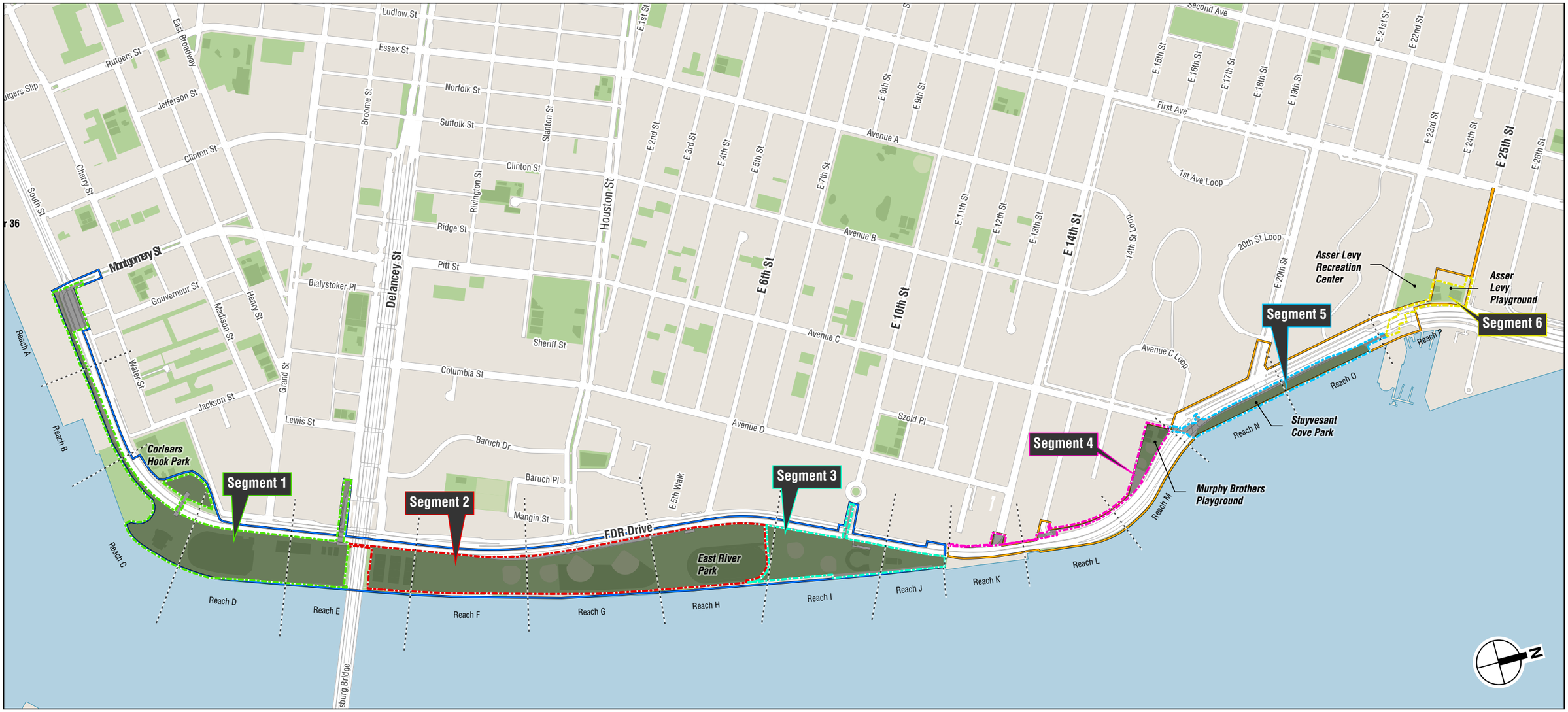
The proposed project is divided into two project areas, 16 reaches for design, and six construction segments for analysis purposes (see **Figure 6.0-1**), described in detail in Chapter 2.0, "Project Alternatives."

Construction of the proposed project is projected to start in spring 2020 with Alternatives 2, 3, and 5 projected to be completed in 2025 and the Preferred Alternative expected to be completed in 2023. This shorter construction duration for the Preferred Alternative is primarily due to relocation of the line of protection further east into East River Park, minimizing the need for coordination of construction efforts with, and disruption to, the FDR Drive. The Preferred Alternative as well as Alternatives 3 and 5 assume full closure of East River Park during construction.

B. ANALYSIS FRAMEWORK

This chapter describes the different alternatives and construction options considered. It also outlines the methodology used to establish the reasonable worst-case construction phasing and schedules, which inform the analysis of potential environmental effects during the construction period. The analyses in the subsequent construction-related chapters focus on socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, natural resources, hazardous materials, water and sewer infrastructure, energy, transportation, air quality, greenhouse gas, noise and vibration, and public health. Construction of the proposed project would be temporary and have limited effects on land uses near the project area, and would not result in the displacement of community facilities and services such as schools, libraries, child care facilities, healthcare facilities, or fire and police protection, and would not alter the character of the neighborhoods surrounding the project area. As such, the following areas were not determined to warrant construction period analyses: land use, zoning, and public policy; community facility and services; and neighborhood character.

This section focuses on the framework used to assess the temporary construction effects for each alternative. As no construction associated with the proposed project is assumed as part of the No



Project Area One

Project Area Two

Construction Limits of Work/Active Construction

Segment

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Proposed Project Area, Design Reaches, and Construction Segments

Figure 6.0-1

Action Alternative (Alternative 1), no analysis of potential construction effects is included. This chapter describes the construction options, including materials transport with trucks and/or barges and pile installation method. It also outlines the methodology used to establish the preliminary construction schedule used to evaluate the potential environmental effects during construction.

PROJECT ALTERNATIVES

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative (Alternative 1) is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. The build year for the proposed project is 2025 and accordingly, Alternative 1 assumes that projects planned or currently under construction in the project area are completed by the 2025 analysis year (i.e., No Action projects).[1] A list of these planned projects is included in **Appendix A1**.

PREFERRED ALTERNATIVE (THE PREFERRED ALTERNATIVE): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection in East River Park into the park, thereby protecting both the community and the park from design storm events (the 100-year flood events with sea level rise to 2050s), as well as increased tidal inundation resulting from sea level rise.

In Project Area One, the proposed flood protection alignment begins at its southerly tieback along Montgomery Street about 130 feet west of South Street; at South Street the system turns north along for a distance of about 50 linear feet and then east, crossing under the FDR Drive to the east side of the highway with a pair of swing floodgates. Once on the east side of the highway, the flood protection system turns north and runs adjacent to the FDR Drive, continuing north into East River Park. Once in East River Park, the proposed flood protection alignment starts to turn east towards the East River near the existing amphitheater. From here, the alignment continues north and the system parallels the East River Park bulkhead. The Preferred Alternative would raise the majority of East River Park from the amphitheater to approximately East 13th Street, excluding the Fireboat House. This plan would reduce the length of exposed wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. Between the amphitheater and East 13th Street, the park would be raised by an average of approximately eight-feet with the floodwall installed below-grade to meet the design flood elevation criteria. The Delancey Street, East10th Street, and Corlears Hook Bridges would be reconstructed to be universally accessible. A portion of the park's underground water and drainage infrastructure and bulkhead are reaching the end of their serviceable life and are in need of repair. Therefore, this park infrastructure would be reconstructed, along with existing park structures and recreational features, including the esplanade, amphitheater, track facility, and tennis house, as part of the raised park. In addition, two existing embayments would be relocated within the project area to

[1] Note that although the superstructure of the shared-use flyover bridge, which is a common component across each of Alternatives 2 through 5, would be completed in 2025, the flood protection and enhanced park and access features under Alternative 4 (the preferred alternative) would be anticipated to be completed in 2023.

provide adequate space to site heavily utilized active recreation facilities and to allow for an Americans with Disabilities Act (ADA) accessible path to improve accessibility to, and enjoyment of, the waterfront for all Park users. The two proposed embayments would be comparable or larger in size, would be similarly located within East River Park, and would be designed to provide enhanced ecological value to the aquatic environment compared to the existing embayments. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area.

In Project Area Two, the line of flood protection would cross the FDR Drive with closure structures near East 13th Street, and continue along the west side of the FDR Drive, bordering the eastern boundary of NYCHA's Jacob Riis Houses, Con Edison's facilities at East 13th, East 14th, and East 15th Streets (including closure structures that cross at East 13th, East 14th, and East 15th Streets), and Murphy Brothers Playground. The system would then cross under the FDR Drive at Avenue C with closure structures, and run along the western edge of Stuyvesant Cove Park. Stuyvesant Cove Park would be reconstructed and redesigned to include elevated pathways, seating, and planted areas on a series of berms against the wall along the rear of the park and a pedestrian esplanade along the water's edge. The system would then traverse under the FDR Drive at East 23rd Street with a series of closure structures, and would run adjacent to the eastern edge of Asser Levy Recreation Center along the FDR Drive off-ramp then turn in along the northern edge of the building to cross Asser Levy Playground. The portions of Murphy Brothers Playground and Asser Levy Playground that are affected by construction of the floodwall would be reconstructed and reconfigured. A closure structure then connects to the VA Medical Center's flood protection system to close the compartment along East 25th Street to First Avenue.

The Preferred Alternative also includes modifications of the existing sewer system, including installing gates underground near the northern and southern extents of the project area within the existing large capacity sewer pipe (interceptor) and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment to control flow into the project area from the larger combined sewer drainage area. Installation of additional sewer pipes and, in one location, enlarging existing sewer pipes, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a design storm event.

Since the flood protection under this alternative is primarily along the existing esplanade of East River Park, there would be less construction disruption and delay along the FDR Drive, which would require temporary nighttime single-lane closures of the FDR Drive to allow construction. Therefore, the flood protection system and raised East River Park proposed under this alternative would be constructed in 3.5-years and would provide the flood protection in an accelerated timeframe before the hurricane season of 2023, compared to the 5-year construction duration and a completion year of 2025 anticipated under Alternatives 2, 3, and 5. In addition, as described in Chapter 6.12, "Construction—Noise," compared to Alternatives 2 and 3, maximum construction noise levels at locations west of the FDR Drive nearest floodwall construction within East River Park under this alternative would be lower, because pile driving would occur further from these locations. This alternative would have an increased usage of barges compared to Alternatives 2 and 3 due to the amount of fill materials required to raise East River Park and the reconstruction of the esplanade. However, the use of barges instead of trucks would reduce truck traffic in inland neighborhoods. Based on preliminary estimates, approximately 600,000 cubic yards of fill would

be required for the construction of the Preferred Alternative. The foundations for the shared-use flyover bridge under this alternative would be completed in 2023, with a prefabricated bridge span installed and completed in 2025.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 provides flood protection in Project Areas One and Two using a combination of floodwalls, levees, and closure structures (i.e., deployable gates) from Montgomery Street to East 25th Street. In Project Area One, the line of flood protection would generally be located on the west side of East River Park. Protection would be provided by a concrete floodwall starting at Montgomery Street within the sidewalk adjacent to the Gouverneur Gardens Cooperative Village. The floodwall would then cross under the FDR Drive with closure structures across the FDR Drive's South Street off- and on-ramps. A combination of floodwalls and levees would then run along the west side of East River Park for the length of the entire park. The park-side landings for the Delancey Street and East 10th Street bridges would be rebuilt within East River Park to accommodate the flood protection system. The flood protection system in Project Area Two would be the same as the Preferred Alternative except that the portions of Murphy Brothers Playground and Asser Levy Playground that are affected by construction of the floodwall would be replaced in kind.

As with the Preferred Alternative, Alternative 2 would include drainage components to reduce the risk of interior flooding and construction of the shared-use flyover bridge to address the Con Edison pinch point.

The flood protection alignment proposed in Alternative 2 would require that the majority of flood protection construction be performed during night-time single-lane closures of the FDR Drive and in close proximity to sensitive Con Edison transmission lines. Given the related construction complexities and logistical considerations, the flood protection system and associated components under this alternative are assumed to be constructed in 5-years and completed in 2025.

ALTERNATIVE 3 – FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 provides flood protection using a combination of floodwalls, levees, and closure structures in Project Areas One and Two. As with Alternative 2, the line of protection in Project Area One would be generally located on the western side of East River Park. However, under Alternative 3, there would be more extensive use of berms and other earthwork compared to Alternative 2 in association with the flood protection along the FDR Drive to provide for more integrated access, soften the visual effect of the floodwall on park users, and introduce new types of park experience. The landscape would generally gradually slope down from high points along the FDR Drive towards the existing at-grade esplanade at the water's edge. Due to the extent of the construction of the flood protection system, this alternative would include a more extensive reconfiguration and reconstruction of the bulk of East River Park and its programming (i.e., landscapes, recreational fields, playgrounds, and amenities) as compared to Alternative 2 but not as extensive as those proposed under the Preferred Alternative as described above. In addition, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to provide universal access, and a new raised and landscaped park-side plaza landing would be created at the entrance to the park from the East Houston Street overpass. In Project Area Two, the flood protection alignment would be the same to that proposed in the Preferred Alternative.

As with the Preferred Alternative, this alternative would include drainage components to reduce the risk of interior flooding and the shared-use flyover bridge to address the Con Edison pinch point.

Alternative 3 would involve construction of the flood protection system alignment along the FDR Drive and in close proximity to sensitive Con Edison transmission lines. Given the associated complexities and logistical considerations involved when working in and around these facilities, a 5-year construction duration is assumed, with the proposed project estimated to be completed in 2025.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

The Flood Protection System East of FDR Drive (Alternative 5) proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need for closures structures crossing the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property and Murphy Brothers Playground.

As with the Preferred Alternative, this alternative would include drainage components to reduce the risk of interior flooding and construction of the shared-use flyover bridge to address the Con Edison pinch point.

Anticipated project completion under this alternative is driven by construction of the raised northbound lanes of the FDR Drive and the adjacent shared-use flyover bridge in this same footprint, therefore Alternative 5 is anticipated to be constructed in 5-years and completed in 2025.

C. CONSTRUCTION OF PROPOSED PROJECT COMPONENTS

A discussion of construction approaches to the components of the proposed project (i.e., how floodwalls, levees, closure structures, drainage management elements, etc., would be constructed) is provided below. In addition, potential construction methods, including materials transport and pile installation methods, are described.

FLOODWALLS AND LEVEES

As discussed in Chapter 2.0, "Project Alternatives," floodwalls are narrow, vertical structures with a below-grade foundation that are designed to withstand both tidal storm surge and waves. They are typically constructed of steel, reinforced concrete, or a combination of materials with a reinforced concrete cap. The floodwalls would consist of I-walls and/or L-walls, which provide protection to withstand tidal surge and wave forces. Floodwalls can be incorporated into a berm to reduce the amount of wall exposure in areas where there are horizontal space limitations making a levee infeasible. For the Preferred Alternative, East River Park would generally be raised by approximately eight feet and floodwalls would generally be installed below-grade within the raised park and would therefore not be visible. In addition, the Preferred Alternative would include the construction of a subgrade seepage barrier to provide protection to East River Park.

Levees are flood protection elements where the existing topography is elevated to reach or exceed the design flood elevation to form a line of coastal flood protection and, therefore, require a relatively wide footprint to be installed. They are typically constructed of a core of compacted fill material, capped by stiff clay to withstand storm waves, with a stabilizing landscaped cover.

Construction of floodwalls and levees would typically require excavation, installation of sheet piles and pile foundations, forming and pouring concrete walls, and/or placement of earth fill.

Existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work where relocation or replacement is not proposed. Prior to excavation, any interference with existing water and sewer infrastructure would be identified. Utility work associated with the construction of floodwalls and raised landscapes may also include relocation or replacement of existing water mains and combined sewer lines within East River and Stuyvesant Cove Parks. This work would require the use of excavators and loaders for excavation, backfill and placement of utility lines, and trucks to transport materials. Relocation of water mains or combined sewer lines would be undertaken without affecting the conveyance of flow through the existing water supply and sewer system. All relocation work would be performed in accordance with methods and standards approved by the New York City Department of Environmental Protection (DEP).

FLOODWALL (L-WALL)

Construction of the L-wall would require trench excavation, which would require conventional excavation equipment such as excavators, loaders, and dump trucks. After excavation, sheet pile walls would be installed using a vibratory or impact pile driver and/or a hydraulic press-in hammer in areas where vibration control is critical. Following installation of the steel piles reinforced cast-in-place (CIP) L-walls would be cast on the supporting piles. Construction would likely require a crane capable of handling a pile hammer and lifting and positioning the formwork, steel reinforcing cages, and steel piles. A concrete pump would be used to convey ready-mix concrete.

FLOODWALL (I-WALL)

I-wall construction would require installation of steel sheet piles using a vibratory or impact pile driver and/or a hydraulic press-in hammer in areas where vibration control is critical. Following installation of the sheet piles, a CIP concrete pile cap would be poured on top of the portion of sheet pile exposed above the existing grade. The concrete pile cap provides water-tightness, corrosion protection, and a softer visual aesthetic.

LEVEES

The levees would be constructed using bulldozers and graders for placement, compaction, and grading, and would require fill material. Following construction of the levees, disturbed areas would be landscaped and reestablished for public use. Landscaping, which would also occur in all areas of the reconstructed East River Park, would first involve soil and plant procurement as well as soil mixing and testing. Then, plantings would take place during the planting windows in the spring and the fall. Typical equipment used for landscaping activities include excavators and loaders.

CLOSURE STRUCTURES

As discussed in Chapter 2.0, “Project Alternatives,” in many flood protection systems it is necessary to provide an opening to accommodate day-to-day vehicular or pedestrian circulation along a street or sidewalk. In these instances, closure structures (i.e., gates) are used. Construction of the closure structures would consist of excavation, foundation and cut-off wall installation, jet grouting, forming and pouring CIP concrete, and steel gate installation. For areas with extensive subsurface electrical lines and manholes within the roadways, excavation would involve a mixture of equipment such as excavators, loaders, and dump trucks, and careful hand excavation to protect or relocate these utilities. Installation of the closure structures located in proximity of the FDR

Drive or within existing roadways or ramps would require maintenance and protection of traffic plans.

EAST RIVER PARK ESPLANADE RECONSTRUCTION

As discussed in Chapter 2.0, "Project Alternatives," the Preferred Alternative would include the reconstruction of the esplanade to raise it to a higher elevation and the relocation of the two existing embayments at the esplanade to accommodate park programming and provide ADA accessibility to the waterfront. Esplanade reconstruction activities would generally consist of the removal of the existing esplanade concrete deck, excavation, installation of sheet pile bulkhead (cut-off wall), backfill, and the installation of girders and deck structure. Esplanade reconstruction activities would be constructed waterside and would involve barges, cranes, and excavators.

PEDESTRIAN BRIDGES RECONSTRUCTION

Replacing pedestrian bridge landings (i.e., Corlears Hook, Delancey, and/or East 10th Street Bridges) would first require demolition of the existing ramp surface using a small excavator and a skid steer to move the material. Following this, the steel structure of the pedestrian bridges would be cut into sections and removed using a crane. Steel sections would then be loaded in large pieces onto trucks for removal.

Removal of the existing foundations and construction of new foundations would require excavation, pile foundations, concrete pours and backfill. Structural steel or precast concrete structural members would then be placed with a crane and a concrete deck would be added by pouring it in place using a concrete pump. The placement of the spans across the FDR Drive is anticipated to require limited FDR Drive full lane closures in both directions. The closures would occur during the night and would follow requirements set forth by the New York City Department of Transportation (NYCDOT) and would be limited to a maximum of 6 hours of full lane closures per night. To ensure public safety, access to pedestrian bridges would be closed during reconstruction activities, and pedestrian traffic would be rerouted to the nearest open pedestrian bridge.

Similar to the construction of floodwalls and levees described above, utility work associated with the construction of the bridge landings may require existing water and sewer lines to be protected, supported, and maintained in place or relocated/replaced. This construction would not affect water or sewer service. All maintenance or relocation activities would be performed in accordance with methods and standards approved by DEP.

EAST RIVER PARK RECONSTRUCTION

Construction of the new flood protection will require the disturbance and reconstruction of most of East River Park, Murphy Brothers Park and Asser Levy Playground. As discussed above, under The Preferred Alternative and 5, East River Park would be raised by approximately eight feet to meet the design flood protection criteria, providing flood protection for both the park and the inland community. The reconstruction of East River Park under Alternatives 4 and 5 would include replacing the East 10th Street comfort station, Tennis House and Track and Field Complex, the NYC Parks maintenance facilities, reconstruction of the existing amphitheater, and relocation of two existing embayments.

Elevating East River Park would consist primarily of earthwork to place, compact, and grade earth fill in these areas, as well as demolition of the existing buildings with the park. Landscaping would first involve soil and plant procurement as well as soil mixing and testing. Then, plantings would take place during the planting windows in the spring and the fall. Activities for the comfort station,

the maintenance facilities would require earthwork and concrete work for the replacement structure where applicable.

CON EDISON UTILITY CARBON FIBER WRAPPING

Con Edison high-voltage transmission lines within the project area present a variety of challenges to the design and construction of the proposed project. These conduits, critical to the transmission of electricity in Lower Manhattan, are currently buried in the fill and natural soils in the area at a depth that allows effective heat dissipation from the lines, which is critical to the efficient function of the system, and at which they are accessible to Con Edison for maintenance and repair. Where possible, considerations have been made in the design of the flood protection system to: minimize the depth of additional fill to be placed above the conduits to minimize detrimental effects on transmission; revise the alignment of the system to reduce conflicts and crossings of the conduits by the flood protection elements; reduce potential effects of construction vibration; wrap the lines with carbon fiber to provide enhanced corrosion protection.

During construction of the proposed project, Con Edison would undertake the wrapping of their existing live transmission lines located belowground in a protective carbon fiber material. Carbon fiber wrapping activities would be performed in conjunction with the installation of the flood protection measures and would involve the use of handtools.

DRAINAGE ISOLATION

As noted in Chapter 5.8, "Water and Sewer Infrastructure," modifications to the existing sewer system would be implemented to control flow into the protected area from the larger sewershed and to eliminate potential pathways for storm surge waters to inundate the protected area sewer system and flood inland areas (i.e., drainage isolation). The measures include: (1) installing interceptor gates on the existing 108-inch diameter interceptor at East 20th Street and Avenue C to the north and between Corlears Hook Park and the FDR Drive to the south; (2) flood-proofing regulators and manholes on the unprotected side of the flood protection system (mainly within East River Park); (3) replacing existing tide gates on the combined sewer outfall pipes that serve the drainage protected area; and (4) installing one isolation gate valve in Regulator M-39, located within Asser Levy Playground, to isolate a branch interceptor that crosses the flood protection system alignment at the northern boundary of the drainage protected area.

INTERCEPTOR GATES

The work required to install interceptor gates would include excavating sections of roadway near the intersection of East 20th Street and Avenue C, and in the pathway between Corlears Hook Park and the FDR Drive within New York City owned right-of-way (see Figures 5.8-4 and 5.8-5). Installation of the interceptor gates would begin with site preparation, pavement excavation, support of excavation (installing sheeting and grouting to hold open the excavation during construction), dewatering, and excavation to fully expose the interceptor where the interceptor gate chambers are to be constructed. Once the excavation is complete, the crown of the interceptor would be opened to install a temporary flume within the interceptor to allow flow to pass uninhibited during construction. Next, a concrete chamber would be constructed around the existing interceptor to house the gate and associated operators. The chamber may be constructed on piles, as described in Chapter 5.8, and would extend from the bottom of the interceptor to the ground surface.

Installation of the interceptor gates would be followed by removal of the flume, backfill of the excavation and site restoration, including patching and restoring the street surface. Closure of

lanes to local traffic and a temporary lane shift within the FDR would be required while the necessary areas are excavated, and the interceptor gate work is completed. NYCDOT has provided work stipulations for road closures as discussed in Chapter 6.9, "Construction—Transportation." Construction of each interceptor gate is anticipated to require approximately one year. Following this construction, the two gate chambers would be installed without affecting the conveyance of sanitary flow through the combined sewer system.

In conjunction with the construction of the below-grade interceptor gate chambers, a building would be constructed adjacent to each chamber to house the controls, electrical panels, and other components to support the interceptor gates. These single-story buildings would be approximately 500 square feet, sited within the right-of-way. Pedestrian walkways and roadway curbs would be realigned as needed to maintain adequate clearance for pedestrian, bike, and/or vehicular traffic.

REGULATORS, DRAINAGE STRUCTURES, AND MANHOLES

The construction proposed for the regulator chambers and other combined sewer structures would begin with an inspection of each structure to determine existing structural capacity and methods of floodproofing, which may include lining, patching, jet-grouting, sheet piling, or excavating to reinforce existing walls. Excavation would follow the approach typical for any deep excavation, as was described for the interceptor gate chambers, and would include support of excavation, excavation, dewatering, and backfill.

Any vented hatches or manholes on the unprotected side of the flood protection alignment, through which stormwater or floodwater could infiltrate, would be replaced with water-tight hatches or manhole covers. These hatches and manholes are located on both the existing regulators and on the combined sewers and sewer infrastructure. The watertight covers would consist of an inner pressure cover and outer traffic cover. The inner cover could be positioned to allow the sewer to vent as under existing conditions. In advance of a design storm, the inner covers would be engaged to effectively seal them to prevent water entry. Following the design storm event, covers that were locked would be unsealed and returned to the venting position. In addition, durable accessways designed for heavy work vehicle loads (H-20 loading) would be installed to allow for future maintenance access. Following construction, the area would be backfilled and restored.

The amount of work required to make these manholes watertight would depend on the structural stability of the manhole. The manholes that are less structurally stable would be either partially or fully reconstructed in addition to the replacement of the frame and cover. Manholes requiring additional support would follow the methods described above for the regulators. Minimally, to make any manhole watertight, excavation of the top one-to-two feet of asphalt, concrete, or soil would need to be removed. At that time, the manhole frame and cover would be replaced with the watertight cover and the area would be restored to its previous condition or better.

Storm drainage collection on the unprotected side of the flood protection system is proposed to be rerouted and connected to the outfalls downstream of the tide gates, therefore isolating them from the combined sewer system and eliminating the need to floodproof those portions of the proposed park drainage system. Open-cut excavation would be used, in which shallow trenches would be excavated, to facilitate construction of pipe supports and piles and installation of new storm drainage piping. In conjunction, some existing storm drainage structures and pipes would be capped and abandoned in place while others would be removed.

TIDE GATES

Existing tide gates would be replaced for each of the outfalls within the project protected area and new tide gates would be installed on outfalls without tide gates in the existing condition. These gates would isolate the protected area from flow entering from the river side of the flood protection system during a design storm surge event. Construction of these tide gates would follow the same construction approach as the regulators described above. Installation of stop logs (temporary barriers that are used to isolate the area of work) upstream and downstream of the tide gate would prevent flow to the outfall and allow for installation of a new gate to replace the existing gate. Closure of stop logs on outfall pipes is a typical procedure performed during regular replacement of existing tide gates. Depending on the configuration of the existing tide gate and outfall pipe, an additional concrete chamber may be constructed around the outfall pipe to house the new gate. Following gate installation, the excavated site would be backfilled and restored, and the stop logs would be removed.

ISOLATION GATE VALVE

An isolation gate valve is proposed to be installed within regulator M-39 on a sewer that crosses the alignment of the flood protection system. This isolation gate valve would reduce the risk of floodwaters from outside the protected area inundating the protected area. This valve would be anchored to the wall within the existing regulator and would be operated manually from the ground surface. The isolation gate valve could be installed using bypass pumping to redirect flow around the construction area while maintaining service. Alternatively, the work could be performed by professionals capable of installing the isolation gate valve while the sewer is in service. Neither method would result in changes to sewer service. Construction of the isolation gate valve is anticipated to require approximately one to three months. The regulator is located within Asser Levy Playground. The construction will require minor excavation and resurfacing of the park in the vicinity of the regulator.

DRAINAGE MANAGEMENT

In addition to the floodproofing and isolation measures outlined above, the proposed project include drainage management elements to manage potential sewer surcharge and above-grade flooding within the protected area. This flooding could occur during a coastal flood event as a result of rainfall coincident with a storm surge. These drainage elements include installing parallel conveyance pipes for 9 regulators and upsizing branch interceptor sewers for three additional regulator tributary areas.

Parallel conveyance pipes would be constructed for regulators M-22, M-23, M-27, M-28, M-31, M-37, M-38, M-38A, and M-38B and upsized branch interceptor pipes would be constructed downstream of regulators M-33, M-34, M-35 to increase and support the full flow capacity of the main interceptor. This construction would take place primarily in the right-of-way, in the roadways and properties along Avenue C, Avenue D, Columbia Street, Delancey Street, South Street, Water Street, and Jackson Street.

As described in Chapter 5.8, “Water and Sewer Infrastructure,” the drainage management infrastructure consists of three components: (1) an upstream connection to a lateral sewer or regulator; (2) a length of piping; and (3) a downstream connection to the interceptor. Construction of the upstream connection would involve a shallow excavation around the existing sewer or regulator, as described for the interceptor gate. The existing sewer or regulator would be supported while connecting the drainage management piping. The parallel conveyance would be installed during dry weather conditions, above the regular flow level in the lateral sewers, so as not to

interfere with operation of the existing sewer infrastructure. Bypass pumping can be used if needed. For the sewer upsizing for regulators M-33, M-34, and M-35, the existing downstream pipes would be excavated and demolished and the new upsized pipes would be installed at the same elevations as the existing sewers. This work would require bypass pumping during the construction of the connection between the regulator and the new pipe. To install the drainage management piping, open-cut excavation would be used, in which shallow trenches would be excavated to facilitate construction of pipe supports and piles and installation of piping. The branch interceptor for M-33, M-34, and M-35 would also require tunneling below the FDR Drive near East 10th Street to install piping. This tunneling work would be constructed according to DDC and DEP specifications.

The downstream connection to the interceptor would be constructed either by connecting to an existing manhole on the interceptor or by constructing a new manhole on the interceptor. Connection to an existing manhole would be constructed as described for the upstream connection, by supporting the existing manhole structure while the connection is made. Additional structural modifications or enlargements may also be required to provide personnel access to the inside of the manhole and to direct flow to the interceptor. If a new downstream connection manhole is required, a new manhole would be constructed for the drainage management pipe to tie into, using the same method described for the interceptor gate chamber construction. Neither of these construction methods would result in changes to sewer service. All excavated sites would be backfilled and restored after construction. All utilities in the construction zone of influence would be supported, replaced or relocated. Construction of each drainage management component is anticipated to require about three to seven months on average, depending on the location, size of conveyance, type of downstream interceptor connection, and complexity of construction. This work would require lane closures to local traffic throughout the duration of construction. NYCDOT has provided work stipulations for road closures as discussed in Chapter 6.9, "Construction—Transportation."

INFRASTRUCTURE RECONSTRUCTION

To reconstruct the water and sewer infrastructure within East River Park as proposed under the Preferred Alternative and Alternative 5, open-cut excavation would be used to prepare for construction of the new structures and piping. Support of exaction and dewatering, as described for the interceptor gates, would be used to hold the excavation open during construction. The new sewer infrastructure would be constructed on piles and new structures would be constructed with reinforced concrete, similar to the existing infrastructure. The new piping would be installed in open-cut shallow trenches on pipe supports and piles. The new sewer infrastructure would be constructed with reinforced concrete and would be built in a similar configuration as the existing sewer infrastructure. The new piping would be installed in open-cut shallow trenches on pipe supports and piles with the exception of any line crossing the FDR Drive, which would require microtunneling, or a similar trenchless construction method, for installation. Structures such as tide gate chambers, junction chambers and regulators would also be built on pile foundations. DEP and DDC standards and specifications will be used where applicable for design.

Throughout construction, the existing sewer infrastructure would remain in service until the new infrastructure is completed and ready to be connected to the portions of the existing sewer system that will remain. Connecting the reconstructed infrastructure to the existing infrastructure would require bypass pumping. Once completed, the existing infrastructure that is replaced would be filled and abandoned in place.

To reconstruct the outfalls, a watertight cofferdam would be installed adjacent to the bulkhead and the work area would be dewatered. The top of the cofferdam would be above the mean higher-high water line to isolate the work area from tidal influence. The work area would not contain standing water and approved dewatering measures would be installed, as necessary, and would discharge below the mean higher-high water line. A portable sediment tank or approved equivalent would be used to treat dewatering effluent.

FLYOVER BRIDGE

A shared-use flyover bridge is proposed to address the pedestrian/bicycle pinch point near the Con Edison Facility between East 13th Street and East 15th Street. As currently contemplated, the proposed shared-use flyover bridge would be a steel thru-truss superstructure supported on footings placed adjacent to the eastern edge of the northbound FDR Drive lanes, within the limits of the existing East River Bikeway. The proposed flyover bridge would be cantilevered over the northbound FDR Drive. The thru-truss bridge would be approximately 1,000 feet long and 15 feet wide and approximately 19 feet tall from the surface of the bridge deck to the top of the truss. The bridge would have a 16-foot minimum clearance above the elevated roadway between East 13th and East 15th Streets adjacent to the Con Edison pier. The total height of the flyover bridge would be approximately 40 feet above grade. The flyover bridge would slope down to connect to East River Park on the south and to Captain Patrick J. Brown Walk around East 16th Street on the north.

RAISED FDR DRIVE PLATFORM WITH FLOODWALL PROTECTION

As discussed above, under Alternative 5, the northbound lanes of the FDR Drive would be raised approximately 6 feet between East 13th Street and East 18th Street. To create the platform, drilled shafts would be installed generally in the middle lane of the FDR Drive northbound lanes and would extend to bedrock at intervals of approximately 125 feet (with possibly just one shaft needed between Con Edison's intake tunnels). It is estimated that approximately 12 to 15 shafts would be necessary. A precast pre-stressed box structure/raised platform would then sit on the piers supported by the shafts, and a new paved roadway for the northbound FDR Drive would then be supported on the box structure.

Prior to elevating this portion of the FDR Drive, utility infrastructure would be protected, supported, or relocated. Construction of the raised northbound lanes would include drilling shafts, and placement of concrete to provide for the foundation of the structure, installation of piers, and placement of the raised platform. To connect the new elevated roadway and the existing elevated roadway abutment, approximately 200 linear feet of the existing roadway would likely need to be modified or reinforced. This work would require cranes and typical earthwork equipment such as excavators and loaders. On the east side of the elevated roadway, a floodwall would be installed to protect the protected area from flooding, replacing the existing parapet wall of the abutment.

Construction associated with the raised FDR Drive platform would require work within and/or near the FDR Drive that would necessitate temporary FDR Drive closures, as detailed below under "Construction Schedule."

CONSTRUCTION METHODS

MATERIALS TRANSPORT

Construction materials would be delivered to and removed from the project area by a combination of trucks and barges. For the Preferred Alternative, since a substantial amount of fill would be required to raise East River Park approximately 8 feet to meet the design flood elevation, most of

the fill materials are anticipated to be transported by barges, with the exception of specialty top soils that are required for planting. Based on preliminary estimates, it is anticipated that approximately 600,000 cubic yards of fill would be required for construction under the Preferred Alternative.

Truck Transport

Construction materials (e.g., top soil, rebars, concrete) that are transported by trucks (e.g., dump trucks, flatbed trucks, concrete trucks) would adhere to strict schedules as a result of site constraints and limited vehicular access to the different construction areas along the project alignment (e.g., within East River Park, along the FDR Drive, near Con Edison properties). To adhere to delivery schedules, flaggers would be employed where necessary, pursuant to standard procedure for construction in the City. The flaggers could be supplied by the contractor on site at that time or by the construction manager. The flaggers would manage trucks traffic into and out of the project area. In addition, the flaggers would aid trucks entering and exiting the on-street traffic streams in order to ensure the safety of the public passing through the area.

The area under the Williamsburg Bridge is currently cordoned off to restrict access to the six 30-foot by 30-foot bridge footings, but additional safety measures such as additional fencing and flaggers would be implemented, where necessary, during construction to protect the footings from the construction traffic streams passing through this area.

Barge Transport

Under the scenario in which barges supplement truck deliveries, the potential barge mooring locations considered the following factors: proximity to the Federal Navigation Channel; proximity to the Williamsburg Bridge, existing water depth, location of ferry landings, proximity to the Con Edison Pier, and shoreline features (e.g., pedestrian bridges) that cannot support truck weights.

The shorefront area north of the Fireboat House to the north end of East River Park, with the exception of the areas immediately adjacent to the Williamsburg Bridge, is potentially a suitable location for barge mooring, loading, and unloading to support construction operations (see **Figure 6.0-2**). In addition, construction barges used for storage may be sited along the bulkhead in up to three other locations: between Pier 36 and Pier 42, at the northern end of East River Park, and/or along Captain Patrick J. Brown Walk.

One potential barge delivery option would involve using a harbor barge to transport equipment and materials (e.g., excavated materials, fill) to/from the project area. Under this option, the harbor barge would be transported to the project area by a tug boat. The harbor barge would be moored along the shoreline and a crane would be used to load/unload the materials to East River Park. When the harbor barge is emptied or filled, a new barge would take its place, and a tug boat would transport the emptied or full barge off-site.

Another potential barge delivery option would involve using both transit barges, which may be employed to supplement truck deliveries, and storage barges. With this technique, temporary unloading barges would be installed parallel to the bulkhead in water of sufficient depth to preclude any need for dredging. The anchoring of construction barges would be accomplished with spuds (vertical steel shafts) located on the barges. Monopile dolphins (a cluster of piles used as a fender for the bulkhead) could also be installed to control the transverse movements of transit barges to ensure safe barging operations. Transit barges would then deliver materials and equipment to the unloading barges. The unloading barges, typically used to support excavators

Potential Barge Mooring Locations

Bulkhead & Pierhead

HS20 Loading

Depth of Water (35 Feet or Greater)

Note: Potential barge mooring locations would be further developed during construction design.

0 1,000 FEET

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Potential Barge Mooring Locations

Figure 6.0-2

and small crawler cranes used for transferring materials from transit barges to the shoreline, would be sited along the bulkhead and moved as necessary between the East River Park Fireboat House and the north end of the park.

Depending on the construction contractor means and methods, a concrete batch plant may be mounted on a barge or within the closed East River Park to supply the concrete needed for the construction at East River Park. For this option, concrete trucks would be used to deliver the concrete from the barge to the inland areas and would travel only within East River Park, which would reduce truck traffic in nearby roadway networks.

Barging operations would primarily require the installation of steel piles, monopile dolphins, and barge ramps. Construction would likely involve the use of construction barges with barge-mounted cranes and a vibratory pile driver or other drilling equipment to place the piles. Access from the landing barge to East River Park could be accomplished by using a ramp with traffic control for pedestrians.

PILE INSTALLATION METHOD

It is assumed that the steel piles for the proposed project would be installed with hydraulic or diesel impact hammers for the reasonable worst-case construction noise and vibration analysis presented in Chapter 6.12, "Construction—Noise and Vibration." However, the proximity to and sensitivity of the existing Con Edison transmission lines to movement may require construction methods that minimize vibrations during installation. In addition, construction would take place adjacent to a densely populated residential neighborhood. Moreover, pile installation would be required for the construction of the floodwall within the project area which extends from Montgomery Street to East 25th Street and would likely take considerable time to complete. Therefore, a method that would reduce the noise created by pile driving has been considered.

One alternative method for installation of the steel sheet piles for the northern and southern ends of East River Park and between the Con Edison East River Generating Station and Murphy Brothers Playground is the "press-in" hydraulic pile driver. The "press-in" method is quieter, limits vibrations, and requires smaller staging areas and overhead clearance than traditional methods, but is not suitable for pile installation should large subsurface obstructions be encountered.

D. CONSTRUCTION SCHEDULE

Construction of the proposed project is anticipated to be completed in 2025. Under the Preferred Alternative, the flood protection, reconstruction of three existing pedestrian bridges, foundations for a new shared use flyover bridge, and park access features are expected to be completed in 2023, which would provide the flood protection in an accelerated timeframe before the hurricane season of 2023 compared to other alternatives that would have flood protection installed by 2025. Under the Preferred Alternative, the superstructure of the shared-use flyover bridge would then be completed in 2025.

This shorter construction duration for the flood protection under the Preferred Alternative is primarily due to less construction disruption and delay along to the FDR Drive (which would require temporary nighttime single-lane closures of the FDR Drive to allow construction) and reduced Con Edison transmission line complexity since the flood protection alignment under this alternative is primarily along the existing esplanade of East River Park. Closures of the FDR Drive would need to meet requirements set forth by NYCDOT and would be limited to approximately 6 hours of single-lane closure of the FDR Drive per night. The Preferred Alternative, as well as

Alternatives 3 and 5 also assume full closure of East River Park during construction. The City is committed to the outdoor recreational needs for these communities and is currently identifying opportunities to open portions of East River Park as work is completed, however, to be conservative, the analysis assumes a full close of the park for 3.5 years. The construction schedule serves as the basis of the technical analyses presented in the subsequent construction chapters.

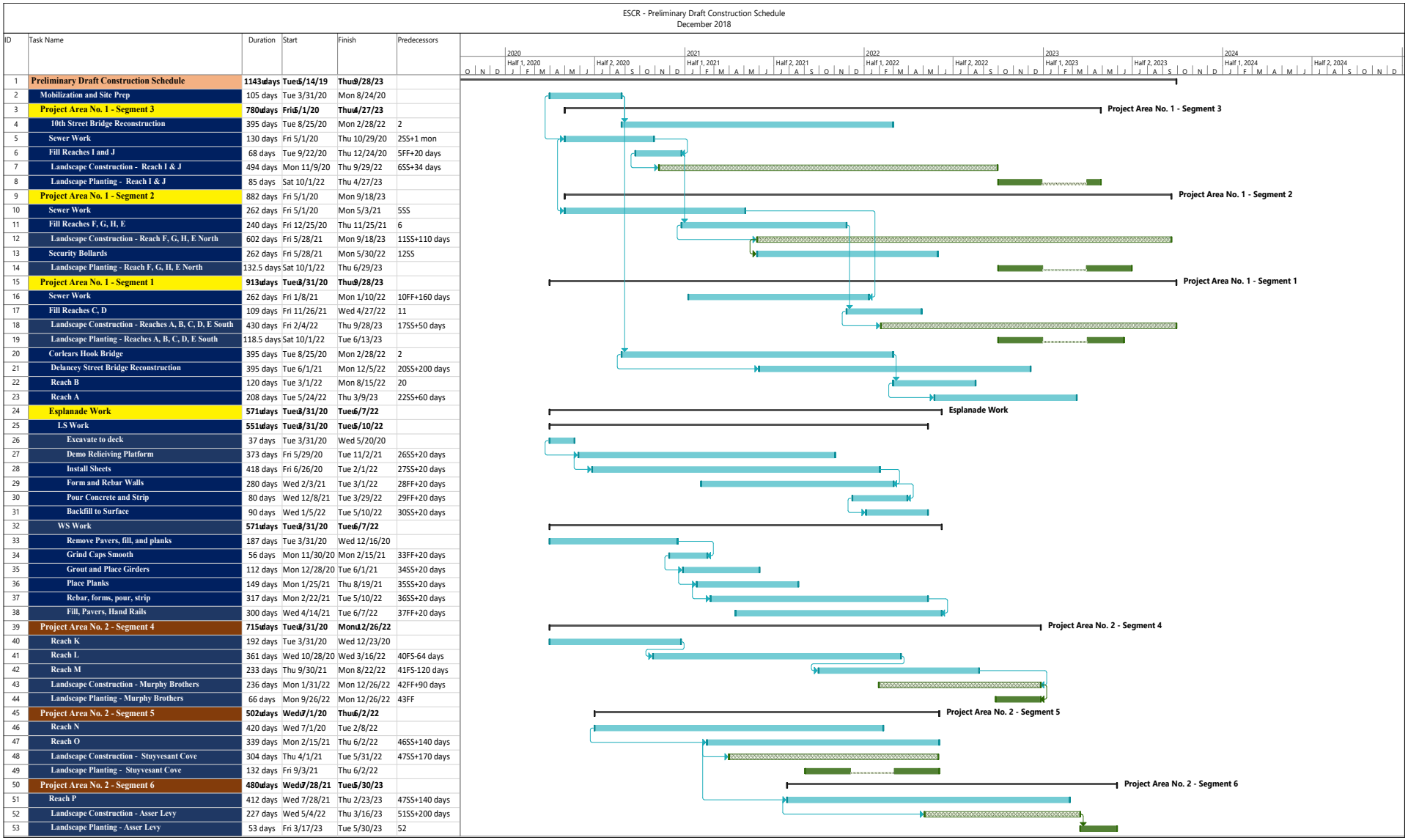
Due to the length corridor of the proposed project, construction activities in Project Area One are separated into three primary segments: Segment 1 encompasses construction from Montgomery Street to the Williamsburg Bridge; Segment 2 encompasses construction from the Williamsburg Bridge to the northern end of the Track and Field Complex; and Segment 3 encompasses construction from the northern end of the Track and Field Complex to the northern end of East River Park (see **Figure 6.0-1**).

Similarly, construction activities in Project Area Two are also separated into three segments: Segment 4 encompasses construction from south of the Con Edison Complex at approximately East 14th Street to Murphy Brothers Playground and includes the closure structure across the FDR Drive; Segment 5 encompasses construction within and immediately adjacent to Stuyvesant Cove Park; and Segment 6 encompasses construction at and near Asser Levy Playground, including the gate spanning the playground and connecting to the VA Medical Center (see **Figure 6.0-1**).

PREFERRED ALTERNATIVE

The preliminary construction schedule for the Preferred Alternative is shown on **Figure 6.0-3** and **Table 6.0-1**. The schedule assumes 5 workdays per week with one 8-hour day shift and when necessary, one 6-hour night shift per workday. The night shift would accommodate pile installation activity in proximity of the FDR Drive. Construction of the Preferred Alternative is anticipated to occur at all segments more or less simultaneously during a majority of the construction period, with limited or no access to the park resources (i.e., East River Park, Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground) until work is completed at that resource. However, the flood protection system and raised East River Park proposed under this alternative would be constructed in 3.5 years and completed in 2023 compared to the 5-year construction duration anticipated under Alternatives 2, 3, and 5. The foundations for the shared-use flyover bridge would also be completed in 2023, with the prefabricated bridge span installed and completed in 2025. The Preferred Alternative would result in less disruption to the FDR Drive because the floodwall would be primarily below-grade along the East River instead of along the FDR Drive in Project Area One.

As discussed above, the Preferred Alternative would raise East River Park by an average of approximately eight-feet with the floodwall installed below-grade to meet the design flood elevation criteria. In addition, the Delancey Street, East 10th Street, and Corlears Hook bridges would be reconstructed. Furthermore, existing park infrastructures including a portion of the park's underground water and drainage infrastructure and bulkhead and esplanade would be reconstructed, along with existing park structures and recreational features, including the amphitheater, track facility, and tennis house, as part of the raised park. Relocation of two existing embayments along the East River Park esplanade is also proposed under this plan to facilitate a direct connection to the water, increase the type and quality of park user experiences, and allow for the retention of extremely heavily utilized active recreation fields within the park.



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Preliminary Construction Schedule: Preferred Alternative

Figure 6.0-3

Table 6.0-1
Preliminary Construction Schedule for Preferred Alternative

Project Element	Start Month	Finish Month	Approximate duration[1] (months)
Project Area One			
Segment 3 [Northern End of Track and Field Complex to Northern End of East River Park]	May 2020	April 2023	36
Segment 2 [Williamsburg Bridge to Northern End of East River Park]	May 2020	September 2023	41
Segment 1 [Montgomery Street to Williamsburg Bridge]	March 2020	September 2023	42
Esplanade Work	March 2020	June 2022	28
Project Area Two			
Segment 4 [South of Con Edison Complex to Murphy Brothers Playground]	March 2020	December 2022	34
Segment 5 [Stuyvesant Cove Park]	July 2020	June 2022	23
Segment 6 [Area around Asser Levy Park]	July 2021	May 2023	23
Flyover Bridge	-	-	42
Drainage Elements[2]			
Interceptor Gates	-	-	12 per gate
Regulators, Drainage Structures, and Manholes	-	-	4 to 6
Tide Gates	-	-	2 to 3
Isolation Gate Valve	-	-	1 to 3
Parallel Conveyance	-	-	3 to 7 per element
Lateral Sewer Upsizing	-	-	21
Infrastructure Reconstruction	-	-	6 to 12 per segment

Note:
[1] Assumes 5 workdays per week with one 8-hour day shift and, as needed, one 6-hour night shift per workday.
[2] Construction activities related to the drainage management elements may occur at any time over the 3.5-year construction period.
Source: AKRF-KSE Joint Venture, December 2018.

ALTERNATIVE 2

Alternative 2 would provide the requisite flood protection for the protected area, but lacks elements proposed as part of Alternative 3 as described below, including reconstruction of the Delancey and East 10th Streets Bridges, the reconstruction of Murphy Brothers and Asser Levy Playgrounds, the creation of a park-side plaza landing at the East Houston Street overpass, the implementation of certain resiliency measures in East River Park and a shared-use flyover bridge between the northern end of East River Park and Captain Patrick J. Brown Walk. As such, Alternative 2 would require less construction activity/earthwork and material deliveries and East River Park is not anticipated to be fully closed during construction under this alternative. However, the construction and duration of Alterative 2 would be expected to be similar to Alternative 3 (see **Table 6.0-2**), described below, since the line of flood protection under Alternative 2 would also be generally located on the west side of East River Park where construction would require FDR Drive lane closure that is limited to overnight hours. Therefore, for the purposes of the EIS analysis, construction of Alternative 2 is assumed to have a similar phasing sequence and a construction duration that is comparable to or shorter than Alternative 3, described below.

ALTERNATIVE 3

The preliminary construction schedule for Alternative 3 is shown on **Table 6.0-21**. The schedule assumes 5 workdays per week with one 8-hour day shift and when necessary, one 6-hour night shift per workday. The night shift would accommodate pile installation activity in proximity of the FDR Drive.

Construction activities are anticipated to proceed from north to south in Project Area One and would begin first with Segments 2 and 3. The primary reason for this phasing approach is that Montgomery Street is the only existing vehicular access point to East River Park. Using the north to south phasing, once a construction phase is completed, construction-related vehicles would no longer need to travel on the newly constructed shared-use pathway. During construction of Alternative 3, East River Park is anticipated to be closed during the project's construction period, with limited or no access to this park resource until construction is completed.

As with Alternative 2, Alternative 3 includes the shared-use flyover bridge and drainage elements to modify the existing sewer system to isolate the protected area from the larger sewershed during design storm events to prevent coastal floodwaters from inundating the protected area. The existing sewer system would also be modified to increase its capacity to convey flows during design storm events with coincident rainfall, thereby managing flooding within the protected area. These modifications include installation of two interceptor gates, an isolation gate valve, replacing existing tide gates on outfalls, floodproofing sewer infrastructure on the unprotected side of the flood protection system, installing parallel conveyance and upsizing one branch interceptor. The durations of construction for each of these modifications is presented in **Table 6.0-2** and could be included at any time during the five-year construction period.

Table 6.0-2
Preliminary Construction Schedule for Alternative 3

Project Element	Start Month	Finish Month	Approximate duration[1] (months)
Project Area One			
Segment 3 [Northern End of Track and Field Complex to Northern End of East River Park]	March 2020	March 2022	25
Segment 2 [Williamsburg Bridge to Northern End of East River Park]	March 2020	March 2023	37
Segment 1 [Montgomery Street to Williamsburg Bridge]	June 2022	March 2025	34
Project Area Two			
Segment 4 [South of Con Edison Complex to Murphy Brothers Playground]	March 2020	March 2023	37
Segment 5 [Stuyvesant Cove Park]	May 2021	April 2023	23
Segment 6 [Area around Asser Levy Park]	March 2023	March 2025	25
Flyover Bridge			42
Drainage Management Elements[2]			
Interceptor Gates	-	-	12 per gate
Regulators, Drainage Structures, and Manholes	-	-	4 to 6
Tide Gates	-	-	2 to 3
Isolation Gate Valve	-	-	1 to 3
Parallel Conveyance	-	-	3 to 7 per element
Lateral Sewer			21

Note:
[1] Assumes 5 workdays per week with one 8-hour day shift and, as needed, one 6-hour night shift per workday.
[2] Construction activities related to the drainage management elements may occur at any time over the 5-year construction period.
Source: Turner Construction Company, December 2015; AKRF-KSE Joint Venture, revised December 2018.

ALTERNATIVE 5

Flood protection features and connectivity improvements for Alternative 5 would remain largely the same as the Preferred Alternative. However, under this alternative, the northbound lanes of the FDR Drive would be raised approximately 6 feet between East 13th Street and East 18th Street **Tables 6.0-3 and 6.0-4** presents the preliminary construction schedule for this alternative, assuming one drilling crew for the installation of raised platform shafts and one drilling crew for

the installation of flyover bridge shafts. As shown in **Table 6.0-4**, the construction duration of shaft installation may be accelerated if multiple crews are able to work simultaneously.

Table 6.0-3
Preliminary Construction Schedule for Alternative 5

Project Element	Start Month	Finish Month	Approximate duration (months)
Raised Platform / Flood Protection System			
Mobilization and Site Preparation	Month 1	Month 2	2
Installation of Raised Platform Shafts[1]	Month 3	Month 8	6
Installation of Raised Platform and Paving[2]	Month 9	Month 10	2
Construction Closeout	Month 11	Month 12	2

Notes:
[1] Assumes weekend closure of northbound lanes (and possibly a southbound lane) of the FDR Drive.
[2] Assumes closure of all FDR Drive northbound lanes and potentially one southbound lane.
Source: NYCDOT, February 2016.

Table 6.0-4
Preliminary Construction Schedule for Shaft Installation

Project Element	Number of Shafts Required	Installation Pace per Crew	Approximate Construction Duration for the Raised Platform for Flyover Bridge (in months)		
			With 1 Crew	With 2 Crews	With 3 Crews
Raised Platform / Flood Protection System					
Installation of Raised Platform Shafts	12 to 15	3 to 4 weekends per shaft (includes drilling, rebar and concrete placement)	4 to 6	2 to 4	1.5 to 3

Source: NYCDOT, March 2016.

Construction of this alternative would require work within the FDR Drive. Assumptions for construction phasing and implementation include:

- Weekend closure of northbound lanes (and possibly a southbound lane) of the FDR Drive during the installation of the raised platform shafts (approximately 12 to 24 successive weekends, or 1 to 2 weekends per shaft; the installation of each shaft would also require additional time for rebar and concrete placement);
- Weekend closure of the bikeway/walkway between Stuyvesant Cove Park and East River Park during installation of the flyover bridge shafts and diversion of bicycle and pedestrian traffic;
- Closure of all FDR Drive northbound lanes and potentially one southbound lane for installation of the proposed raised platform and paving (approximately two months); and
- Closure of the bikeway/walkway between Stuyvesant Cove Park and East River Park for installation of the proposed bridge structure (approximately two months).

E. DESCRIPTION OF CONSTRUCTION ACTIVITIES

Construction activities are based on the preliminary Preferred Alternative, and the associated construction requirements may change as the project design progresses and is finalized.

POTENTIAL CONSTRUCTION STAGING AREAS

In Project Area One, since the majority of East River Park would be reconstructed and activities would occur simultaneously across all segments, construction staging for activities within East River Park could occur anywhere within the park to allow for optimal construction efficiency.

Tables 6.0-5 show the locations that are in consideration for the temporary staging of construction materials, equipment, and trucks as well as truck loading/unloading activities in Project Area Two. After construction is complete, these areas would be reconstructed and where applicable, the active use amenities would be replaced or restored. The construction staging areas would be used to facilitate the construction of the proposed project.

Table 6.0-5
Potential Staging Area Locations for Construction within Project Area Two

Affected Resource	Existing Uses	Description of Construction Activities	Potentially Affected Area (sq. ft.)
Murphy Brothers Playground	Baseball Fields, Basketball Court, Handball Court, Playground	Construction staging area for proposed flood protection system at Murphy Brothers Playground	43,600
Stuyvesant Cove Park	Picnic Areas, Bicycle Path, Solar One	Construction staging area for proposed flood protection system in Stuyvesant Cove Park	82,800
Asser Levy Playground	Basketball Court, Handball courts, Playground, Recreation Building, Outdoor Pools	Construction staging area for proposed flood protection system in Asser Levy Playground	27,300
Con Edison Area 1 (East 14th Street)	Existing roadway with restricted access	Construction staging area for proposed flood protection system (Segment 4 construction west of the FDR Drive near Con Edison facility)	6,000
Con Edison Area 2 (East 15th Street)	Existing roadway with restricted access	Construction staging area for proposed flood protection system (Segment 4 construction west of the FDR Drive near Con Edison facility)	8,500
Con Edison Area 3 (Workout Facility)	Service center for Con Edison's electric, gas, construction, and steam operations	Construction staging area for proposed flood protection system (Segment 4 construction west of the FDR Drive near Con Edison facility)	25,000
EDC Area 1	Parking Lot	Construction staging area for proposed flood protection system (Segment 5 construction west of the FDR Drive near Con Edison facility)	50,000
EDC Area 2	Parking Lot	Construction staging area for proposed flood protection system (Segment 5 construction west of the FDR Drive near Con Edison facility)	35,000

1. **Murphy Brothers Playground.** Murphy Brothers Playground is the proposed construction staging area to support construction activities within this site. The playground is not anticipated to be used to support the construction of the proposed flood protection system from the south of the Con Edison Complex (at East 13th Street) to south of the playground.
2. **Stuyvesant Cove Park.** Stuyvesant Cove Park is the proposed construction staging area to support construction activities within this site. However, access to the ferry landing near the southern end of the park and the Solar One Environmental Education near the northern end of the park would be maintained throughout the construction period.

3. **Asser Levy Playground.** Asser Levy Playground is the proposed construction staging area to support the construction of the proposed flood protection system and playground reconstruction at this site.
4. **Con Edison Area 1 (East 14th Street).** This area is proposed to be used for storage, access, and construction of the floodwall and floodgates across East 14th Street. Without access through this area, the construction of the floodwall and floodgates would need to be staged from the FDR Drive side. Materials and equipment used for the construction would have to be brought in from the East 20th Street FDR Drive entrance and exit the FDR Drive at East Houston Street at the end of every shift. This restriction may substantially affect construction productivity. The use of this area would permit easier access to the construction zone along the FDR Drive in Reach K (floodwall, roller gate, and pedestrian gates at the end of East 14th Street). If this area is used, coordination with Con Edison would be made to ensure that access to Con Edison's utility properties, facilities, equipment, and infrastructure would be maintained at all time during construction.
5. **Con Edison Area 2 (East 15th Street).** This area is proposed to be used for storage, access, and construction of the floodwall and floodgates across E15th Street. Without access through this area, the construction of the floodwall and floodgates would need to be staged from the FDR Drive side. Materials and equipment used for the construction would have to be brought in from the East 20th Street FDR Drive entrance and exit the FDR Drive at East Houston Street at the end of every shift. This restriction could substantially affect construction productivity. The use of this area would permit easier access to the construction zone along the FDR Drive in Reach L (floodwall, swing gate, and pedestrian gate from the end of E15th Street to Murphy Brothers Playground). If this area is used, coordination with Con Edison would be made to ensure that access to Con Edison's utility properties, facilities, equipment, and infrastructure would be maintained at all time during construction.
6. **Con Edison Area 3 (Workout Facility).** This area is proposed to be used for storage, access, and construction of the floodwall along the Con Ed parking lot from the end of East 15th Street to Murphy Brothers Playground. Without access through this area, the construction of the floodwall would need to be staged completely from the FDR Drive side. Materials and equipment used for the construction would have to be brought in from the East 20th Street FDR Drive entrance and exit the FDR Drive at East 15th Street or East Houston Street at the end of every shift. The currently closed off exit lane and striped area from the East 20th Street ramp would be used to facilitate construction of the floodwall but it is anticipated that additional space within the Con Edison parking lot would still be needed. If this area is used, coordination with Con Edison would be made to ensure that access to Con Edison's utility properties, facilities, equipment, and infrastructure would be maintained at all time during construction.
7. **EDC Area 1.** This area, which is currently under the jurisdiction of SBS and maintained by EDC, is proposed to be used for the storage of materials and equipment to facilitate construction of the flood protection system and associated park improvements within Stuyvesant Cove Park. Use of the existing parking area would help reduce the storage area required within Stuyvesant Cove Park itself (which would be under construction) and would also minimize interference with the ferry landing at East 20th Street. Portions of the floodwall and closures structures which run underneath the FDR Drive viaduct would require the parking lot area located below the elevated FDR Drive for their construction. Where the floodwall and closure structures are outside of the FDR Drive viaduct alignment, the parking lot area would be used to stage construction materials and equipment. The availability of the

parking lot area is crucial for the construction of the project due to the narrow width of Stuyvesant Cove Park for staging and restrictions on staging materials.

8. **EDC Area 2.** This area, which is currently under the jurisdiction of SBS and maintained by EDC, is also proposed to be used for the storage of materials and equipment to facilitate construction of the flood protection system and associated park improvements within Stuyvesant Cove Park. In addition, this area would be needed to stage materials and equipment for the construction of two proposed roller floodgates in this area. Use of the existing parking area would help reduce the storage area required within Stuyvesant Cove Park itself (which would be under construction). This would help minimize interference with access to the existing ferry landing. The availability of the parking lot area is crucial for the construction of the project due to the narrow width of Stuyvesant Cove Park for staging, restrictions on staging materials, and the need to maintain access to the ferry landing.

FLOOD PROTECTION SYSTEM AND ACCESS IMPROVEMENT ELEMENTS CONSTRUCTION

The description below summarizes the elements that are specific to the Preferred Alternative, which reflects the current design. The construction elements in Project Area Two is the same for Alternatives 3 through 5.

PROJECT AREA ONE

Segment 1

This segment would include the construction of a series of concrete I-walls and swing floodgates at street crossings (Montgomery Street and the FDR Drive on-ramp). A concrete I-wall that extends along the interior edge of the southern portion of East River Park adjacent to the FDR Drive would be constructed. Moving northward, the flood protection alignment would cross under the shared-use path south of the existing amphitheater and continue towards the esplanade. The Corlears Hook Bridge would be reconstructed to accommodate pedestrian, bicycle, and park maintenance vehicle access. The existing amphitheater would be relocated closer to the waterfront and reconstructed with landscaping features. From north of the amphitheater within this segment, the park would be raised with the placement of filled material to a minimum elevation of 16.5 feet NAVD88 with the installation of a below-grade floodwall, followed by the construction of the proposed park and landscaping features. This segment would also include the reconstruction of the relocated (south) Delancey Street Bridge. The East River Promenade would be modified and reconfigured to raise the elevation of the deck and introduce new hardscape features. Furthermore, the existing water and sewer infrastructure within East River Park would be reconstructed and hardened, and the waterfront embayment would be relocated and reconstructed near the amphitheater to accommodate the proposed park programming.

Segment 2

Similar to Segment 1, East River Park within this segment would be raised with the placement of filled material to a minimum elevation of 16.5 feet NAVD88 with the installation of a below-grade floodwall, the East River Promenade would be modified and reconfigured to raise the elevation of the deck and introduce new hardscape features, and the existing water and sewer infrastructure would be reconstructed and hardened. Segment 2 would also include the construction of the 12 relocated tennis courts and meandering paths. The existing oval plaza and Reflections Labyrinth would both be removed and a secondary path would be raised to meet the apex of the new earthen slope at the East Houston Street overpass. Ball Fields Nos. 3 through 6 would be reconfigured and relocated to allow for the new park entrance at East Houston Street. The existing embayment area

in south of Track and Field Complex would be relocated to south of Ball Fields Nos. 3 and 6 to accommodate the proposed park programming. In addition, the existing Track and Field Complex as well as the existing Tennis House, Track and Field building, and comfort stations at the tennis courts and adjacent to the track would be reconstructed and raised.

Segment 3

Similar to Segments 1 and 2, East River Park within this segment would be raised with the placement of filled material to a minimum elevation of 16.5 feet NAVD88 with the installation of a below-grade floodwall, the East River Promenade would be modified and reconfigured to raise the elevation of the deck and introduce new hardscape features, and the existing water and sewer infrastructure would be reconstructed and hardened. In addition, within this segment, the existing East 10th Street bridge would be replaced with a widened bridge slightly southward, the existing playground and picnic and barbecue areas would be rebuilt and expanded, the basketball courts (to be relocated to South of the Williamsburg Bridge) would be replaced with picnic lawns, and Ball Fields Nos. 7 and 8 would be reconfigured and combined into one multiuse field. This segment would also include the construction of footings for the proposed shared-use flyover bridge between the north end of East River Park and Captain Patrick J. Brown Walk, and subsequently the superstructure of the flyover bridge. A pair of swing floodgates would be constructed across the FDR Drive to connect the park-side floodwall to a city-side floodwall that begins the Project Area Two flood protection system (as described in more detail below for Segment 4).

East River Park Restoration

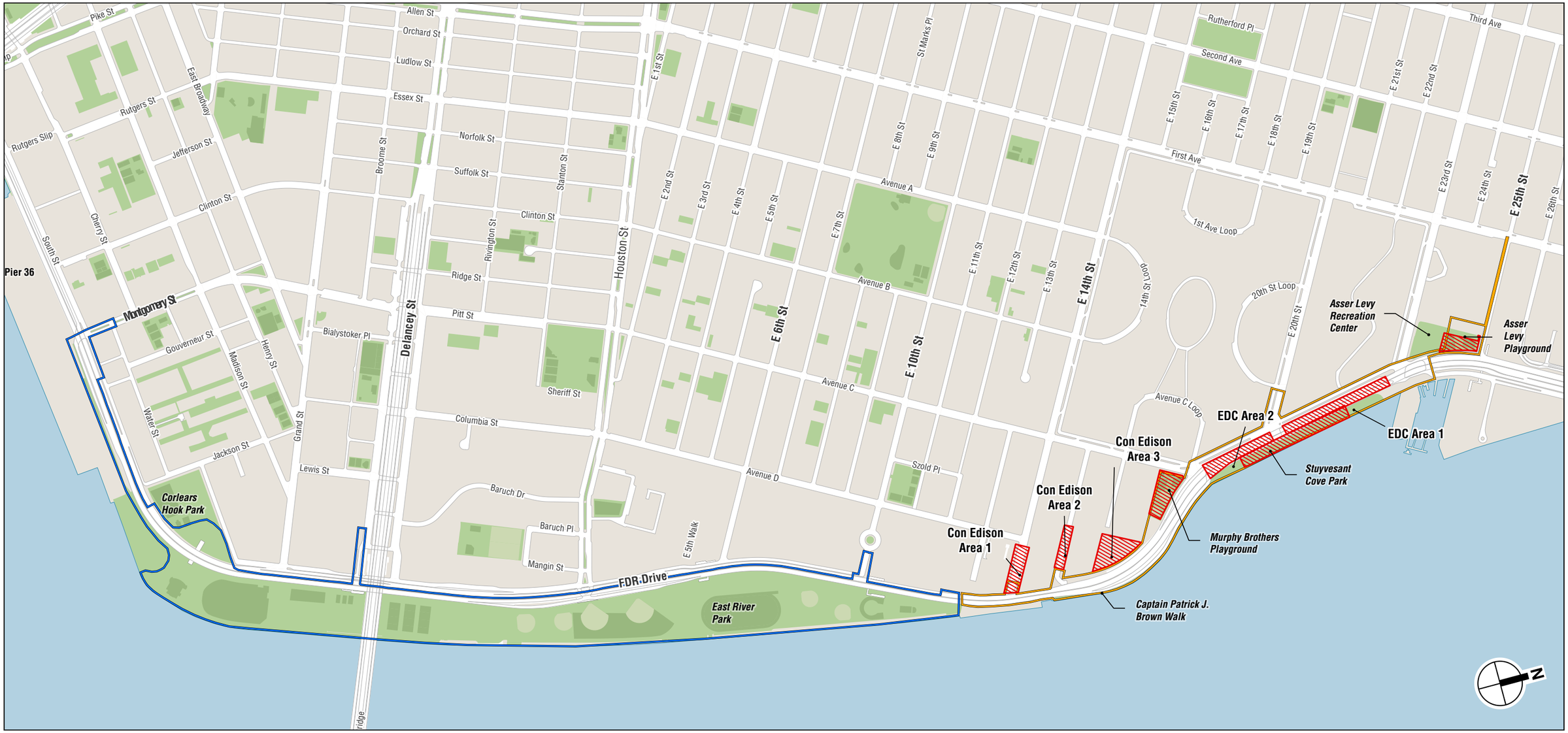
The proposed project would require activities to restore East River Park following construction. These activities would include planting trees in disturbed areas, removing construction barriers, and seeding and planting remaining disturbed areas. These activities would primarily entail landscaping work and final grading, though some staging areas may require replacing or reinstalling temporary fences or other features such as benches and lighting that had been temporarily removed. Seeding and planting activities may also include installing erosion control or slope stabilization measures in some areas.

PROJECT AREA TWO

Segment 4

Site preparation activities for Segment 4 would primarily entail: installing construction fencing within Con Edison's parking area and at Murphy Brothers Playground; removing the existing playground; clearing and grubbing plants and trees; protecting trees to remain during construction; and preparing the ballfields at Murphy Brothers Playground (including removing fencing and backstops) for use as a storage and staging area (see **Figure 6.0-4**).

The primary construction activity in Segment 4 would include installing the steel sheet pile I-wall along the FDR Drive from East 13th Street to the Con Edison East 13th Street Substation and from East 15th Street—adjacent to the Con Edison parking area—to the west of Murphy Brothers Playground at Avenue C. Along the Riis Houses, north of East 13th Street, construction of these elements may require the use of cranes positioned on the FDR Drive, necessitating overnight construction during NYCDOT-approved road closure periods. North of East 15th Street, within the Con Edison property, pile driving operations would be performed by cranes stationed within the former East 14th Street exit lane or from within the existing Con Edison parking area. At Murphy Brothers Playground, pile installation would be performed from within the ball fields and



Project Area One

Project Area Two

Potential Construction Staging Areas

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Potential Construction Staging Areas
Project Area One and Project Area Two

Figure 6.0-4

playground. At the roadway crossings at East 14th Street and East 15th Street, construction work would consist of excavation, foundation and cut-off wall installation, jet grouting, forming and pouring CIP concrete, and steel gate fabrication and installation. Gate installation at the site would require special handling due to proximity to the elevated FDR Drive.

Segment 4 would also include constructing two pairs of swing floodgates across the FDR Drive near the Con Edison facility, which is anticipated to take approximately one year to complete. Construction of the proposed project at this section is comprised of the following key elements:

- A floodwall with a foundation and gate columns that would be constructed in the center median of the FDR Drive;
- Cut-off walls, foundation slabs, and approach slabs for the proposed floodgates that would be installed within the north and southbound lanes of the FDR Drive
- A gate-column structure west of the FDR Drive southbound lanes that would be installed in the area between the existing highway barrier and the sidewalk;
- A gate-column structure east of the FDR Drive northbound lanes that would be installed in East River Park;
- Installation of prefabricated floodgates; and
- A deployment test.

The transportation effects of constructing the swing floodgates across the FDR Drive are discussed in detail in Chapter 6.9, "Construction—Transportation."

This segment would also include the construction of footings for the proposed shared-use flyover bridge between Captain Patrick J. Brown Walk and the north end of East River Park, and subsequently the superstructure of the flyover bridge.

Segment 5

Site preparation activities for Segment 5 would primarily entail the following: creating new pedestrian and bicycle circulation routes along Avenue C; installing construction fencing; creating a vehicular access point at East 20th Street; removing park furniture and features; and clearing and grubbing plants and trees throughout the park.

The primary construction activities within Segment 5 consist of excavation, foundation and cut-off wall installation, Con Edison utility carbon fiber wrap construction, forming and pouring concrete, and steel gate fabrication and installation. Construction would likely begin on one end of park (i.e., the northern end or the southern end) and proceed linearly to allow continuous movement of operations along the area. Constructing gate foundations and cut-off walls crossing the FDR Drive exit ramp and on-ramp would require excavation and pile installation in the roadway, which would be performed during overnight hours. All roadway closures would be coordinated with NYCDOT. At the north end of the construction segment adjacent to the existing fuel station, excavation to install wall and gate foundations would require careful excavation to minimize risk to the subsurface fuel tanks. Utility work would likely include relocation of existing water mains within Stuyvesant Cove Park. Work and staging areas for access, materials, equipment, and construction activities would occur within Stuyvesant Cove Park; public access would be limited during construction. However, access to the proposed ferry landing and near the southern end of the park and the Solar One Environmental Education Center near the northern end of the park would be maintained throughout the construction period.

Segment 6

Site preparation activities for Segment 6 would primarily entail: installing construction fencing within Asser Levy Playground and beneath the elevated FDR Drive; removing existing playground and handball courts at Asser Levy Playground, clearing and grubbing of plants and trees within the primary construction zone, protection of trees to remain in the area of disturbance, and the preparation—including removal of features, fencing and walls—of the playground and handball courts at Asser Levy Playground to make ready for use as a storage and staging area (see **Figure 6.0-4**).

The primary construction activities required within Segment 6 consist of excavation; foundation and cut-off wall installation; pile installation for a proposed L-wall along the Asser Levy Recreation Center; concrete formation and pouring; and steel gate fabrication and installation. Constructing gate foundations and cut-off walls crossing Avenue C would require excavation and pile installation in the roadway, which would be performed during overnight hours. All roadway closures would be coordinated with NYCDOT. Installing the closure structures would require special handling due to proximity to the elevated FDR Drive and the historic Asser Levy Bathhouse. Work and staging areas for access, materials, equipment, and construction activities would limit public access to Asser Levy Playground during construction. It is expected that pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use.

F. CONSTRUCTION PRACTICES

This section describes the construction practices that would be employed for the construction of the proposed project, including hours of work, material deliveries, vehicular access and circulation, pedestrian/bicyclist access and circulation, public safety, Maintenance and Protection of Traffic (MPT) plans, and rodent control. The construction practices described below would be applicable for Alternatives 2 through 5 unless otherwise noted.

HOURS OF WORK

Construction of the proposed project would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7:00 AM and 6:00 PM on weekdays. Construction work would typically occur on weekdays and typically begin at 7:00 AM, with most workers arriving between 6:00 AM and 7:00 AM. Normally, work would end at 3:30 PM, but the workday may occasionally be extended beyond normal work hours to complete certain critical tasks (e.g., finishing a concrete pour). Any extended workdays would require only those construction workers involved in the specific task to remain on site and would generally last until approximately 6:00 PM.

The construction schedules presented above in **Table 6.0-1 and Table 6.0-2** assumes five workdays per week with one 8-hour day shift and one 6-hour night shift. The night shift work would be to complete activities that require FDR Drive lane closures, which are only permitted at night. Specifically, the proximity of the proposed project alignment to the FDR Drive, the proposed swing gates across the FDR Drive, and the southern interceptor gate infrastructure adjacent to and below the FDR would require FDR Drive lane closures for excavation, pile driving, and concrete activities. Appropriate work permits from NYCDOT would be obtained for any nighttime work. **Table 6.0-7** shows the schedule for FDR Drive lane closures currently permitted by NYCDOT's Office of Construction Mitigation and Coordination (OCMC).

Table 6.0-7
Schedule for Permitted FDR Drive Lane Closures
Brooklyn Bridge to East 125th Street

Day of Week	One Lane	Two Lanes[1]
Weekdays	11:00 PM to 5:30 AM	1:00 AM to 5:00 AM
Saturday	12:00 AM to 6:00AM	1:00 AM to 5:00 AM
Sunday	1:00 AM to 11:00 AM	1:00 AM to 5:00 AM

Note:
[1] OCMC generally allows for closure of up to two lanes of traffic for 4 hours beginning at 1:00 AM, with clearance, and full re-opening by 5:00 AM; full closure (3 lanes) is generally limited to 15 minutes.
Source: NYCDOT comment letter, April 22, 2015.

Night and weekend work may also be required to make up for weather and/or construction delays and to meet the 2023 or 2025 completion year for construction. Appropriate work permits from DOB and/or NYC Parks would be obtained for any necessary work outside of normal construction and no work outside of normal construction hours would be performed until such permits are obtained

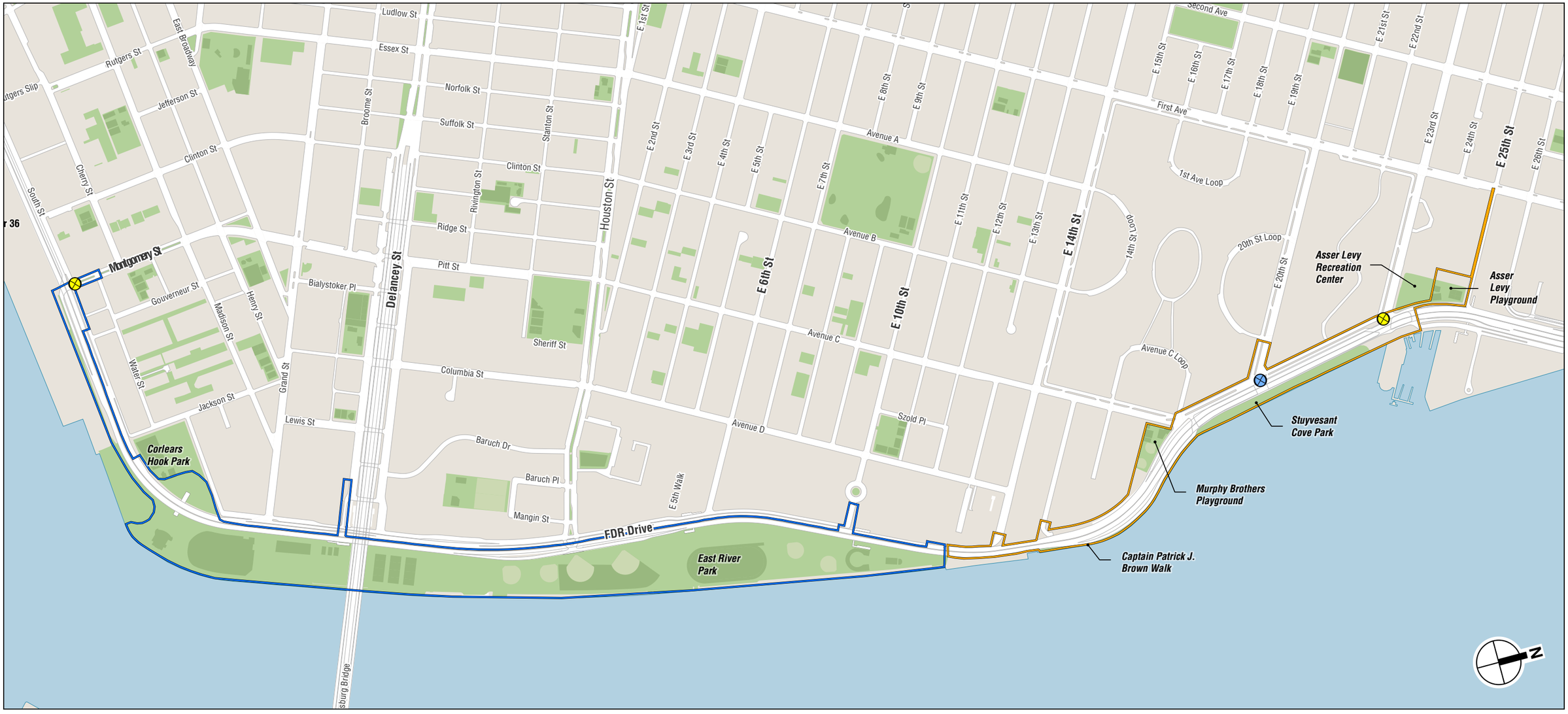
In addition, night and weekend work requires approval of a noise mitigation plan from DEP under the *City's Noise Code*. The *New York City Noise Control Code*, as amended in December 2005 and effective July 1, 2007, limits construction (other than circumstances described below) to weekdays between the hours of 7:00 AM and 6:00 PM and sets noise limits for certain pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM and on weekends) may be permitted only to accommodate one or more of the following: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise effects; and (5) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. Appropriate work permits would be obtained for any necessary work outside of normal construction hours and no work outside of normal construction hours would be performed until such permits are obtained. The numbers of workers and pieces of equipment in operation for weekend work would be limited to those needed to complete the authorized task. Therefore, the level of activity for weekend work would typically be less than a normal workday.

TREE REMOVAL

Construction of the proposed project would result in the removal of between approximately 265 to 981 trees from East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground, and the broader study area. Specific details on the number of trees to be retained, removed, and transplanted for each of these alternatives are presented and discussed in details in Chapter 5.6, "Natural Resources," and **Appendix I**. Tree replacement would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Parks Rules) and Local Law 3 of 2010. All trees that are removed and not transplanted would be mitigated for with a pre-approved NYC Parks Tree Mitigation Plan.

VEHICULAR ACCESS AND CIRCULATION

Figure 6.0-5 shows the existing and potential vehicular access/egress locations to Project Areas One and Two. There is one existing vehicular access/egress location to East River Park at Montgomery Street and the FDR on-ramp. This location would serve as the access/egress point to East River Park for construction vehicles as well as emergency and NYC Parks maintenance vehicles during construction of the proposed project in Project Area One.



Project Area One

Project Area Two

Existing Construction Vehicle Access/Egress Points

Potential Construction Vehicle Access/Egress Points

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Existing and Potential Construction Vehicle Access Points
Project Area One and Project Area Two

Figure 6.0-5

Construction trucks are anticipated to enter/exit through available access point(s) and travel on an internal park access road that runs parallel to the FDR Drive (from Montgomery Street to the northern end of East River Park) to transport materials to/from the active construction areas within the park. The drivable path would be of a width sufficient to allow for efficient transit of construction vehicles traversing the park. Emergency vehicles and NYC Parks maintenance vehicles would also be able to use this road during construction. As discussed above, construction of the flood protection system within Project Area One is anticipated to proceed from north to south. Therefore, construction truck traffic within the park could be eliminated as each phase of construction is completed. (i.e., during construction in Segment 1 on the southern portion of the park, construction trucks would not need to travel on the new shared-use pathway constructed on the northern portion of the park).

The proposed design of the flood protection system in Project Area Two would include elements within Stuyvesant Cove Park. There is one existing vehicular access/egress location to Stuyvesant Cove Park at East 23rd Street, but a potential new vehicular access/egress point at East 20th Street may be temporarily available during construction of the proposed project if the barrier within the existing NYCEDC parking lot under the FDR Drive is removed.

PEDESTRIAN/BICYCLIST ACCESS AND CIRCULATION

As discussed in Chapter 5.9, "Transportation," pedestrians and bicyclists can currently access East River Park at Montgomery Street as well as at five pedestrian crossings, including the Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges, the East Houston Street overpass, as well as from the north-south East River Greenway. Construction workers would access East River Park at these locations during construction. However, Alternatives 3 through 5 would include the reconstruction of the Delancey Street and East 10th Street bridges; Alternatives 4 and 5 also include the reconstruction of the Corlears Hook Bridge. Based on the preliminary construction schedule, these bridges would each be closed for approximately one and a half years during construction for Alternative 2, and for the full duration of the construction period for Alternatives 3, 4, and 5, East River Park would be temporarily closed to accommodate the construction of the proposed project, during which time the public would not have access or limited access to this public park. Therefore, pedestrian and bicyclist circulation through East River Park would be rerouted inland. The following measures are being explored to accommodate pedestrians and bicyclists at this area during construction::

- NYCDOT will reroute greenway users to the most direct alternate route, under The Preferred Alternative.
- NYCDOT will investigate supporting bicycle projects, including the installation of a southbound lane on First Avenue between East 20th Street and East 19th Street and the installation of a standard bicycle lane along East 19th Street between Frist Avenue and Second Avenue or remove parking and install a two-way path along the north curb of East 20th Street between First Avenue and Second Avenue.
- NYCDOT will investigate supporting bicycle projects, including upgrading bicycle facilities on East 10th Street between Avenue C and the proposed park access bridge.

ACCESS TO EAST RIVER PARK AND STUYVESANT COVE PARK FACILITIES

Pedestrians and bicyclists' access to certain existing Park facilities (i.e., Ferry landings in East River Park and Stuyvesant Cove Park, Solar One Environmental Education Center, Pier 42) would be maintained during construction of the proposed project. As discussed in further details below

in "Public Safety," construction fences would be erected, and flaggers would be employed where necessary to ensure safe passage of pedestrians and bicyclists during construction.

Pedestrians and bicyclists can access Stuyvesant Cove Park at three locations, including Avenue C loop and East 18th Street, Avenue C and East 20th Street, and Avenue C and East 23rd Street. However, these locations may be temporarily closed for a portion of the construction period to accommodate construction in this area. The proposed project would also include the temporary closure of Captain Patrick J. Brown Walk during a portion of the construction period to accommodate activities associated with the flyover pedestrian bridge.

COMMUNITY OUTREACH

DDC maintains an Office of Community Outreach and Notification to conduct community outreach for projects managed by DDC. A team of Community Construction Liaisons (CCLs) would be available from pre-construction through the completion of the proposed project to serve as contacts for the community and local leaders, and would be available to address concerns or problems that may arise during construction. The CCLs would maintain direct communication with the construction project managers and would be able to quickly troubleshoot and respond to construction-related inquiries. The CCLs would keep the communities informed during the entire construction period and send out email advisories and notifications, weekly construction bulletins, newsletters, and other forms of information through the Neighborhood Network Notification (NNN) list. The CCLs would also attend meetings held by District Service Cabinet, Community Boards, Elected Officials and other types of community meetings as necessary. The CCLs are managed and staffed by a Borough Outreach Coordinator. In addition, New York City maintains a 24-hour telephone hotline (311) so that concerns can be registered with the City.

PUBLIC SAFETY

A variety of measures would be employed to ensure public safety during construction of the proposed project. A construction fence would be erected around active construction areas to provide a safe path for pedestrians and bicyclists, including commuter access to the ferry landings at the East River Park Promenade near Grand Street and at Stuyvesant Cove Park, during construction. Construction safety signs would be posted to alert the public of ongoing construction activities. Flaggers would be employed to control trucks entering and exiting the construction work areas, to provide guidance to pedestrians and bicyclists, and/or to alert or slow down any on-site vehicular traffic. Further, as discussed above, the area under the Williamsburg Bridge is currently cordoned off to restrict access to the six 30-foot by 30-foot footings but additional safety measures such as additional fencing and flaggers would be implemented where necessary during project construction to protect the footings from the construction traffic streams passing through this area.

All safety requirements would be followed, and construction of the proposed project would be conducted with care to minimize the disruption to the community.

MAINTENANCE AND PROTECTION OF TRAFFIC (MPT) PLANS

Similar to other construction projects in New York City, temporary curb-lane and sidewalk closures would be required at specific locations during construction of the proposed project. MPT plans would be developed for any temporary curb-lane and sidewalk closures as required by NYCDOT. Measures specified in the MPT plans that are anticipated to be implemented may include but not be limited to the following: sidewalk closures; curbside moving lane closures; safety signs; safety barriers; and construction fencing. Approval of these plans and implementation

of the closures would be coordinated with NYCDOT OCMC. Potential traffic effects during construction of the proposed project would be short-term and temporary and would be minimized with the implementation of MPT plans. Additional MPT requirements would be required for Alternative 5 since, as discussed above, the FDR Drive would need to be closed temporarily during construction activities under this alternative.

Temporary curb-lane closures and/or the development of MPT plans are expected to be required immediately adjacent to the planned construction work for the proposed project, at the following locations:

- **Project Area One – Reach A:** A floodwall would be constructed in the public right of way on the sidewalk beginning at Water Street and Montgomery Street that would extend east on Montgomery Street and north on South Street before transitioning to a roller gate at South Street. Temporary curb-lane and/or sidewalk closures would likely be required on the portion of Montgomery Street and South Street adjacent to the floodwall. In addition, MPT plans would be developed for the construction of the swing gates at South Street and the FDR Drive on-ramp.
- **Project Area Two – Reach K:** Two pairs of swing gates are proposed across FDR Drive, crossing where Project Area Two begins. The flood protection system then transitions to an I-wall installed along the western edge of the FDR Drive along the public right-of-way (sidewalk). The floodwall continues north along the west side of the FDR Drive before tying into the existing reinforced brick façade wall that surrounds Con Edison's East 13th Street Substation. MPT plans would be developed for the construction of the closure structures across the FDR Drive.
- **Project Area Two – Reach N:** In this reach, the flood protection system turns east (from east of Murphy Brothers Playground), crossing Avenue C under the elevated FDR Drive to Stuyvesant Cove Park. A series of three swing gates are proposed here to allow both vehicular and pedestrian circulation at the intersection of Avenue C and the FDR Drive service road and ramps. MPT plans would be developed for the construction of the closure structures at the intersection of Avenue C and the FDR Drive service road and ramps.
- **Project Area Two – Reach P:** The floodwall would continue north past East 23rd Street along the Asser Levy Playground property line, and then would turn west to continue just north of Asser Levy Recreation Center, where a roller gate system would span the large opening. The roller gate would tie into the VA Medical Center flood protection system. Temporary curb-lane and/or sidewalk closures would likely be required on the portion of the FDR Drive Service Road and near East 23rd Street adjacent to the flood protection system. In addition, MPT plans would be developed for the construction of the closure structures at South Street and the FDR Drive on-ramp.
- **Project Areas One and Two (FDR Drive):** As discussed above in "Hours of Work," the FDR Drive may need to be temporarily closed during construction due to the proximity of the proposed project alignment to the FDR Drive and location of the southern interceptor gate adjacent to and below the FDR Drive. In addition, the proposed project would include the construction of two pairs of swing gates across the FDR Drive where Project Area Two begins near the Con Edison facility. **Table 6.0-6** shows the schedule for FDR Drive lane closures currently permitted by NYCDOT's OCMC. MPT plans would be developed for any temporary lane closures on the FDR Drive to ensure the safety of the construction workers and public vehicles passing through the area.

- **Interceptor Gates Installation:** The work required to install interceptor gates at East 20th Street and Avenue C to the north and between Corlears Hook Park and the FDR Drive to the south and would include excavating sections of these roadways. Temporary closure of lanes to local traffic would be required while the necessary areas are excavated and the interceptor gate work is completed.
- **Parallel Conveyance Pipes:** Parallel conveyance pipes and upsized branch interceptor pipes would be constructed to increase and support the full flow capacity of the main interceptor. This construction would take place primarily in the right-of-way, in the roadways and properties along Avenue C, Avenue D, Columbia Street, Delancey Street, South Street, Water Street, and Jackson Street. Temporary closure of lanes to local traffic would be required at these locations to accommodate these activities.

MANUFACTURED GAS PLANTS (MGPS)

The project area has a long history of commercial/industrial and residential uses. Based on the area's history, subsurface contaminants would be expected to include those related to gasoline and petroleum, manufactured gas plants (MGPs) that were historically located nearby, as well as other subsurface contamination (in the fill, soil, and/or groundwater). As discussed in further details in Chapter 6.6, "Construction—Hazardous Materials," in an effort to reduce the potential migration of MGP-related contamination associated with the former MGPs and identified during the project area subsurface investigations, a number of product recovery wells are anticipated to be installed in these affected areas prior to, or in conjunction with, construction of the proposed project, along the landward (western) side of the proposed flood protection alignment. These recovery wells would be used to recover (i.e., actively pump/vacuum or hand bail) free product from the subsurface for disposal. A Mitigation Work Plan (MWP)[2] proposing these activities was previously submitted to NYSDEC for implementation prior to and/or during construction of the proposed project. However, it will be revised based upon project design changes since the previous version was submitted, and resubmitted to NYSDEC for approval. The associated MWP design plans would include additional details pertaining to the recovery well locations and construction specifications. These would be submitted to NYSDEC for review and approval, likely concurrent with a MGP Waste MMP and associated Construction Health and Safety Plan (CHASP).

RODENT CONTROL

Construction contracts may include provisions for a rodent (i.e., mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During construction, the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be conducted with appropriate public agencies. Only rodenticides registered with the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC) would be permitted. The contractor would be required to implement the rodent control program in a manner that is not hazardous to the general public, domestic animals, and non-target wildlife. ✷

[2] Mitigation Work Plan for Manufactured Gas Plant-Related Non-Aqueous Phase Liquid Contamination, prepared for DDC, by AKRF, Inc., October 30, 2017.

Chapter 6.1: Construction—Socioeconomic Conditions

A. INTRODUCTION

This chapter describes the potential socioeconomic effects of construction activities associated with the proposed project from two perspectives: (1) it considers whether the proposed project could result in significant adverse socioeconomic effects due to construction activities; and (2) it estimates the economic benefits generated by construction.

SOCIOECONOMIC STUDY AREA

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

As described in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, if a proposed project would entail construction for a long duration that could affect the access to and therefore viability of a number of businesses, and the failure of those businesses has the potential to affect neighborhood character, a preliminary assessment for construction effects on socioeconomic conditions should be conducted.

The socioeconomic study area (see Figure 5.2-1) is based largely on the furthest extent of either the ¼-mile radius from the project area or the protected area, which generally follows the Federal Emergency Management Agency (FEMA) 100-year Special Flood Hazard Area (SFHA) with 90th percentile 2050s sea level rise assumptions for the area between Montgomery Street and East 25th Street. As per CEQR methodology, the above-described outer boundary is adjusted to align with census tracts to form the socioeconomic study area. Within the socioeconomic study area, the analysis focuses on locations where construction activities may have the potential to directly affect business conditions.

ECONOMIC BENEFITS DURING CONSTRUCTION

The analysis of economic benefits during construction is presented, per the *State Environmental Quality Review* (*SEQR) Handbook*, 3rd Edition, 2010. Economic benefits estimated for this analysis include the direct, indirect, and induced jobs, wages and salaries, and total economic output generated by project construction activities within New York City and New York State. The study areas for the assessment of economic benefits are New York City and New York State.

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is constructed in the proposed project area. Therefore, under the construction phase, no changes to socioeconomic conditions are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction activities associated with the Preferred Alternative would not generate significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Construction activities would, at times, affect pedestrian and vehicular access in the immediate vicinity of construction activities. However, construction activities in the project area are located far enough away from businesses such that access to businesses would not be impeded. Lane and/or sidewalk closures and construction staging areas would not obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers. Businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities.

An economic benefits analysis was performed and utilized the Impact Analysis for Planning (IMPLAN) economic input-output modeling system to estimate construction costs for the proposed project. Based on the construction costs of the Preferred Alternative, as well as the other With Action Alternatives, the economic benefits—including construction-related jobs, wages and salaries, and the total economic output of construction—were estimated. Total employment, employee compensation, and economic activity, including direct, indirect, and induced effects in New York City are summarized by alternative in **Table 6.1-1**.

Table 6.1-1
Economic Benefits from Construction by Alternative – New York City

	Other Alternative (Alternative 2): Flood Protection System on the West Side of East River Park – Baseline	Other Alternative (Alternative 3): Flood Protection System on the West Side of East River Park – Enhanced Park and Access	Preferred Alternative (Alternative 4): Flood Protection System with A Raised East River Park	Other Alternative (Alternative 5): Flood Protection System East of FDR Drive
Total Employment (Person-Years)[1]	1,529	6,652	8,124	Similar to the Preferred Alternative
Total Employee Compensation (Millions of Constant 2021 dollars)	$154.53	$686.56	$823.09	Similar to the Preferred Alternative
Total Economic Output or Demand[2] (Millions of Constant 2021 dollars)	$411.63	$1,814.81	$2,171.53	Similar to the Preferred Alternative

Notes:
[1] A person-year is the equivalent of one person working full-time for a year.
[2] The total effect on the local economy, including the sum of the cost of goods and services used to produce a product and the associated payments to workers, taxes, and profits.
Sources:
The characteristics and construction cost of the development; the IMPLAN economic modeling system.

Total direct, indirect, and induced employment resulting in New York City from construction is estimated to range between approximately 1,529 to 8,124 person-years of employment, depending on the alternative. Total direct, indirect, and induced employee compensation resulting in New York City from construction is estimated to range from between approximately

$154.53 million to $823.09 million, depending on the alternative. Total economic activity that would result from construction is estimated to range between $411.63 million and $2,171.53 million in New York City, depending on the alternative. Each alternative would generate additional employment, employee compensation, and economic activity in the broader New York State economy.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive Alternative (Alternative 5) would be similar to the Preferred Alternative in that they would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Overall, construction activities associated with these alternatives would not generate significant adverse socioeconomic effects.

C. REGULATORY CONTEXT

A detailed discussion of the regulatory context governing the open space analysis is presented in Chapter 5.2, "Socioeconomic Conditions." In addition, in accordance with the National Environmental Policy Act (NEPA) of 1969 requirements and SEQRA and their implementing regulations, economic benefits are provided to allow the agencies to make a determination that balances environmental impacts with economic and social considerations. According to the New York State Department of Environmental Conservation's (NYSDEC) *The SEQR Handbook 3rd edition—2010*, "Social and economic benefits of, and need for, an action must be included in an EIS" (p. 89).

D. METHODOLOGY

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

This assessment focuses on whether construction conditions could affect access to existing businesses, the potential consequences concerning their continued viability, and the potential effects of any loss of business activity on the character of the area.

ECONOMIC BENEFITS ANALYSIS

Economic benefits—including construction-related jobs, wages and salaries, and the total economic output of construction—were estimated using IMPLAN, an economic input-output modeling system. The IMPLAN model was developed by the U.S. Department of Agriculture Forest Service in 1979 and was subsequently privatized by the Minnesota IMPLAN Group (MIG). The model uses the most recent economic data from sources such as the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor Statistics, and the U.S. Census Bureau to predict effects on the local economy from direct changes in spending. The model contains data for New York City on 536 economic sectors, showing how each sector affects every other sector as a result of a change in the quantity of its product or service. A similar IMPLAN model for New York State was used to trace the effects on the state economy.

MEASURES OF ECONOMIC EFFECT

Using IMPLAN terminology, economic effects are broken into three components: direct, indirect, and induced:

- *Direct effects* represent the initial benefits to the economy of a specific new investment (e.g., a construction project or changes in employment).
- *Indirect effects* represent the benefits generated by industries purchasing from other industries as a result of the direct investment (e.g., indirect employment resulting from construction expenditures would include jobs in industries that provide goods and services to the contractors). A direct investment triggers changes in other industries as businesses alter their production to meet the needs of the industry in which the direct effect has occurred. These businesses in turn purchase goods and services from other businesses, causing a ripple effect through the economy. The ripple effect continues until leakages from the region (caused, for example, by imported goods) stop the cycle. The sum of these iterative inter-industry purchases is called the indirect effect.
- *Induced effects* represent the effects caused by increased income in a region. Direct and indirect effects generate more worker income by increasing employment and/or salaries in certain industries. Households spend some of this additional income on local goods and services, such as food and drink, recreation, and medical services. Benefits generated by these household expenditures are quantified as induced effects.

E. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is provided in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to socioeconomic are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE: FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK (ALTERNATIVE 4)

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

Construction activities associated with the Preferred Alternative would not generate significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Construction activities would, at times, affect pedestrian and vehicular access in the immediate vicinity of construction activities. However, construction activities in the project area are located far enough away from businesses such that access to businesses would not be impeded. Lane and/or sidewalk closures and construction staging areas would not obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers. Businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities.

ECONOMIC BENEFITS DURING CONSTRUCTION

Construction of the Preferred Alternative is estimated to cost approximately $1.45 billion in 2021 dollars in hard and soft costs.

Employment and Economic Effects

Employment

The direct expenditures for the construction of the Preferred Alternative is estimated at $1,450.00 million. As a result of the direct expenditures, direct employment from construction is estimated at 5,452 person-years of employment (see **Table 6.1-2**). A person-year is the equivalent of one person working full-time for one year. Assuming a 3.5-year construction schedule for this alternative, the 5,452 person-years estimate equates to 1,558 people working full-time over that 3.5-year period.

When new direct jobs are introduced to an area, those jobs lead to the creation of additional *indirect* and *induced* jobs, as defined in Section D. Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of the Preferred Alternative would generate an additional 1,088 person-years of indirect employment and 1,584 person-years of induced employment in New York City, bringing the total number of jobs from construction to 8,124 person-years of employment in New York City (see **Table 6.1-2**). In the larger New York State economy, the construction of this alternative would generate an estimated 145 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 8,269 person-years of employment.

Table 6.1-2
Economic Benefits from Construction – Preferred Alternative

	Portion in New York City	Total New York City And State
Employment (Person-Years)[1]		
Direct (jobs from construction)	5,452	5,452
Indirect (jobs in support industries)	1,088	1,191
Induced (jobs from household spending)	1,584	1,626
Total	**8,124**	**8,269**
Employee Compensation (Millions of Constant 2021 dollars)		
Direct (earnings from construction)	$561.07	$561.07
Indirect (earnings from support industries)	$116.68	$125.06
Induced (earnings from household spending)	$145.34	$148.63
Total	**$823.09**	**$834.76**
Total Economic Output or Demand[2] (Millions of Constant 2021 dollars)		
Direct (output from construction)	$1,450.00	$1,450.00
Indirect (output from support industries)	$305.12	$338.53
Induced (output from household spending)	$416.41	$428.30
Total	**$2,171.53**	**$2,216.83**

Notes:
[1] A person-year is the equivalent of one person working full-time for a year.
[2] The total effect on the local economy, including the sum of the cost of goods and services used to produce a product and the associated payments to workers, taxes, and profits.
Sources:
The characteristics and construction cost of the development; the 2017 IMPLAN economic modeling system.

Employee Compensation

The direct employee compensation during construction is estimated at $561.07 million (see **Table 6.1-2**). Total direct, indirect, and induced employee compensation resulting in New York City from the construction is estimated at $823.09 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $834.76 million.

Total Effects on the Local Community

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $2,216.83 million in New York State, of which $2,171.53 million would occur in New York City.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE (ALTERNATIVE 2)

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

As with the Preferred Alternative, construction activities associated with Alternative 2 would not generate significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites.

ECONOMIC BENEFITS DURING CONSTRUCTION

Construction of Alternative 2 is estimated to cost approximately $445 million in 2021 dollars in hard and soft costs. These costs were distributed amongst IMPLAN Sectors 58 (Construction of other new nonresidential structures), 62 (Maintenance and repair construction of nonresidential structures), 64 (Maintenance and repair construction of highways, streets, bridges, and tunnels), 447 (Legal services), and 449 (Architectural, engineering, and related services).

Employment and Economic Effects

Employment

The direct expenditures for the construction of this alternative are estimated at $445 million. As a result of the direct expenditures, direct employment from construction is estimated at 1,020 person-years of employment (see **Table 6.1-3**). A person-year is the equivalent of one person working full-time for one year. Assuming a five-year construction schedule for this alternative, the 1,020 person-years estimate equates to 204 people working full-time over that five-year period.

When new direct jobs are introduced to an area, those jobs lead to the creation of additional *indirect* and *induced* jobs, as defined in the Methodology section above. Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of Alternative 2 would generate an additional 211 person-years of indirect employment and 297 person-years of induced employment in New York City, bringing the total number of jobs from construction to 1,529 person-years of employment (see **Table 6.1-3**). In the larger New York State economy, the construction of this alternative would generate an estimated 28 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 1,557 person-years of employment.

Table 6.1-3
Economic Benefits from Construction – Alternative 2

	Portion in New York City	Total New York City And State
Employment (Person-Years)[1]		
Direct (jobs from construction)	1,020	1,020
Indirect (jobs in support industries)	211	231
Induced (jobs from household spending)	297	306
Total	**1,529**	**1,557**
Employee Compensation (Millions of Constant 2021 dollars)		
Direct (earnings from construction)	$105.03	$105.03
Indirect (earnings from support industries)	$22.21	$23.85
Induced (earnings from household spending)	$27.29	$27.93
Total	**$154.53**	**$156.80**
Total Economic Output or Demand[2] (Millions of Constant 2021 dollars)		
Direct (output from construction)	$275.24	$275.24
Indirect (output from support industries)	$58.20	$64.75
Induced (output from household spending)	$78.19	$80.48
Total	**$411.63**	**$420.48**

Notes:
[1] A person-year is the equivalent of one person working full-time for a year.
[2] The total effect on the local economy, including the sum of the cost of goods and services used to produce a product and the associated payments to workers, taxes, and profits.
Sources:
The characteristics and construction cost of the development; the 2017 IMPLAN economic modeling system.

Employee Compensation

The direct employee compensation during construction is estimated at $105.03 million (see **Table 6.1-3**). Total direct, indirect, and induced employee compensation resulting in New York City from the construction is estimated at $154.53 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $156.80 million.

Total Effects on the Local Community

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $420.48 million in New York State, of which $411.63 million would occur in New York City.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS (ALTERNATIVE 3)

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

As with the Preferred Alternative, construction activities associated with Alternative 3 would not generate significant adverse socioeconomic effects. Similar to the Preferred Alternative, construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites.

ECONOMIC BENEFITS DURING CONSTRUCTION

Construction of Alternative 3 is estimated to cost approximately $1.2 billion in 2021 dollars including hard and soft costs (split into the same IMPLAN sectors as for the Preferred Alternative). These costs were distributed amongst IMPLAN Sectors 58 (Construction of other new nonresidential structures), 62 (Maintenance and repair construction of nonresidential structures), 64 (Maintenance and repair construction of highways, streets, bridges, and tunnels), 469 (Landscape and horticultural services), 447 (Legal services), and 449 (Architectural, engineering, and related services).

Employment and Economic Effects

Employment

The direct expenditures for the construction of this alternative are estimated at $1.2 billion. As a result of the direct expenditures, direct employment from construction is estimated at 4,370 person-years of employment (see **Table 6.1-4**). A person-year is the equivalent of one person working full-time for one year. Assuming a five-year construction schedule for this alternative, the 4,370 person-years estimate equates to 874 people working full-time over that five-year period.

Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of Alternative 3 would generate an additional 955 person-years of indirect employment and 1,327 person-years of induced employment in New York City, bringing the total number of jobs from construction to 6,652 person-years of employment (see **Table 6.1-4**). In the larger New York State economy, the construction of this alternative would generate an estimated 117 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 6,769 person-years of employment.

Table 6.1-4
Economic Benefits from Construction – Alternative 3

	Portion in New York City	Total New York City and State
Employment (Person-Years)[1]		
Direct (jobs from construction)	4,370	4,370
Indirect (jobs in support industries)	955	1,037
Induced (jobs from household spending)	1,327	1,361
Total	**6,652**	**6,769**
Employee Compensation (Millions of Constant 2021 dollars)		
Direct (earnings from construction)	$461.96	$461.96
Indirect (earnings from support industries)	$102.88	$109.54
Induced (earnings from household spending)	$121.72	$124.41
Total	**$686.56**	**$695.90**
Total Economic Output or Demand[2] (Millions of Constant 2021 dollars)		
Direct (output from construction)	$1,200.00	$1,200.00
Indirect (output from support industries)	$266.05	$292.86
Induced (output from household spending)	$348.75	$358.47
Total	**$1,814.81**	**$1,851.33**

Notes:
[1] A person-year is the equivalent of one person working full-time for a year.
[2] The total effect on the local economy, including the sum of the cost of goods and services used to produce a product and the associated payments to workers, taxes, and profits.
Sources:
The characteristics and construction cost of the development; the 2017 IMPLAN economic modeling system.

Employee Compensation

The direct employee compensation during construction is estimated at $461.96 million (see **Table 6.1-4**). Total direct, indirect, and induced employee compensation resulting in New York City from the construction is estimated at $686.56 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $695.90 million.

Total Effects on the Local Community

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $1,851.33 million in New York State, of which $1,814.81 million would occur in New York City.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE (ALTERNATIVE 5)

POTENTIAL SIGNIFICANT ADVERSE SOCIOECONOMIC EFFECTS ASSESSMENT

As with the Preferred Alternative, construction activities associated with Alternative 5 would not generate significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area, including businesses on routes of access to/from construction sites. Although this alternative would require more extensive and frequent closures of the FDR Drive, those closures would not be expected to adversely affect local business activities; customers who rely on the FDR Drive to reach area businesses would still have access to those businesses via alternative routes. Study area businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities.

ECONOMIC BENEFITS DURING CONSTRUCTION

The economic benefits that would result from construction of Alternative 5 would be similar to that from the Preferred Alternative. ✷

A. INTRODUCTION

This chapter assesses the potential for temporary significant adverse effects on publicly accessible open space resources during the proposed project's construction. According to the *CEQR Technical Manual*, a publicly accessible open space resource is publicly or privately owned land that is publicly available for leisure, play, sport, or serves to protect and enhance the natural environment. The proposed project involves the temporary displacement of open space resources (East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk), in phases, over an approximately 3.5- to 5-year period. The proposed project's construction would also generate noise and air pollutant emissions that could affect nearby open space resources that would remain open to the public. The analysis considers these direct effects, as well as the indirect effects of construction (e.g., whether the temporary loss of open space or construction effects could result in the overtaxing of other open spaces in the study area).

B. PRINCIPAL CONCLUSIONS

The proposed project requires construction within a number of public parks (East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk), in phases, over an approximately 3.5- to 5-year period. The direct effects include the temporary closure of open space resources, during which time the public would not have access or limited access to these public parks. The adequacy of open space in the study area was quantitatively and qualitatively assessed for existing conditions, the No Action Alternative, and the With Action Alternatives (Alternatives 2 through 5) by each analysis year (2020 through 2025). Construction under the Preferred Alternative would have a 3.5-year construction period with completion in 2023, whereas construction would occur for the full 5 years under Alternatives 2, 3, and 5.

The analysis follows the procedures outlined in the 2014 *City Environmental Quality Review* (*CEQR) Technical Manual*. The summary of potential construction open space effects is described below.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

DIRECT EFFECTS

With the planned construction of Pier 42 Park, Pier 35, East River Waterfront Esplanade-Phase IV, and the Rutgers Slip Open Space, the open space acreage within the ½-mile study area will increase from 85.15 acres under existing conditions to approximately 92.53 acres by the 2025 analysis year. Under the No Action Alternative, with no new comprehensive coastal protection system installed in the project area, East River Park and other open space resources in the protected area would remain vulnerable to storm damage.

INDIRECT EFFECTS

Under the No Action Alternative, total open space ratios are below the Citywide Community District median ratio of 1.5 acres per 1,000.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

DIRECT EFFECTS

There is the potential for temporary adverse direct effects under the Preferred Alternative over multiple analysis years due to the extent of displacement of recreational facilities and open space amenities in East River Park over the 3.5-year construction period. However, once completed, the Preferred Alternative would directly affect East River Park, Stuyvesant Cove Park, Murphy Brothers Playground and Asser Levy Playground in a positive manner, by enhancing their design and increasing their accessibility to the public. The proposed project under the Preferred Alternative would also enhance the resiliency of open space and protect park resources from future design storms.

Construction Noise

As described in Chapter 6.12, "Construction—Noise and Vibration," predicted noise level increases at these open space locations would be noticeable; however, the total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher noise levels. Maximum construction noise levels at receptors nearest floodwall construction with the Preferred Alternative would be slightly lower because pile driving at the Preferred Alternative would generally occur further from to the receptors. As with Alternative 3, East River Park, Asser Levy Playground (outdoor) and Murphy Brothers Playground would be closed under the Preferred Alternative during the times when construction activities would occur at these park resources. Therefore, the duration of construction noise would be limited at any given area of open space that would remain open in proximity to construction activities. Furthermore, the construction noise predictions are conservative in that they consider the area of open space that remains open and accessible closest to the construction area. While construction would likely disturb the Asser Levy outdoor pool temporarily, it is anticipated that construction would take place during the off-season of the pools (mid-September to early June) and not affect the operational season of the pools. Based on these factors, the Preferred Alternative construction noise on these open space resources would not result in a significant adverse effect. However, at Asser Levy Recreation Center, construction activity including pile driving that would occur west of the Franklin Delano Roosevelt East River Drive (FDR Drive) immediately adjacent to this building would produce noise level increases considered high for this area. While the duration of maximum noise levels at this location would be limited and the receptor is typically used for active recreation with a lower sensitivity to noise, the maximum noise levels predicted by the construction noise analysis are high (i.e., in the "clearly unacceptable" range according to CEQR noise exposure guidance). Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction.

Construction of the Preferred Alternative would be required to follow the requirements of the *New York City Noise Control Code* and would use additional measures, including both path control

(e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods) to minimize the effects of the Preferred Alternative's construction activities on the surrounding community.

Construction Air Quality

Construction of the proposed project under the Preferred Alternative would adhere to Local Law 77 of 2003 for emissions reductions on non-road construction engines, *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and *New York City Administrative Code* limitations on construction-vehicle idling time. With the implementation of these measures, the detailed analysis presented in Chapter 6.10, "Construction—Air Quality," showed there would be no significant adverse air quality effects on sensitive receptors, including open space areas near the construction activities.

INDIRECT EFFECTS

As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in the Preferred Alternative from the No Action Alternative. The proposed project would reduce open space ratios by a minimum of 42.6 percent in 2023 and a maximum of 49.6 percent in 2020, and therefore would result in potential temporary significant adverse indirect effects on open space resources within the study area under the Preferred Alternative. There are no significant adverse indirect effects for the 2024 and 2025 analysis years, as any remaining construction would be minimal and the vast majority of displaced open space areas would be restored and reopened to the public with new and enhanced park features.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

The Flood Protection System on the West Side of East River Park – Baseline (Alternative 2) would involve less construction in City parkland (e.g., East River Park), resulting in less temporary displacement of recreational facilities than the Preferred Alternative. Therefore, the temporary significant adverse direct and indirect open space effects under Alternative 2 would be less than the Preferred Alternative. However, Alternative 2 would result in fewer resiliency and enhanced park and access benefits it would not provide flood protection to East River Park; would not reconstruct and improve the landscapes, recreational fields, playgrounds, and amenities within East River Park; and would not redesign and reconstruct the Murphy Brothers and Asser Levy Playgrounds. Additionally, under Alternative 2, a new raised and landscaped park-side plaza landing would not be created at the entrance to East River Park from the East Houston Street overpass.

Similar to the Preferred Alternative, construction activity under Alternative 2 would include pile driving that would occur west of the FDR Drive immediately adjacent to the Asser Levy Recreation Center. These activities would produce noise level increases considered high for this area and in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

The Flood Protection System on the West Side of East River Park – Enhanced Park and Access (Alternative 3) would involve a similar level of temporarily displaced open space as the Preferred Alternative and would therefore result in a similar significant adverse effect as compared to the Preferred Alternative for the 2020 to 2023 analysis years. However, Alternative 3 would involve a longer construction duration, resulting in prolonged significant adverse effects. As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in Alternative 3 from the No Action Alternative. Since the open space ratios would be reduced by a minimum of 44.0 percent in 2025 and a maximum of 48.2 percent in 2022 and 2023, the proposed project would result in potential temporary significant adverse indirect effects on open space resources within the study area under Alternative 3. Therefore, the temporary significant adverse direct and indirect open space effects under Alternative 3 would be greater than the Preferred Alternative. In addition, Alternative 3 would result in fewer resiliency benefits and would not provide flood protection to East River Park.

Similar to the Preferred Alternative, construction activity under Alternative 3 would include pile driving that would occur west of the FDR Drive immediately adjacent to the Asser Levy Recreation Center. These activities would produce noise level increases considered high for this area and in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

The displacement of open space necessary to accommodate construction under the Flood Protection System East of FDR Drive (Alternative 5) would be comparable to the Preferred Alternative. Therefore, any potential temporary significant adverse direct and indirect open space effects identified under Alternative 5 would be of comparable magnitude as the Preferred Alternative. Similar to the Preferred Alternative, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction.

MITIGATION

The proposed project would introduce potential temporary significant adverse direct and indirect effects on open space during the construction period. Therefore, potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the City. The mitigation measures being explored for the Preferred Alternative include accommodating permit users at other existing facilities; identify recreational resources that can be available to the community during construction; providing alternative recreational opportunities (e.g., programs like Shape-Up classes, walking clubs, Arts, greening programs); implementing improvements (e.g., lighting) to parks and playgrounds in the study area; rerouting greenway users to the most direct alternative route; and supporting bicycle projects in the study area. In addition, the City is assessing opportunities to open parts of East River Park as work is completed. The introduction of new publicly accessible open space—such as Pier 42 Park, Pier 35, and Phase IV of the East River Waterfront Esplanade project, totaling 4.81 acres—could be considered a potential mitigation effort. In addition, there has been funding allocated for the demolition of LaGuardia Bathhouse and interim recreation improvements which will create approximately 7,000 square

feet of new publicly accessible open space. The feasibility of utilizing quieter construction methods (i.e., press in pile) in the vicinity of the Asser Levy Recreation Center as it is a public facility, are being explore as potential mitigation measures. However, these measures, would only partially mitigate construction effects on open space resources.

According to the *CEQR Technical Manual*, on-site improvements are considered a mitigation measure. Although construction would temporarily displace open space resources in East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk, the end result would be a refurbished open space resource. After construction, East River Park would be a newly landscaped and raised park with pathways for the Preferred Alternative, which would enhance the user experience of the park. In addition, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. The Preferred Alternative would be especially beneficial for the open space resources in East River Park, as this alternative includes reconstruction of the park, raising it by approximately eight feet to meet the design flood protection criteria while also reducing the risk for effects from future storm events. The flood protection measures proposed to be integrated into park features aim to reduce the effects from future storm events on the community. The Preferred Alternative proposes the replacement of pedestrian crossings at Delancey Street, East 10th Street, and Corlears Hook bridges. The enhancement of pedestrian bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon project completion. The improvements to these open space resources under the proposed project would be considered partial mitigation. Additionally, as stated in the *CEQR Technical Manual*, the implementation of missing segments of the City's greenway network would be considered a mitigation strategy. By remedying a long-standing narrowed pathway at the Con Edison "pinch-point," the proposed project under all alternatives would significantly improve the usability and access to the greenway with the construction of the shared-use flyover bridge.

As discussed above, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction. The feasibility of utilizing less impactful construction methods (i.e., press in pile) are being explored to mitigate this noise effect.

C. REGULATORY CONTEXT

A detailed discussion of the regulatory context governing the open space analysis is presented in Chapter 5.3, "Open Space."

D. METHODOLOGY

According to the *CEQR Technical Manual*, a preliminary construction assessment for open space is needed as the proposed project's construction activities are considered long-term (more than two years). The assessment includes consideration of both direct and indirect effects of the proposed project.

DIRECT EFFECTS

A direct effects analysis should be performed if a project would: directly affect open space conditions by causing a loss of public open space; change the use of an open space so that it no longer serves the same user population; limit public access to an open space; or increase noise, air pollutant emissions, odor, or shadows that would temporarily or permanently affect the usefulness

of a public open space. A project can also directly affect an open space in a positive manner, by enhancing its design or by increasing its accessibility to the public. The direct effects related to the construction of the proposed project include the temporary displacement of open space resources for periods of time due to construction phasing in segments ("Segments"), during which the public would not have access to those resources. The construction segments are referred to as: Segment 1 ([East River Park] Ball Fields No. 1 and No. 2 and Soccer Field, Basketball and Volleyball Courts, Multi-Purpose Field, and Water Play Area); Segment 2 ([East River Park] Tennis Court Complex and Comfort Station, Ball Fields No. 5 and No. 6); Segment 3 ([East River Park] North End of East River Park, Ball Fields No. 7 and No. 8, Playground, Basketball Court and BBQ Area); Segment 4 (Murphy Brothers Playground); Segment 5 (Stuyvesant Cove Park); and Segment 6 (Asser Levy Playground) (see **Figure 6.2-1 through Figure 6.2-8**). For the purposes of analysis, it is assumed that the closure of each segment for construction activities occurs for a full analysis year (i.e., If construction within a segment is complete within an analysis year, this analysis still assumes that the segment is unavailable for that full analysis year); this represents a reasonable worst case scenario for the temporary displacement of open space resources. Under each alternative, qualitative consideration is provided of newly reconstructed open space resources that may be available to the public (once construction is complete within that segment).The analysis also considers whether there are other open space resources within close proximity to the unavailable resources that would provide similar recreational opportunities to the public.

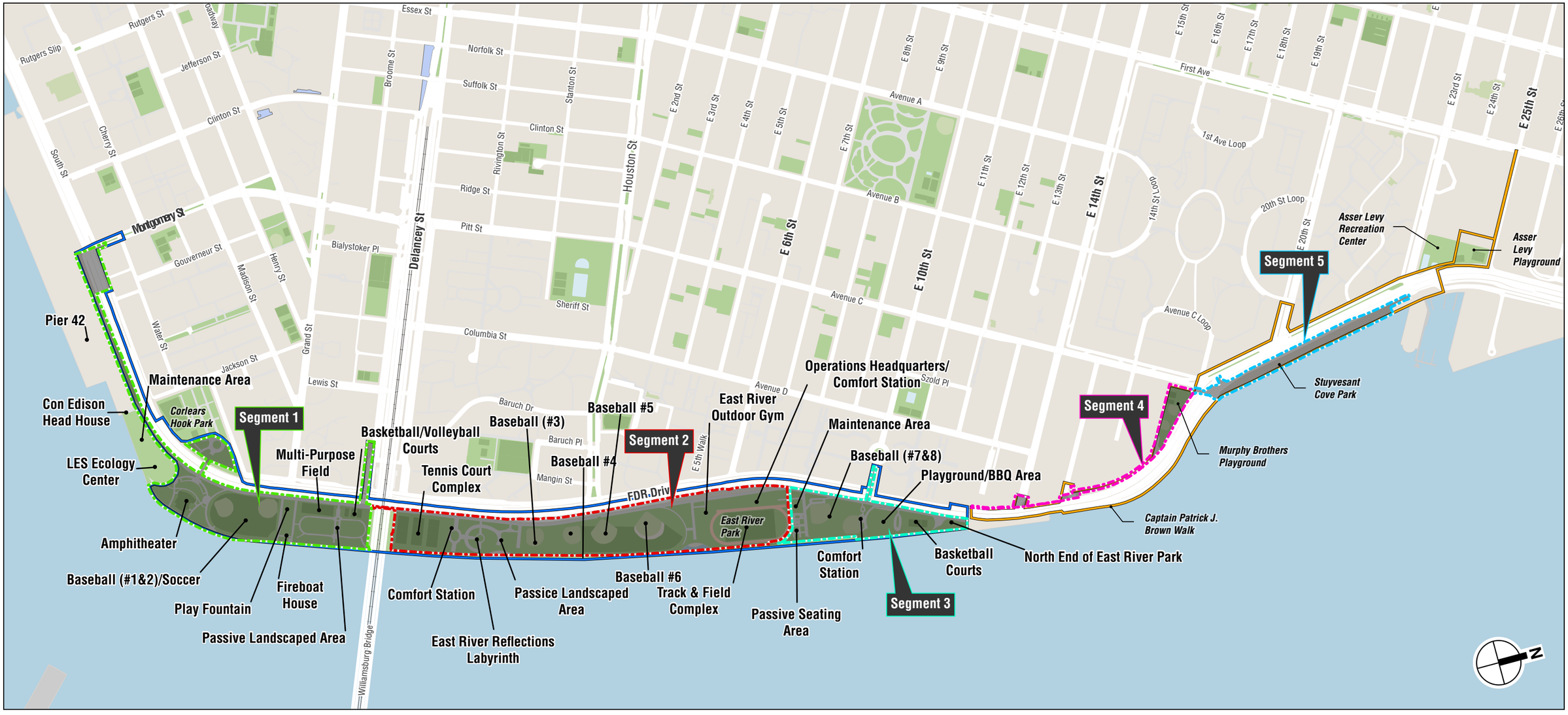
Construction activities may also produce noise and air pollutant emissions affecting neighboring open space resources. Therefore, potential construction noise and air quality effects on open space resources are also considered. The direct effects assessment includes estimates of the extent and timing of open space displacement during construction and considers construction-related noise and pollutant emissions on the usability of the open space resources.

INDIRECT EFFECTS

An indirect effects analysis should be performed if a project would add sufficient population, either residents or non-residents, to noticeably diminish the capacity of open space in an area to serve the future population. Due to the direct effects of temporary displacement of open space resources, the capacity of open space in the area could be affected, therefore causing indirect open space effects. In particular, an increase in demand for other resources in the study area (within a reasonable walking distance) that would remain available during construction of the proposed project may result in temporary significant adverse effects. The indirect effects assessment applies the indirect effects analysis methodologies described in Chapter 5.3, "Open Space," to determine how open space ratios for the ½-mile open space study area could change over the course of the 3.5- to 5-year construction period.

COMPARISON TO CITY GUIDELINES

The adequacy of open space in the study area was quantitatively and qualitatively assessed for existing conditions, the No Action Alternative, and the With Action Alternatives (Alternatives 2 through 5). According to CEQR guidelines, the quantitative assessment is based on ratios of usable open space acreage to the study area populations (the "open space ratios"). These ratios are then compared with the City's open space guidelines for residential populations. For residential populations, there is a City-wide median open space ratio of 1.5 acres per 1,000 residents, which is used as a guideline. In addition to this median ratio, the City has set an open space ratio planning goal of 2.5 acres per 1,000 residents, which includes 0.50 acres of passive space and 2.0 acres of



Project Area One

Project Area Two

Construction Limits of Work

Segment

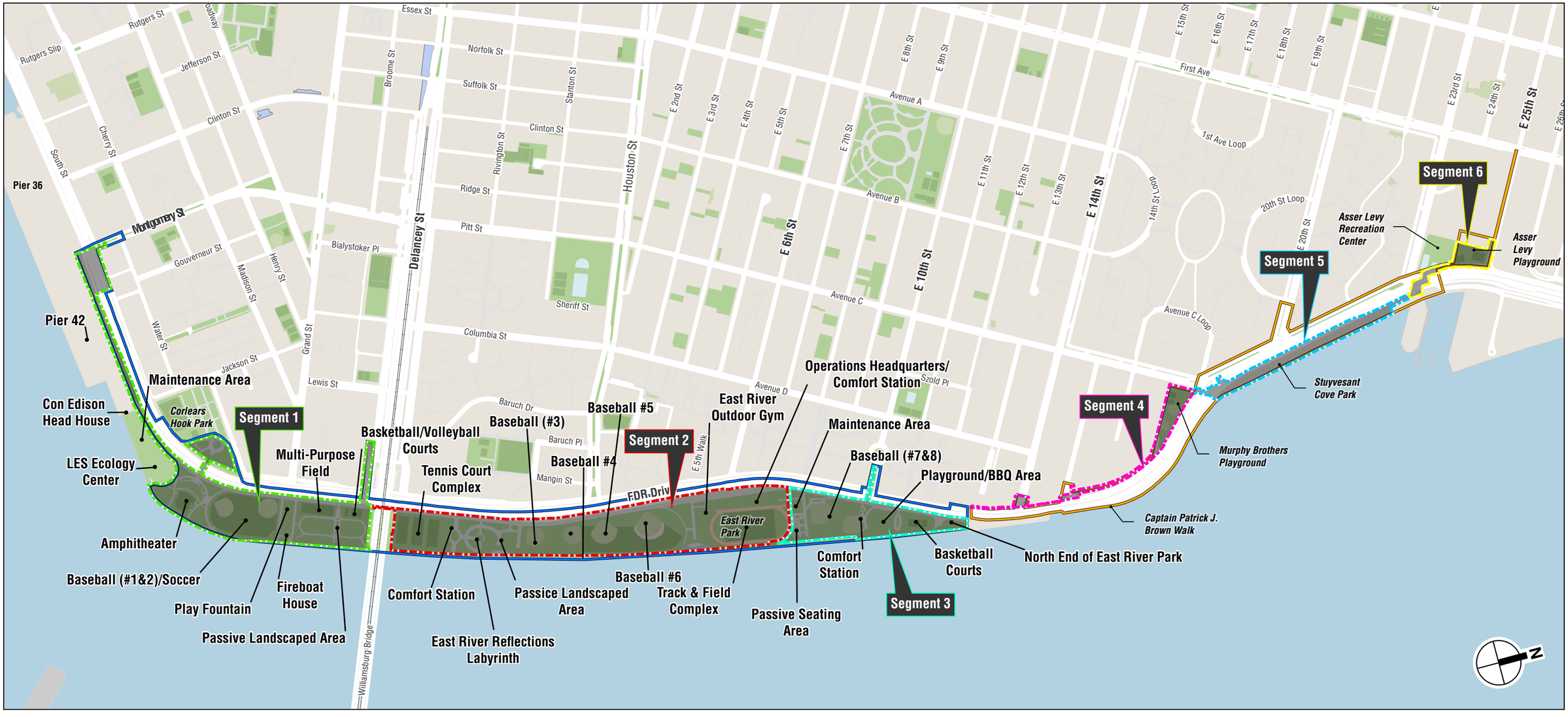
0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Preferred Alternative - Construction Segments 2020

Figure 6.2-1



Project Area One

Project Area Two

Construction Limits of Work

Segment

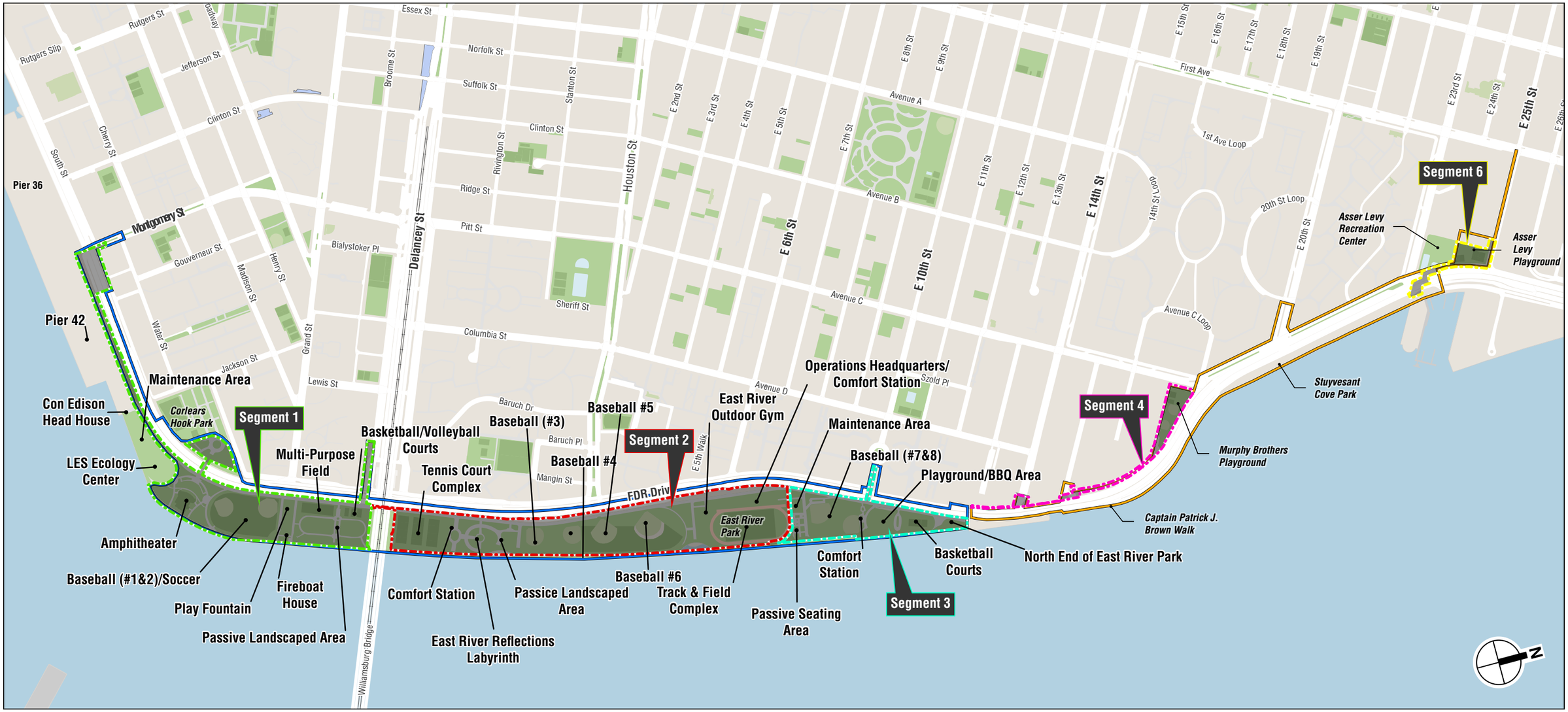
0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Preferred Alternative - Construction Segments 2021

Figure 6.2-2



Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Preferred Alternative - Construction Segments 2022

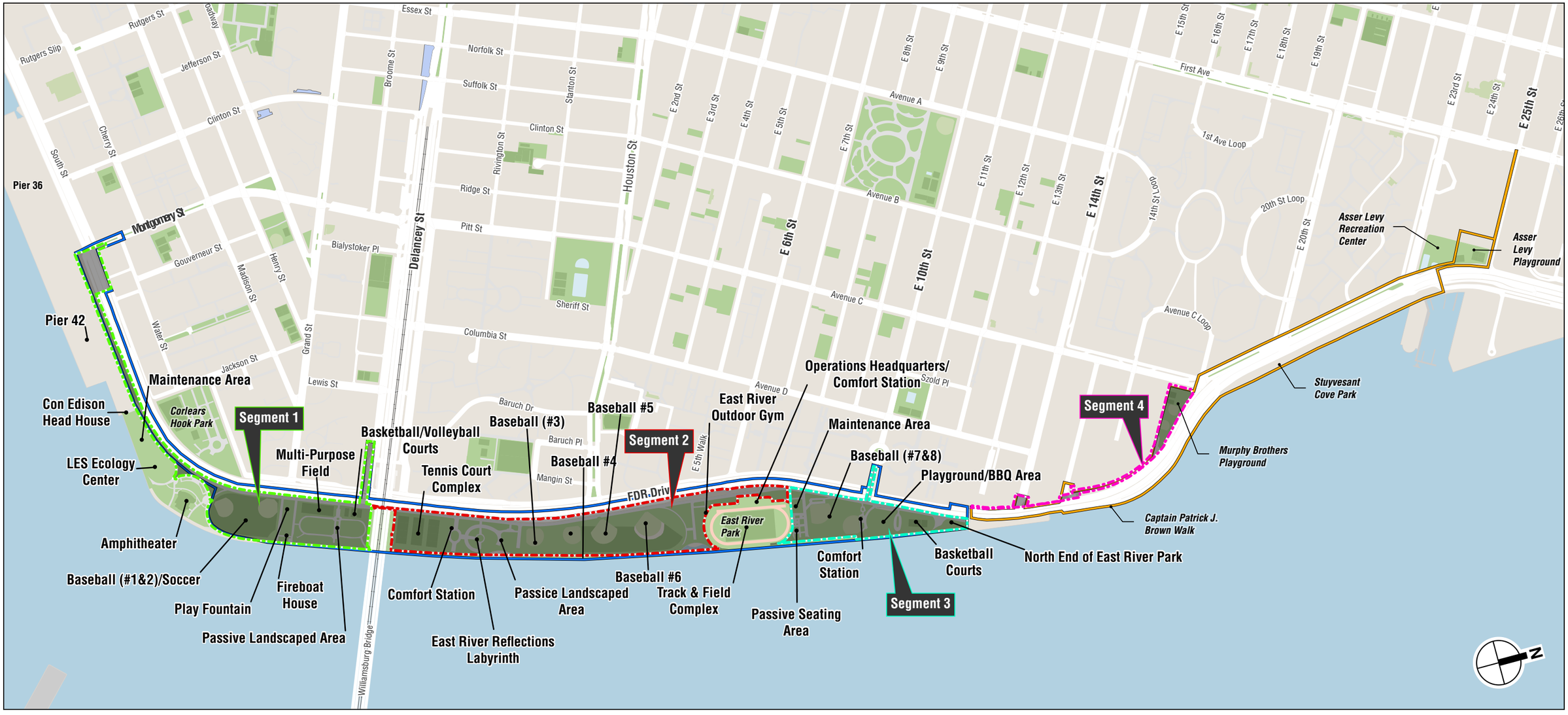
Figure 6.2-3

Project Area One
Project Area Two
Construction Limits of Work
Segment

0 1,000 FEET

Capital Project SANDRESM1
EAST SIDE COASTAL RESILIENCY PROJECT

Preferred Alternative - Construction Segments 2023
Figure 6.2-4



Project Area One

Project Area Two

Construction Limits of Work

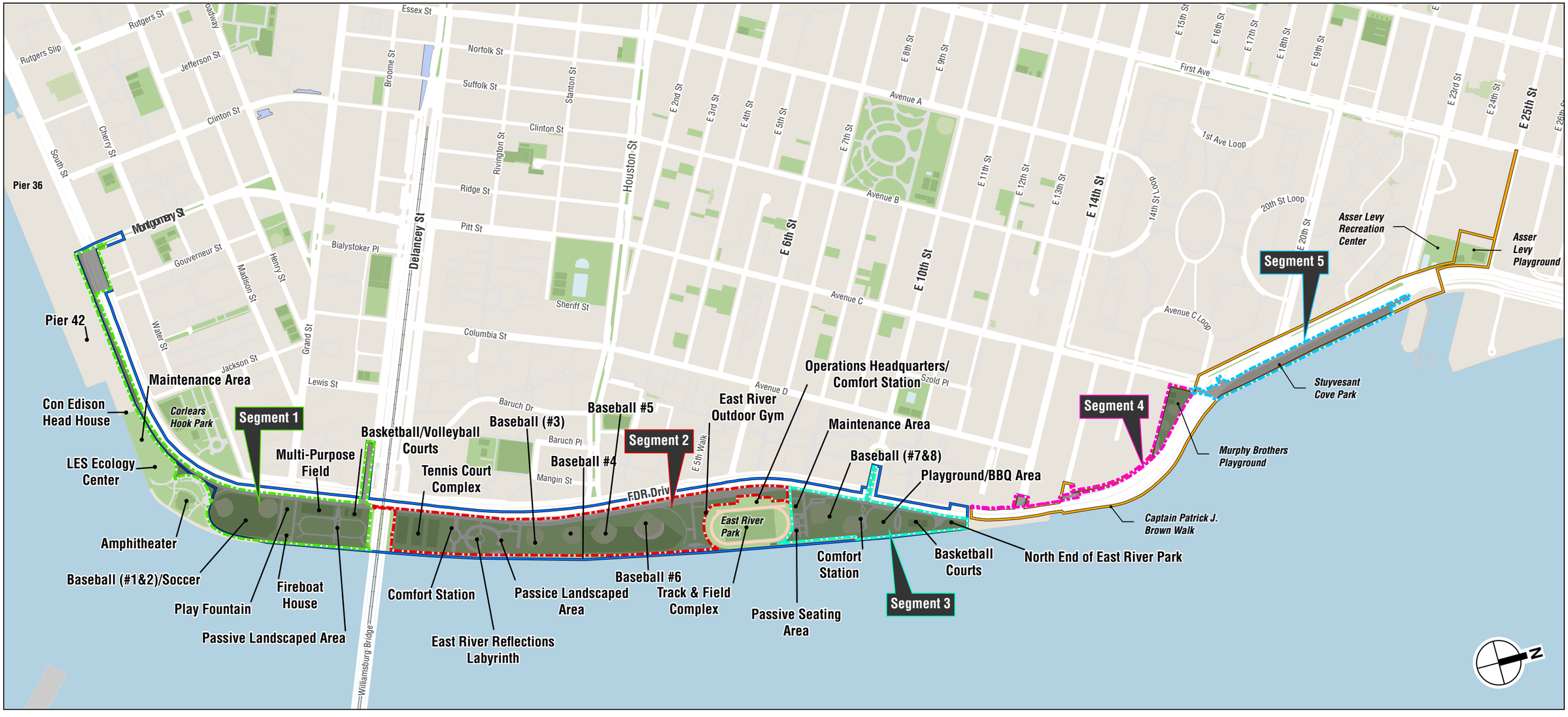
Segment

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Alternative 3 - Construction Segments 2020

Figure 6.2-5

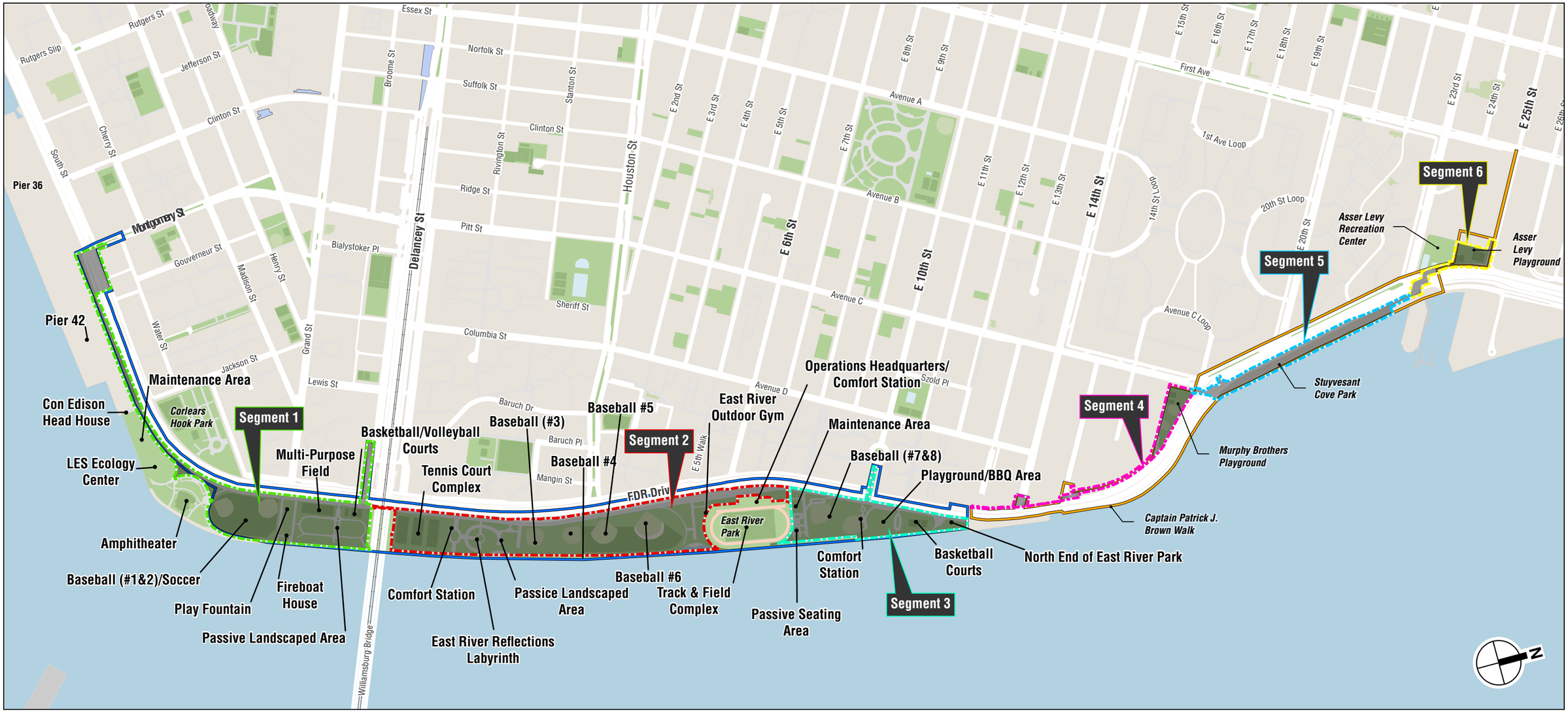


Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Alternative 3 - Construction Segments 2021

Figure 6.2-6



Project Area One

Project Area Two

Construction Limits of Work

Segment

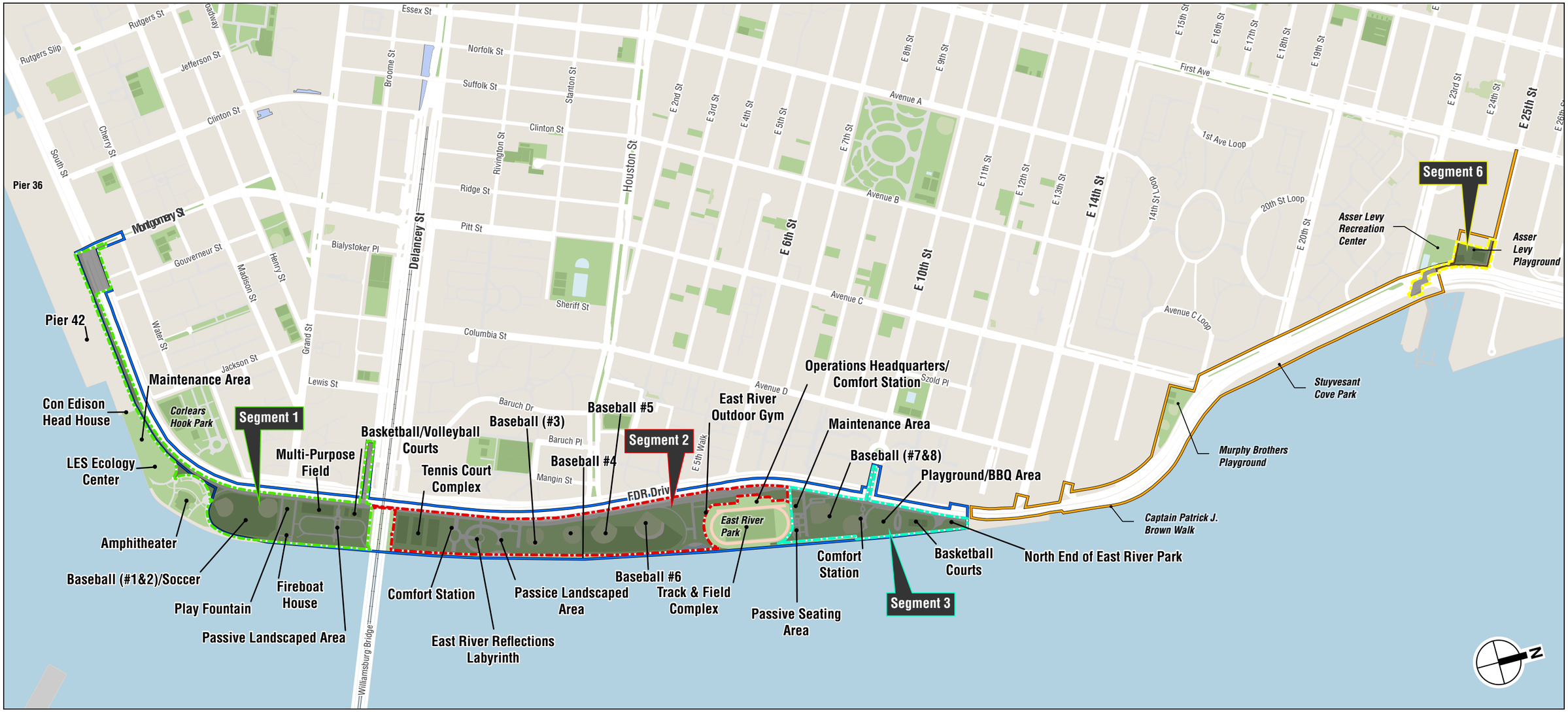
0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Alternative 3 - Construction Segments 2022-2023

Figure 6.2-7



Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Alternative 3 - Construction Segments 2024-2025

Figure 6.2-8

active space per 1,000 residents. It should be noted that the City's open space planning goals are often not feasible for many areas of the City, and they are not considered a significant adverse effect threshold. Rather, they are used as benchmarks to represent how well an area is served by its open space resources.

ANALYSIS YEARS

This chapter assesses the potential direct and indirect effects by each analysis year (2020–2025) for the proposed five-year construction period under all alternatives (it should be noted that construction would occur for the full five years under Alternatives 2, 3, and 5, whereas construction under the Preferred Alternative would have a 3.5-year construction period with a completion in 2023.

EFFECTS ASSESSMENT

The determination of temporary significant adverse effects is based on one of two factors following *CEQR Technical Manual* guidelines. Regarding direct effects: a significant adverse effect would occur if there would be a direct displacement/alteration of existing open space within the study area without a comparable replacement (size, usability, and quality) within the study area, or if a proposed project results in a significant physical effect (such as increasing noise or air pollutant emissions) that would affect the usefulness of a public open space. Regarding indirect effects: if the proposed project would reduce an open space ratio and consequently result in overburdening existing facilities, or if it would substantially exacerbate an existing deficiency in open space, it may result in a significant effect on open space resources. The determination of significant adverse effects is based on how a project would change the open space ratios in the study areas, as well as qualitative factors not reflected in the quantitative assessment. In general, if a study area's open space ratios fall below City guidelines, and the proposed project would result in a decrease in the open space ratio of more than five percent, it could be considered a substantial change. However, in areas which have been determined to be extremely lacking in open space, a reduction as small as one percent may be considered significant.

ALTERNATIVES ANALYZED

The alternatives described below and analyzed in this chapter are described in greater detail in Chapter 2.0, "Project Alternatives." For the purposes of this assessment, the Preferred Alternative is the focus for analysis. The displacement of open space necessary to accommodate construction under Alternative 2 would be comparable to or less than that under the Preferred Alternative. Alternative 5 proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C, where the northbound lanes of the FDR Drive in this area would be raised. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property and Murphy Brothers Playground. Therefore, Alternative 5 would result in temporary displacement of open space similar to that of the Preferred Alternative.

E. AFFECTED ENVIRONMENT

DIRECTLY AFFECTED AREAS

This analysis considers the effects of construction on open space within Project Area One and Two, as described in Chapter 5.3, "Open Space" (see Figure 5.3-1).

STUDY AREA

The study area utilized for analysis is based on the distance a person is assumed to be willing to walk to reach a neighborhood open space based on *CEQR Technical Manual* guidelines. Residents are assumed to walk approximately 10 minutes (about a ½-mile distance) to reach both passive and active neighborhood open spaces. Since the proposed project would be located primarily within parks adjacent to a predominantly residential user population and would not have a substantial amount of commercial user population, a study area based on a ½-mile distance from the boundaries of Project Areas One and Two was established. For a detailed description of open space resources in the study area, refer to Chapter 5.3, "Open Space." As described in Chapter 5.3, "Open Space," the existing total open space acreage within the ½-mile study area is 85.15 acres, of which 53.66 acres are active and 31.49 acres are passive (see Table 5.3-3).

OPEN SPACES TEMPORARILY DISPLACED FOR CONSTRUCTION

This section includes a description of each construction segment, the publicly accessible open spaces in these segments, and the comparable nearby open space resource(s) that would be available to the public during the temporary displacement of open space resources within that construction segment. The order and duration of construction activities during which open spaces in these segments would be unavailable to the public is provided in the next section and is discussed for each alternative.

Segment 1

Segment 1 is approximately 12.99 acres and incorporates open space resources, mainly East River Park, from Montgomery Street to the south and Williamsburg Bridge to the north between the FDR Drive and the East River. The resources (moving south to north) within this segment are as follows: the shared-use path adjacent to the FDR Drive from Montgomery Street to the Williamsburg Bridge; the amphitheater and the tree lined grassy knolls to the west of the amphitheater; a large soccer field straddled by two baseball fields (Ball Fields No. 1 and No. 2) enclosed with a tall chain-linked fence and planted areas to the south, east and north of these fields; a water play area containing multiple sprinkler jets set in the ground, rocks that create pool areas, and bronze sculptures of sea lions at play, paved promenades with benches flank the play area and connect the shared-use path to the East River Promenade (a pedestrian walkway located directly adjacent to the East River extending the length of the park); a multi-purpose field with artificial turf, 2 paved volleyball courts, and 1 paved basketball court enclosed with chain-link fences adjacent to the shared-use path as well as a large lawn encircled with soft-surfaced paths adjacent to the East River Promenade. Additionally, Segment 1 includes the Delancey Street Bridge and the East River Promenade from Ball Fields No. 1 and No. 2 to the Williamsburg Bridge. Segment 1 also include an access point to the NYC Ferry service. Construction activities within this segment are not anticipated to obstruct NYC Ferry access or service.

Outside of Segment 1, comparable resources of similar type and quality would be available at Baruch Playground (soccer fields, basketball courts, and water play areas), Corlears Hook Park (baseball fields), Seward Park, and Little Flower Playground (volleyball courts), Hamilton Fish Park and Luther Gulick Playground (water play areas). Nearly all 29 other open space resources in the ½-mile study area have comparable passive recreation areas (lawns, pathways, seating, etc.). Other than other sections of East River Park, which may also be temporarily unavailable due to construction, there are no comparable shared-use pathways in the ½-mile study area.

Segment 2

Segment 2 is approximately 18.36 acres and incorporates open space resources in East River Park, from north of the Williamsburg Bridge to the south and East 8th Street between the FDR Drive and the East River. The resources (moving south to north) within this segment include the following: the shared-use path adjacent to the FDR Drive and the East River Promenade adjacent to the East River from the Williamsburg Bridge to East 8th Street; a tennis center with 12 tennis courts enclosed with a tall chain link fence; a comfort station flanked by two lawns; a paved promenade that connect the shared-use path to the East River Promenade with landscaped areas, benches, fixed tables, and a dance circle to approximately Stanton Street; baseball fields (Ball Fields No. 3 and No. 4) enclosed with a tall chain-linked fence and planted areas to the south, west, and east; the East Houston Street overpass connects to East River Park adjacent to this area; baseball fields (Ball Fields No. 5 and No. 6) separated by a planted area; additional tree-lined lawns with pathways that connect the shared-use path and the East River Promenade with outdoor fitness equipment enclosed with a tall chain-link fence; the Track and Field Complex; and the area of East River Park north of the Track and Field Complex up to East 8th Street.

Other comparable resources are Coleman Field and Murry Bergtraum Softball Field, which are just outside of the ½-mile study area. Nearly all 29 other open space resources in the ½-mile study area have comparable passive recreation areas (lawns, pathways, seating, etc.). Aside from other sections of East River Park, which may also be temporarily unavailable due to construction, there are no comparable shared-use pathways in the ½-mile study area.

Segment 3

Segment 3 is approximately 7.83 acres and incorporates open space resources in East River Park, from north of East 8th Street to East 13th Street between the FDR Drive and the East River. The resources (moving south to north) within this segment include: the shared-use path adjacent to the FDR Drive and the East River Promenade adjacent to the East River from East 8th Street to East 13th Street; maintenance yards and paved seating areas separated by planted areas that connect the shared-use path to the East River Promenade between the Track and Field Complex and baseball fields (Ball Fields No. 7 and No. 8); a comfort station and playground at the terminus of the East 10th Street bridge; a paved playground, which contains play equipment, a sprinkler, and benches enclosed by a metal fence; basketball half-courts; and areas to grill and picnic. Additionally, Segment 3 is inclusive of the East 10th Street Bridge. At the northern end of the park, where the esplanade transitions to a narrow path alongside the Con Edison East River Generating Facility, there are trees and a grassy area with benches and fixed tables.

Outside of Segment 3, comparable resources of similar type and quality could be utilized at Dry Dock Playground and Tompkins Square Park (basketball courts). Nearly all 29 other open space resources in the ½-mile study area have comparable passive recreation areas (lawns, pathways, seating, etc.). Aside from other sections of East River Park, which may also be temporarily unavailable due to construction, there are no comparable shared-use pathways in the ½-mile study area. Additionally, there are no comparable grilling areas within the ½-mile study area.

Segment 4 (Murphy Brothers Playground and Captain Patrick J. Brown Walk)

Segment 4 is approximately 2.96 acres and incorporates approximately 1.27 acres of Murphy Brothers Playground. Located east of Stuyvesant Town, Murphy Brothers Playground includes a mixture of active and passive recreational amenities, such as tee-ball fields, a basketball court, playground equipment, hopscotch squares, and benches. Segment 4 also includes Captain Patrick J. Brown Walk, an esplanade that runs along the shoreline, which also serves as the East River

Bikeway. The surface of the walk is covered in decorative pavers and contains benches and an ornamental fence along the FDR Drive. Captain Patrick J. Brown Walk provides expansive river views that include the Queens waterfront, Roosevelt Island, the Ed Koch Queensboro Bridge, and Midtown Manhattan, including views of the United Nations Secretariat and the Empire State Building.

Outside of Segment 4, comparable resources of similar type and quality to Murphy Brothers Playground include, but are not limited to the Baruch Playground, P.S. 110 Playground, Sol Lain Playground, and Augustus St. Gardens Playground. Asser Levy Playground, located directly north of Murphy Brothers Playground at East 23rd Street and would potentially be open during construction of this Segment under certain alternatives (described below).

Segment 5 (Stuyvesant Cove Park)

Segment 5 is approximately 3.27 acres and incorporates approximately 1.90 acres of Stuyvesant Cove Park. Located along the waterfront, Stuyvesant Cove Park provides passive recreation, gardens, and paved area which is used for educational programming and special events (e.g., movies). In addition to the walking, jogging, and bicycling paths, park users may fish, or utilize benches and tables for social gathering or waterfront viewing. The northernmost portion of the park includes the Solar One building, which is maintained by a non-profit organization of the same name. The Solar One Environmental Education Center is proposed to be rebuilt as part of a separate project. Segment 5 also includes an access point to the NYC Ferry service. Construction activities within this segment are not anticipated to obstruct NYC Ferry access or service.

Outside of Segment 5, a comparable resource of similar type and quality includes Stuyvesant Square located within the ½-mile study area along 2nd Avenue between East 15th and East 17th Street.

Segment 6 (Asser Levy Playground)

Segment 6 is approximately 1.79 acres and incorporates approximately 0.77 acres of Asser Levy Playground. The totality of Asser Levy Playground is 2.44 acres. Construction would require use of the park excluding the Asser Levy Recreation Center building and the outdoor pools. While construction would likely disturb the outdoor pool temporarily, it is anticipated that construction would take place during the off-season of the pools (mid-September to early June) and not affect the operational season of the pools. Located just north of Peter Cooper Village, this segment is comprised of the Asser Levy Recreation Center, located just north of East 23rd Street, as well as the playground complex adjacent to the recreation center. Asser Levy Recreation Center houses a diverse set of active areas, including an indoor pool within the recreation center building, an outdoor intermediate pool, and an outdoor wading pool located east of the recreation center building. Asser Levy Playground contains specially designed free-form game tables, wood and concrete benches, drinking fountains, as well as pull-up bars, balance boards, steps and ramps, chain ladders, and parallel bars. Neighborhood residents and visitors play ping pong, badminton, chess, soccer, football, tee-ball, exercise, jog, practice yoga, or enjoy shaded seating on an expanded park area that was former Right-of-Way. Outdoor adult fitness equipment is also available.

Outside of Segment 6, comparable resources of similar size and quality include, but are not limited to the Baruch Playground, Sol Lain Playground, and Augustus St. Gardens Playground. Murphy Brothers Playground, located directly south of Asser Levy Playground is expected to be open during construction of this Segment under certain alternatives (described below).

F. ENVIRONMENTAL EFFECTS

NO ACTION ALTERNATIVE – (ALTERNATIVE 1)

DIRECT EFFECTS

As described in Chapter 5.3, "Open Space," some of these projects have the potential to affect open spaces within the study area.

The Pier 42 project will introduce approximately 2.93 acres of new passive open space to the study area by 2021. Pier 35 will introduce approximately 0.65 acres of new passive open space to the study area by 2019. The New York City Economic Development Corporation's (NYCEDC's) East River Waterfront Esplanade-Phase IV project by 2025will introduce 1.23 acres of recreational open space, of which, 0.62 is active and 0.62 is passive. The Two Bridges Large-Scale Residential Development (LSRD) project will convert the existing private Rutgers Slip Open Space into 0.77 acres of publicly accessible open space, of which, 0.21 acres is active and 0.56 acres is passive by 2021. With the construction of these projects, open space within the ½-mile study area would increase from 85.15 acres under existing conditions to approximately 85.80 acres by the 2020 analysis year and 90.73 acres by the 2025 analysis year. Of the 90.73 acres, 54.49 will be active and 36.87 acres will be passive (see Table 5.3-4 and **Table 6.2-1**).

Table 6.2-1
Alternative 1: Open Space in ½-Mile Study Area (Acres)
No Action Alternative

Analysis Year	Open Space in the ½-Mile Study Area (Acres)	Active (Acres)	Passive (Acres)
2020	85.80	53.66	32.14
2021	89.50	53.87	35.63
2022	89.50	53.87	36.25
2023	89.50	53.87	36.25
2024	89.50	53.87	36.25
2025	90.73	54.49	36.87

Note: Pier 35 will introduce 0.65 acres of passive open space by 2019; Pier 42 will introduce 2.93 acres of passive open space by the 2021 analysis year; the Two Bridges-LSRD development would introduce 0.77 acres, on its Site 5, of which 0.21 acres will be active and 0.56 acres will be passive; and NYCEDC's East River Esplanade-Phase IV project will introduce 1.23 acres, of which 0.62 acres will be active and 0.62 acres will be passive.

Under Alternative 1, with no new comprehensive coastal protection system installed in the project area, existing and planned open space resources will remain vulnerable to storm damage.

INDIRECT EFFECTS

The open space ratios for Alternative 1 were calculated for each analysis year, accounting for the planned open spaces and new residents from planned projects. The open space ratios in **Table 6.2-2** were calculated by dividing the existing and projected open space acreages within the ½-mile study area from **Table 6.2-1** by the combined residential population and projected residential population anticipated to be generated from the projected development as outlined in **Appendix A1**. The open space ratios under existing conditions and Alternative 1 are used as the baseline condition for the indirect effects analysis for the Preferred Alternative.

As shown in **Table 6.2-2**, during each analysis year total open space ratios will be below the Citywide Community District median ratio of 1.5 acres per 1,000 residents.

Table 6.2-2
Open Space Ratios for ½-Mile Study Area with Future Residential Population
No Action Alternative

Analysis Year	Open Space Ratios Acres per 1,000 Residents		
	Total	Active	Passive
2020	0.53	0.33	0.20
2021	0.54	0.32	0.21
2022	0.53	0.32	0.22
2023	0.55	0.33	0.22
2024	0.53	0.32	0.21
2025	0.52	0.31	0.21

PREFERRED ALTERNATIVE: FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK (ALTERNATIVE 4)

DIRECT EFFECTS ANALYSIS

Construction sequencing

As described in Chapter 6.0, "Construction Overview," a preliminary construction schedule was developed for the Preferred Alternative that illustrates which construction segment would be engaged in construction activity by month and year for the 2020–2023 analysis period (see Table 6.0-2 in Chapter 6.0, "Construction Overview"). Activities at each of the construction segments are anticipated to range in duration from approximately two to three years with periods of overlapping activities when work on multiple segments would be occurring concurrently during a particular year.

For the purposes of the construction open space analysis, using the preliminary construction schedule as a basis, the information provided in **Table 6.2-3** was developed. To evaluate a reasonable worst-case scenario for the temporary displacement of open space resources, it is assumed that the construction segment is engaged in construction activities for the full analysis year (i.e., if construction within a segment is complete within an analysis year, this analysis still assumes that the segment is unavailable for that full analysis year). A description of the reconstructed resources that would become available mid-year, if any, is provided below.

Table 6.2-3
Construction Open Space Direct Effects Analysis
The Preferred Alternative: Summary Table

Analysis Year	Construction Segments[1]	Displaced Open Space (Acres)
2020	1, 2, 3, 4, 5	42.35
2021	1, 2, 3, 4, 5, 6	43.12
2022	1, 2, 3, 4, 6	41.22
2023	1, 2, 3, 6	39.95
2024[2]	None	Minimal
2025[2]	None	Minimal

Notes:
[1] The Segments within the Project Areas that are engaged in construction activities and therefore temporarily unavailable to the public. See **Figures 6.2-1 through 6.2-4**.
[2] Under the Preferred Alternative, construction would be complete by May 2023 with minimal construction activities displacing open space areas during the 2024 and 2025 analysis years.

Construction segments that would be temporarily unavailable during each analysis year and are illustrated in **Figures 6.2-1 through 6.2-4**.

2020 Analysis Year

Commencing in March 2020, construction Segments 1, 2, and 3 (encompassing the entirety of East River Park), as well as Segments 4 (Murphy Brothers), and 5 (Stuyvesant Cove Park) would be unavailable to the public. Construction Segment 6 (Asser Levy Playground) would not yet be engaged in construction activities and would therefore remain open to the public during the first analysis year (see **Figure 6.2-1**). By the 2020 analysis year, Pier 35 (planned No Action project) is anticipated to be complete and will introduce 0.65 acres of passive open space on the waterfront to the study area. Due to the temporary displacement of approximately 42.35 acres, there is the potential for temporary significant adverse direct effects during this analysis year.

2021 Analysis Year

All construction segments would be unavailable to the public (see **Figure 6.2-2**). Additionally, both Asser Levy Playground (Segment 6) and Murphy Brothers Playground (Segment 4) would be engaged in construction activities during this analysis year. By the 2021 analysis year, the Pier 42 project and the Rutgers Slip Open Space (planned No Action projects) will introduce approximately 3.70 acres—of which 0.21 acres is active and 3.49 acres is passive—to the study area. However, due to the temporary displacement of approximately 43.12 acres, there is the potential for temporary significant adverse direct effects during this analysis year.

2022 Analysis Year

Construction Segments 1, 2, 3 (encompassing the entirety of East River Park), 4 (Murphy Brothers Playground), and 6 (Asser Levy Playground) would be unavailable to the public. The majority of construction activities would be complete in Segment 5 (Stuyvesant Cove Park) and would be available to the public by this analysis year. However, due to the temporary displacement of approximately 41.22 acres of public open space, there is the potential for temporary significant adverse direct effects during this analysis year (see **Figure 6.2-3**).

Both Asser Levy Playground (Segment 6) and Murphy Brothers Playground (Segment 4) would be engaged in construction activities during this analysis year.

Construction on the flyover bridge would commence during this analysis year. Therefore, additional temporary displacement of Captain Patrick J. Brown Walk would occur. However, this additional displacement (approximately 1 acre) is minimal compared to the overall temporary displacement of open space resources during this analysis year.

2023 Analysis Year

Construction Segments 1, 2, and 3 (encompassing the entirety of East River Park), as well as Segment 6 (Asser Levy Playground), would be unavailable to the public. It is anticipated that Segment 4 (Murphy Brothers Playground) would be reopened and would introduce reconstructed open space resources to the public (see **Figure 6.2-4**). Due to the temporary displacement of approximately 39.95 acres, there is the potential for temporary significant adverse direct effects during this analysis year. In addition, the shared-used flyover bridge would be under construction during this analysis year.

2024 and 2025 Analysis Years

Construction would largely be complete by the 2024 and 2025 analysis years (September 2023) with the exception of construction on the shared-use flyover bridge during these analysis years, which would result in the temporary displacement of Captain Patrick J. Brown Walk. However, this additional displacement is minimal (approximately 1 acre). East River Park, Stuyvesant Cove

Park, Murphy Brothers Playground, and Asser Levy Playground would be reopened and would introduce reconstructed open space resources to the public. The displaced open space areas would be restored and reopened to the public with new and enhanced park features.

Although there is the potential for temporary significant adverse effects on open space during construction for the 2020 to 2023 analysis years under the Preferred Alternative, once completed, the proposed project would have positive direct effects on East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground, by enhancing their design through reconstruction and their improved programming, including landscapes, recreational fields, playgrounds, and/or amenities. In addition, accessibility to East River Park would be enhanced with the reconstruction of the pedestrian bridges at Delancey Street, East 10th Street, and Corlears Hook, a new raised landscaped park-side plaza landing at the entrance to the park from the East Houston Street overpass, and the construction of a shared-use flyover bridge to address the Con Edison pinch point. Under the Preferred Alternative, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. Unlike the No Action Alternative, Alternative 2 and Alternative 3, the Preferred Alternative would also protect East River Park from future design storms.

Construction Noise

As described in Chapter 6.12, "Construction—Noise and Vibration," East River Park, Asser Levy Playground (outdoor) and Murphy Brothers Playground would be closed under the Preferred Alternative during the times when construction activities would occur at these park resources. As described in Chapter 6.12, "Construction—Noise and Vibration," at the open space receptors along the FDR Drive (Corlears Hook Park and Stuyvesant Cove Park), construction is predicted to produce noise levels at these receptors in the mid 60s to mid 80s dBA, resulting in noise level increases of up to approximately 10 dBA when construction occurs at the shortest distance from them. The predicted noise level increases at these open space locations would be noticeable and would exceed CEQR construction noise screening thresholds, and the total noise levels would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas also exceed CEQR recommended values for existing and No Action conditions.) However, the total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways experience comparable, and sometimes higher noise levels.

At these open space receptors, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur during no more than two of the five years of construction. At these open space receptors, the construction activity that would produce the highest noise levels would be pile installation, as well as landscaping work. Both pile installation and landscaping would occur in a single location for a relatively brief period of time, typically not more than a month. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the entire construction period. Lower construction noise levels that would be expected to occur during activities other than pile installation may still result in exceedances of CEQR construction noise screening thresholds at some times, but would be substantially lower than the maximum levels that would occur during pile installation.

Maximum construction noise levels at receptors nearest floodwall construction would be slightly lower because pile driving would occur further from the receptors.

While the noise from construction would be noticeable at times, the duration of construction noise would be limited at any given area of open space that would remain open in proximity to

construction activities. Furthermore, the construction noise predictions are conservative in that they consider the area of open space that remains open and accessible closest to the construction area. Based on these factors, construction noise at nearby open space receptors would not result in a significant adverse effect.

At Asser Levy Recreation Center, construction activity including pile driving that would occur west of the FDR Drive immediately adjacent to this building would produce exterior noise levels in the mid 80s dBA during the day and at nighttime, resulting in noise level increases up to approximately 19 dBA. These noise level increases would be noticeable and noise levels in the mid 80s are high for this area. Noise level increases at the Recreation Center exceeding the CEQR construction noise screening thresholds are predicted to occur during the construction activity including pile installation in Reach P west of the FDR Drive immediately adjacent to this building. Construction in Reach P is expected to occur over the course of approximately 20 months, however, pile installation would occur in a single location for a relatively brief period of time not greater than 4 months. It is expected that this pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use. While the duration of maximum noise levels at this location would be limited and the receptor is typically used for active recreation with a lower sensitivity to noise, the maximum noise levels predicted by the construction noise analysis are high, i.e., in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction. The feasibility of utilizing less impactful construction methods (i.e., press in pile) are being explored to mitigate this noise effect.

Construction of the proposed project would be required to follow the requirements of the NYC Noise Control Code and would use additional measures, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods) to minimize the effects of the proposed project's construction activities on the surrounding community.

Construction Air Quality

Construction of the proposed project under the Preferred Alternative would adhere to Local Law 77 of 2003 for emissions reductions on non-road construction engines, New York City Air Pollution Control Code regulations regarding construction-related dust emissions, and New York City Administrative Code limitations on construction-vehicle idling time. With the implementation of these measures, the detailed analysis presented in Chapter 6.10, "Construction—Air Quality," showed there would be no significant adverse air quality effects on sensitive receptors, including open space areas near the construction activities.

INDIRECT EFFECTS

The indirect effects analysis considers how the temporary closures of open space during construction would affect the utilization of remaining study area open spaces, which due to the closures, are expected to experience greater demand. The analysis will focus on the quantification of displaced open space discussed in the direct effects analysis above by analysis year (see **Table 6.2-4**). As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in the Preferred Alternative from the No Action Alternative. The indirect effects analysis is summarized in **Table 6.2-4**.

Table 6.2-4
Construction Open Space Indirect Effects Analysis
The Preferred Alternative: Summary Table

Analysis Year	No Action Open Space Ratio (Acres/1,000)	Construction Open Space Ratio (Acres/1,000)	Percent Change	Significant Adverse Effect
Alternative 4				
2020	0.54	0.27	-49.64%	Yes
2021	0.53	0.28	-47.80%	Yes
2022	0.55	0.29	-47.67%	Yes
2023	0.53	0.30	-42.57%	Yes
2024*	0.53	0.53	0.00%	No
2025*	0.52	0.52	0.00%	No

Note:
* Under the Preferred Alternative, construction of the flood protection system and raised East River Park would be complete by 2023 and minimal construction activities of other components displacing open space areas would occur in the 2024 and 2025 analysis years.

As the proposed project would reduce open space ratios by a minimum of 42.57 percent in 2023 and a maximum of 49.64 percent in 2020, the proposed project would result in potential temporary significant adverse indirect effects on open space resources within the study area. As shown in **Table 6.2-4**, there are no significant adverse indirect effects for the 2024 and 2025 analysis years, as the majority of construction would be complete and the displaced open space areas would be restored and reopened to the public with new and enhanced park features.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE (ALTERNATIVE 2)

As Alternative 2 involves reconstruction of fewer components (e.g., pedestrian bridge landings), the magnitude of construction activities during the peak construction period for Alternative 2 would be lower than the Preferred Alternative. In addition, the displacement of open space necessary to accommodate construction under Alternative 2 would be comparable to or less than that under the Preferred Alternative. Therefore, any potential temporary significant adverse direct and indirect open space effects identified under Alternative 2 would be of lesser magnitude than the effects identified under the Preferred Alternative presented above.

Under Alternative 2, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. However, East River Park will remain vulnerable to storm damage from future design storms.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS (ALTERNATIVE 3)

DIRECT EFFECTS ANALYSIS

Construction Sequencing

Similar to the Preferred Alternative, a preliminary construction schedule was developed for Alternative 3. Activities at each of the construction segments are anticipated to range in duration from approximately two to three years with periods of overlapping activities when work on multiple segments would be occurring concurrently during a particular year (see **Table 6.2-5**). To

evaluate a reasonable worst case scenario for the temporary displacement of open space resources, it is assumed that the construction segment is engaged in construction activities for the full analysis year (i.e., If construction within a segment is complete within an analysis year, this analysis still assumes that the segment is unavailable for that full analysis year).However, a qualitative description of the reconstructed resources that would become available following the completion of construction is provided below. The construction segments that would be temporarily unavailable during each analysis year are summarized in **Table 6.2-5** and illustrated in **Figures 6.2-5 through 6.2-8**.

Table 6.2-5
Construction Open Space Direct Effects Analysis
Alternative 3: Summary Table

Analysis Year	Construction Segments[1]	Displaced Open Space (Acres)
2020	1, 2, 3, 4	40.45
2021	1, 2, 3, 4, 5	42.35
2022	1, 2, 3, 4, 5, 6	43.12
2023	1, 2, 3, 4, 6	41.22
2024	1, 2, 3, 6	39.95
2025[2]	1, 2, 3, 6	39.95

Note:
[1] The segments within the Project Areas that are engaged in construction activities and therefore temporarily unavailable to the public. See **Figures 6.2-5 through 6.2-8**.
[2] Construction is anticipated to be complete by March 2025.

2020 Analysis Year

Commencing in May 2020, construction segments 1, 2, 3, and 4 (Murphy Brothers Playground) would be unavailable to the public. Construction segments 5 (Stuyvesant Cove Park), and 6 (Asser Levy Playground) would not yet be engaged in construction activities and would therefore remain open to the public during the first analysis year (see **Figure 6.2-5**). By the 2020 analysis year, Pier 35 (planned No Action project) is anticipated to be complete and would introduce 0.65 acres of passive open space on the waterfront to the study area. Due to the temporary displacement of approximately 40.45 acres, there is the potential for temporary significant adverse direct effects during this analysis year.

2021 Analysis Year

Construction, construction segments 1, 2, 3, 4 (Murphy Brothers Playground), and 5 (Stuyvesant Cove Park) would be unavailable to the public. It is anticipated that Asser Levy Playground (Segment 6) would remain open during this second analysis year (see **Figure 6.2-6**). By the 2021 analysis year, the Pier 42 project and the Rutgers Slip Open Space (planned No Action projects) will introduce approximately 3.70 acres, of which 0.21 acres is active and 3.49 acres is passive, to the study area. However, due to the temporary displacement of approximately 42.35 acres, there is the potential for temporary significant adverse direct effects during this analysis year.

2022 Analysis Year

All construction segments would be unavailable to the public, resulting in the temporary displacement of approximately 43.12 acres of public open space. Therefore, as with the 2021 analysis year, there is potential for temporary significant adverse direct effects (see **Figure 6.2-7**).

Both Asser Levy Playground (Segment 6) and Murphy Brothers Playground (Segment 4) would be engaged in construction activities during this analysis year.

Construction of the shared-use flyover bridge would commence during this analysis year. Therefore additional temporary displacement of Captain Patrick J. Brown Walk would occur. However, this additional displacement is minimal compared to the overall temporary displacement of open space resources during this analysis year.

2023 Analysis Year

Construction segments 1, 2, 3, 4 (Murphy Brothers Playground), and 6 (Asser Levy Playground) would be unavailable to the public. The majority of construction activities will have been complete in Segment 5 (Stuyvesant Cove Park) and would be available to the public by this analysis year. However, due to the temporary displacement of approximately 41.22 acres of public open space, there is the potential for temporary significant adverse direct effects during this analysis year (see **Figure 6.2-7**).

As with the 2022 analysis year both Asser Levy Playground (Segment 6) and Murphy Brothers Playground (Segment 4) would also be engaged in construction activities during this analysis year. In addition, the shared-use flyover bridge would be under construction.

2024 Analysis Year

Construction Segments 1, 2, 3, and 6 (Asser Levy Playground) would be unavailable to the public. Approximately 39.95 acres would be temporarily displaced under this analysis year (see **Figure 6.2-8**). Therefore, there is potential for temporary significant adverse direct effects during this analysis year. In addition, the shared-use flyover bridge would be under construction during this analysis year.

2025 Analysis Year

Construction Segments 1, 2, 3, and 6 (Asser Levy Playground) would be unavailable to the public, however construction is anticipated to be complete by March 2025 (see **Figure 6.2-8**). Additionally, by the 2025 analysis year, the East River Waterfront Esplanade-Phase IV project (planned No Action project) will introduce 1.23 acres of recreational open space, of which, 0.62 acres will be active and 0.62 acres will be passive. However, approximately 39.95 acres would be temporarily displace under this analysis year. Therefore, there is potential for temporary significant adverse direct effects during this analysis year. In addition, the shared-use flyover bridge would be under construction during this analysis year.

Although there is the potential for temporary significant adverse effects on open space during construction for every analysis year under Alternative 3, once completed, the proposed project would also have positive direct effects similar to those described under the Preferred Alternative East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground. Similar to the Preferred Alternative, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. However, East River Park will remain vulnerable to storm damage from future design storms under Alternative 3.

Construction Noise

Similar to the Preferred Alternative, East River Park, Asser Levy Playground (outdoor), and Murphy Brothers Playground would be closed during the times when construction activities would occur at these park resources.

Construction of the proposed project would be required to follow the requirements of the *New York City Noise Control Code*. At the open space receptors along the FDR Drive (Corlears Hook Park and Stuyvesant Cove Park), the predicted noise level increases at these open space locations

would be noticeable and would exceed CEQR construction noise screening thresholds. However, the total noise levels would be in the range considered typical for Manhattan, and for this area in general.

At Asser Levy Recreation Center, construction activity including pile driving that would occur west of the FDR Drive immediately adjacent to this building would produce noise level increases that would be noticeable and are considered relatively high, i.e., in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, as with the Preferred Alternative, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Construction Air Quality

Construction of the proposed project under Alternative 3 would adhere to Local Law 77 of 2003 for emissions reductions on non-road construction engines, *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and *New York City Administrative Code* limitations on construction-vehicle idling time. With the implementation of these measures, the detailed analysis presented in Chapter 6.10, "Construction—Air Quality," showed that there would be no significant adverse air quality effects on sensitive receptors, including open space areas near the construction activities. The effects of the proposed project's construction activities on air quality is discussed in more detail in Chapter 6.10, "Construction—Air Quality."

INDIRECT EFFECTS

The indirect effects analysis considers how the temporary closures of open space during construction would affect the utilization of remaining study area open spaces, which due to the closures, are expected to experience greater demand. The analysis will focus on the quantification of displaced open space as discussed in the direct effects analysis above by analysis year (see **Table 6.2-6**). The displaced open space (in acres) was utilized to obtain total open space ratios for Alternative 3, which are compared to the No Action Alternative to determine if there would be temporary significant adverse indirect effects.

As a result of the extended open space closures due to construction, the total open space ratios within the study area would decrease in Alternative 3 from the No Action Alternative. The indirect effects analysis is summarized in **Table 6.2-6**.

Table 6.2-6
Construction Open Space Indirect Effects Analysis
Alternative 3: Summary Table

Analysis Year	Displaced Open Space (Acres)	No Action Open Space Ratio (Acres/1,000)	Construction Open Space Ratio (Acres/1,000)	Percent Change	Significant Adverse Effect
Alternative 3					
2020	40.45	0.53	0.28	-47.14%	Yes
2021	42.35	0.54	0.28	-47.32%	Yes
2022	43.12	0.53	0.28	-48.18%	Yes
2023	41.22	0.55	0.30	-46.05%	Yes
2024	39.95	0.53	0.29	-44.63%	Yes
2025	39.95	0.52	0.29	-44.03%	Yes

According to the *CEQR Technical Manual*, if the percent change between the No Action and With Action open space ratios exceeds 5 percent, it is considered significant, as the loss of open space may result in overburdening of other existing facilities within the study area. As the proposed project would reduce open space ratios by a minimum of 44.03 percent in 2025 and a maximum of 48.18 percent in 2022, the proposed project would result in potential temporary significant adverse indirect effects on open space resources within the study area under Alternative 3.

OTHER ALTERNATIVES– FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE (ALTERNATIVE 5)

The displacement of open space necessary to accommodate construction under Alternative 5 would be comparable to Alternative 4 for park components and comparable to Alternative 3 with respect to the flyover bridge component. Therefore, any potential temporary significant adverse direct and indirect open space effects identified under Alternatives 3 and 4 would be of comparable magnitude.

G. MITIGATION OF EFFECTS

The open space resources within the project area, including East River Park, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Playground, and Captain Patrick J. Brown Walk, would be partially or fully closed for at least a portion of the approximately 3.5- to 5-year-long construction duration to accommodate the construction of the proposed project. Therefore, there is potential for temporary significant adverse direct effects over multiple analysis years due to the displacement of the numerous recreational resources in East River Park across all alternatives. The open space ratios would exceed the *CEQR Technical Manual* threshold of 5 percent change between the With Action and No Action conditions during construction. Temporary displacement of open space for construction over the 5 percent threshold is considered significant since it could result in the overburdening of remaining available open spaces within the study area. Therefore, the analysis concluded that there would be the potential for significant adverse indirect effects on open space during the construction period across all alternatives. As described in further details below, on-site or off-site measures would be made to partially mitigate these open space effects to the greatest extent practicable.

According to the *CEQR Technical Manual*, on-site improvements are considered a mitigation measure. Although construction would temporarily displace open space resources in East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk under the With Action Alternatives, the end result would be a refurbished open space resource. After construction, East River Park would be newly landscaped and raised park with pathways for the Preferred Alternative, which would enhance the user experience of the park. In addition, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. The Preferred Alternative would be especially beneficial for the open space resources in East River Park, as it includes a full reconstruction of the park, raising it by approximately eight feet to meet the design flood protection criteria. These enhancements would ensure that East River Park would be more resilient in future storm events. The flood protection measures proposed to be integrated into park features aim to reduce the effects from future storm events on the community. The Preferred Alternative propose the replacement of pedestrian crossings at the Delancey Street, East 10th Street, and Corlears Hook bridges. The enhancement of pedestrian bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon

project completion. The improvements to these open space resources under the proposed project would be considered partial mitigation. By remedying a long-standing restriction/obstacle at the Con Edison "pinch-point," the proposed project under all alternatives would significantly improve the usability and access to the greenway with the construction of the shared-use flyover bridge.

The proposed project introduces potential temporary significant adverse direct and indirect effects on open space during the construction period. Since the proposed project would result in temporary significant adverse effects, potential on-site or off-site measures to mitigate these effects to the greatest extent practicable are being explored by the City.

POTENTIAL MITIGATION MEASURES

As per *CEQR Technical Manual* guidance, a mitigation effort would be to improve existing open spaces in the study area and increase the utility, safety, and capacity of those resources. To that end, the mitigation measures being explored for the Preferred Alternative by the City include:

- The New York City Department of Parks and Recreation (NYC Parks) would work to accommodate permit users, with youth leagues as highest priority, within existing facilities under NYC Parks jurisdiction. Due to the high volume of permitted use across all NYC Parks, permittees may have to limit playing time to be accommodated;
- The City is working with other entities with open space resources, such as DOE, to identify recreational resources that may be opened to the community during construction;
- The City is assessing opportunities to open parts of East River Park as work is completed;
- NYC Parks is exploring providing alternative recreational opportunities throughout the Lower East Side neighborhoods through programs like Shape-Up classes, walking clubs, Arts, greening programs, etc.;
- The New York City Department of Transportation (NYCDOT) would reroute greenway users to the most direct alternate route within the existing bicycle network, primarily along the protected bike lanes on First Avenue and Second Avenue; bicycles looking to access Stuyvesant Cove Park ferry landing would have access via the existing protected bike lanes onto East 20th Street;
- Investigating supporting bicycle infrastructure upgrades along the alternate route, including new markings and signage;
- NYC Parks is exploring a Lower East Side greening program with the opportunity to plant up to 1,000 trees in parks and streets, and create up to 40 bioswales;
- The City is exploring purchasing lighting to be used at several Lower East Side parks to extend playing time at fields for permitted use during construction of the proposed project;
- The City is assessing opportunities for improvements to parks and playgrounds in the vicinity; and
- The City is also assessing the feasibility of utilizing quieter construction methods (i.e., press in pile), to partially mitigate noise effects that would be experienced at the Asser Levy Recreation Center.

Additionally, the introduction of new publicly accessible open space such as Pier 42 Park, Pier 35, and the Phase IV of the East River Waterfront Esplanade project, totaling 4.81 acres could be considered a mitigation effort. In addition, there has been funding allocated for the demolition of LaGuardia Bathhouse and interim recreation improvements which will create approximately 7,000 square feet of new publicly accessible open space.

Although full mitigation of the significant adverse construction open space effects is not possible as it is not feasible to acquire enough land to develop new open spaces to replace the existing resources that would be displaced under the proposed project, the measures proposed above would mitigate to the extent practicable, the construction effects on open space resources. Furthermore, the proposed project would substantially improve existing open space resources. All temporary displacement would be met with the refurbishment and re-construction of the displaced open space amenities. After construction, Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground would be redesigned and reconstructed and East River Park would be reconstructed as a newly landscaped and raised open space with pathways, which would enhance the user experience of the park. Upon completion of the proposed project, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources. Furthermore, the Preferred Alternative would be especially beneficial for the open space resources in East River Park, as the alternatives seek to enhance the park features to be fully resilient in future design storm events. The flood protection measures proposed to be integrated into park features aim to reduce the effects from future design storm events on the community.

IMPROVEMENT OF NON-MOTORIZED ACCESS TO PARKS

The Preferred Alternative would include the replacement of the Delancey Street, East 10th Street, and the Corlears Hook bridges. The enhancement of these bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon project completion.

The proposed project would also include a shared-use flyover bridge in the East River Bikeway along the Con Edison facility between East 13th Street and East 15th Streets. This would allow pedestrians and cyclists to travel between Stuyvesant Cove Park and the East River Esplanade/East River Bikeway without conflict with visitors travelling in the opposite direction or requiring cyclist dismounts. As stated in the *CEQR Technical Manual*, the implementation of missing segments of the City's greenway network would be considered a mitigation strategy. By remedying a long-standing restriction/obstacle, the proposed project would significantly improve the usability and access to the greenway. ✷

Chapter 6.3: Construction—Historic and Cultural Resources

A. INTRODUCTION

This chapter assesses the potential for significant adverse construction effects on architectural and archaeological resources.

The proposed project's primary Area of Potential Effect (APE), in which construction of the proposed project may directly or indirectly affect historic properties is described in this chapter. To facilitate the analysis of effects, the primary APE has been subdivided to indicate the area in which the proposed project could cause potential direct construction-related effects (within 90 feet) and the area in which the proposed project could cause indirect visual or contextual effects (within 400 feet).

B. PRINCIPAL CONCLUSIONS

ARCHAEOLOGICAL RESOURCES

Two Phase 1A Archaeological Documentary Studies were prepared for the APE in March 2016, and a Supplemental Phase 1A Archaeological Documentary Study was prepared in March 2019. The March 2016 reports identified the following broad categories of historic-period archaeological resources that could be located in the APE—river bottom remains, landfill retaining structures and landfill deposits, historic streetbed resources, and former city block resources. Because of the potential presence of these resources, as mitigation, additional archaeological investigation will be performed in accordance with Section 106 regulations, based on a scope of work reviewed and approved by the New York City Landmarks Preservation Commission (LPC) and the New York State Historic Preservation Office (SHPO); this archaeological investigation would include pre-construction testing and/or monitoring during project construction performed in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidelines in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that work be

halted until the tribe is notified and the artifact can be evaluated by an archaeologist. The additional archaeological investigation will be stipulated in a Programmatic Agreement (PA) that is being prepared and will be included in the Final EIS (FEIS). It is expected that the PA will be executed among the U.S. Department of Housing and Urban Development (HUD), the New York City Office of Management and Budget (OMB), NYC Parks, SHPO, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, and the Advisory Council on Historic Preservation (ACHP).

ARCHITECTURAL RESOURCES

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

One planned New York City Department of Parks and Recreation (NYC Parks) project within Project Area One could affect architectural resources that have been determined eligible for listing on the State and National Registers of Historic Places (S/NR)—construction of an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (#4). This architectural resource would be offered some protection from accidental damage through Building Code Section BC 3309: Protection of Adjoining Property.

In addition, three projects within the 400-foot portion of the Primary APE could affect architectural resources in the No Action Alternative—reconstruction of the Baruch Playground within the Bernard Baruch Houses (#9, S/NR-eligible), resiliency measures at the Baruch Houses (#9, S/NR-eligible), and rehabilitation work at the Asser Levy Public Baths (#12, NYCL, S/NR).

PREFERRED ALTERNATIVE (ALTERNATIVE 4)

Construction of the Preferred Alternative would directly affect the Franklin Delano Roosevelt East River Drive (FDR Drive), which is an architectural resource that has been determined eligible for listing on the S/NR (#1, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement a Construction Protection Plan (CPP) for the FDR Drive to avoid inadvertent construction-period damage from ground-borne vibrations (i.e., from pile driving), falling debris, collapse, dewatering, subsidence, or construction equipment. The plan would be expected to follow the guidelines of the New York City Department of Buildings (DOB) *Technical Policy and Procedure Notice (TPPN) #10/88*, which "requires a monitoring program to reduce the likelihood of construction damage to adjacent historic structures and to detect at an early stage the beginnings of damage so that construction procedures can be changed." It is expected that the CPP will also be prepared in accordance with LPC's guidance document *Protection Programs for Landmarked Buildings* and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. In addition, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

Construction under the Preferred Alternative would occur within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses

(#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

OTHER ALTERNATIVES

As under the Preferred Alternatives, construction under Alternatives 2, 3, and 5 would directly affect the FDR Drive and within 90 feet of the following architectural resources: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); Engine Co. 66 Fireboat House (#4, S/NR-eligible); Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); the Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these architectural resources under the Other Alternatives to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

MITIGATION

ARCHAEOLOGICAL RESOURCES

As will be stipulated in the PA, additional archaeological investigation prior to or during construction will be performed in accordance the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*, and such scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work If significant archaeological resources are identified during testing and/or monitoring, further archaeological testing and/or mitigation would be completed.

ARCHITECTURAL RESOURCES

As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for architectural resources located within 90 feet from the construction area of the proposed project to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

C. REGULATORY CONTEXT/METHODOLOGY

The analysis in this chapter follows the methodologies of the *CEQR Technical Manual* and was also prepared in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as implemented by federal regulations appearing in 36 CFR § 800, in consultation with the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), acting in its capacity as SHPO, and LPC. Additional details on the regulatory context and methodology for the historic and cultural resources analysis are presented in Chapter 5.4, "Historic and Cultural Resources."

D. ENVIRONMENTAL EFFECTS

The proposed project has two APEs: a primary APE, in which construction of the proposed project may directly or indirectly affect historic properties; and a more expansive, secondary APE, in which the absence of the proposed project could result in direct effects to historic properties from future flood events. The portion of the primary APE with the potential for the proposed project to cause direct effects on a historic resource includes all locations that could potentially be subject to direct ground-disturbing activities and adjacent areas within 90 feet, as defined in *TPPN #10/88* and in conformance with New York City Building Code Chapter 3309.4.4. Direct effects on archaeological and architectural resources from the construction of the proposed project may include physical damage or destruction of a resource or its setting.

Project construction activities are anticipated to include demolition, excavation, pile-driving, cutting and filling, and staging. Based on information presented in Chapter 5.4, "Historic and Cultural Resources," the sections below assess the potential for project construction of Alternatives 2 through 5 to adversely affect archaeological resources, identify the architectural resources that could be adversely affected by project construction, and propose measures to avoid adverse construction-related effects.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

ARCHAEOLOGICAL RESOURCES

As described in Chapter 5.4, "Historic and Cultural Resources," the plan to construct an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House at Grand Street and the construction of the Lower East Side Ecology Center could potentially affect archaeological resources that could potentially be present in the APE. In addition, the Phase 1A Archaeological Documentary Study prepared for the northern portion of the project area identified historic-period archaeological sensitivity for the East 23rd and East 25th Street portions of the APE, and the Supplemental Phase 1A Archaeological Documentary Study determined that the sites of the M22-M23 parallel conveyance and the South Interceptor Gate and Building possess potential archaeological sensitivity. However, there are no planned projects that could potentially affect archaeological resources that could potentially be present in these portions of the APE.

ARCHITECTURAL RESOURCES

Project Area One

Under the No Action Alternative, no new comprehensive coastal protection system would be installed in Project Area One.

There are, however, several projects planned or under construction in Project Area One, as described more fully in Chapter 2.0, "Project Alternatives," and in **Appendix A1**. Three projects that could affect architectural resources in the No Action Alternative are described in detail in Chapter 5.4, "Historic and Cultural Resources."

Project Area Two

There are no projects planned or under construction in Project Area Two that could affect architectural resources.

400-Foot Portion of the Primary Area of Potential Effect

There are, however, several projects planned or under construction in the 400-foot portion of the Primary APE. Three of these projects could affect architectural resources and are described in detail in Chapter 5.4, "Historic and Cultural Resources."

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

ARCHAEOLOGICAL RESOURCES

As described in Chapter 5.4, "Historic and Cultural Resources," for the portion of the project area between Montgomery and Rivington Streets, most construction activities are expected to consist of excavation to depths of 2 to 4 feet below current grade to install the upper components of floodwalls and closure structures, and for pile caps. Impacts below these depths would be by sheet piles, which would be mechanically driven into the ground to depths of approximately 40 feet and would not afford visibility of any underlying soils. The Preferred Alternative would also include the installation of new sewers within East River Park, and the installation of the new sewers would involve the excavation of trenches to depths of between 15 and 20 feet below existing grade. Therefore, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA.

For the East 23rd and East 25th Street portions of the APE, the different types of potential archaeological resources within the sensitive areas may be found below the existing and former street and sidewalk pavement layers and bedding, which generally extend at least one foot below the present grade. Therefore, potential resources may be located beginning at one foot below grade. As discussed above, most project effects of the Preferred Alternative would consist of excavation to depths of 2 to 4 feet below the current grade to install the upper components of floodwalls and closure structures, and for pile caps. Disturbance below these depths would require additional archaeological investigation to be performed prior to or during construction as will be stipulated in the PA.

The Supplemental Phase 1A Archaeological Documentary Study identified historic-period archaeological sensitivity for the locations of the proposed M22-M23 parallel conveyance and the South Interceptor Gate and Building. The interceptor gate would be installed at a depth of at least 36 feet below existing grade to connect with the existing interceptor. The new parallel conveyance would be installed between approximately 10 and 28 feet below grade. Therefore, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA.

A scope of work for the additional investigation will be prepared in consultation with LPC and SHPO in accordance with Section 106 regulations, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology,* ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collections*. This further phase of archaeological work will be stipulated in the PA and would include testing and/or monitoring conducted in consultation with LPC and SHPO. The testing and/or monitoring would not be done during the EIS process but would occur before and/or during project construction. The scope of work for additional archaeology would include: a sampling strategy that will select specific areas of the APE to be further investigated; identification of those areas that are believed

to be most sensitive for recovering landfill retaining structures across the overall APE; a description of the basis for the proposed sampling design, including a tabulation of the various archaeological contexts within the APE and a quantification of the sample fraction for each context; and an unanticipated discoveries protocol. If significant archaeological resources are identified during testing and/or monitoring, further archaeology and/or mitigation would be completed in accordance with Section 106 regulations and the guidance in the *CEQR Technical Manual*. In written communications dated April and May 2016, representatives of the Delaware Nation, Delaware Tribe of Indians, and Stockbridge-Munsee Community Band of Mohicans requested, in the case of an unanticipated discovery of an archaeological site or artifacts, that worked be halted until the tribe is notified and the artifact can be evaluated by an archaeologist.

ARCHITECTURAL RESOURCES

Project Area One

In Project Area One, the Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible)[1] through the construction of closure structures across the highway in the vicinity of Montgomery Street and East 13th Street. Construction affecting the FDR Drive would be coordinated with the New York City Department of Transportation (NYCDOT) to ensure its protection during construction. In addition, construction of the Preferred Alternative would occur within 90 feet of the following three S/NR-eligible architectural resources located within Project Area One: the FDR Drive (#1, S/NR-eligible); Williamsburg Bridge (#2, S/NR-eligible); and Engine Co. 66 Fireboat House (#4, S/NR-eligible) (see Figure 5.4-20). Direct effects on these resources could result from ground-borne vibrations (i.e., from pile-driving), collapse, dewatering, subsidence, or construction equipment.

As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for the three S/NR-eligible architectural resources identified above to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. The plans would be expected to follow the guidelines of the DOB *TPPN #10/88*, which "requires a monitoring program to reduce the likelihood of construction damage to adjacent historic structures and to detect at an early stage the beginnings of damage so that construction procedures can be changed." It is expected that the CPPs will also be prepared in accordance with LPC's guidance document *Protection Programs for Landmarked Buildings* and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. With the CPPs in place, construction would not be expected to result in adverse effects to the FDR Drive (#1); Williamsburg Bridge (#2); and Engine Co. 66 Fireboat House (#4). Further, construction adjacent to the FDR Drive and the Williamsburg Bridge would be coordinated with NYCDOT to ensure that these resources are protected during construction of the Preferred Alternative.

Project Area Two

In Project Area Two, the Preferred Alternative would directly affect the FDR Drive (#1, S/NR-eligible) through the construction of closure structures across the highway at Avenue C, and

[1] The architectural resource status designations and reference numbers in this chapter are those used in Chapter 5.4, "Historic and Cultural Resources." See Table 5.4-1 and Figure 5.4-1.

construction of other elements that would occur within 90 feet of the FDR Drive (#1, S/NR-eligible) (see Figure 5.4-21).

Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement a CPP for the FDR Drive that would be expected to follow the guidance documents noted above. With the CPP in place, construction would not be expected to result in adverse effects to the FDR Drive. Further, construction adjacent to the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of the Preferred Alternative.

400-Foot Portion of the Primary Area of Potential Effect

Construction of the Preferred Alternative would occur within 90 feet of Gouverneur Hospital (#5, S/NR); the Asser Levy Public Baths (#12, S/NR, NYCL); and a small portion of the Jacob Riis Houses (#15, S/NR-eligible) (see Figures 5.4-16 and 5.4-17). In addition, construction of the drainage management components of the Preferred Alternative would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6, S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); a portion of the Baruch Houses (#9, S/NR-eligible); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible).

As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for these architectural resources to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. The CPPs would be expected to follow the guidance documents noted above and, with their implementation, construction would not be expected to result in adverse effects to these architectural resources.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTIONS SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

ARCHAEOLOGICAL RESOURCES

The potential effects on archaeological resources under Alternative 2 would be similar to those described under the Preferred Alternative above. Additional archaeological work would be stipulated in the PA and performed in consultation with LPC and SHPO as described above.

ARCHITECTURAL RESOURCES

The effects to architectural resources during construction would be the same with Alternative 2 as with the Preferred Alternative, described above. As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for the same architectural resources as described above under the Preferred Alternative.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

ARCHAEOLOGICAL RESOURCES

The potential effects on archaeological resources under Alternative 3 would be similar to those described under the Preferred Alternative above. Additional archaeological work would be stipulated in the PA and performed in consultation with LPC and SHPO as described above.

ARCHITECTURAL RESOURCES

The effects to architectural resources during construction would be the same with Alternative 3 as with the Preferred Alternative, described above. As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for the same architectural resources as described above under the Preferred Alternative.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE (ALTERNATIVE 5)

ARCHAEOLOGICAL RESOURCES

The potential effects on archaeological resources under Alternative 5 would be similar to those described under the Preferred Alternative above. Additional archaeological work would be performed in consultation with LPC and SHPO as described above and as will be stipulated in the PA.

ARCHITECTURAL RESOURCES

Project Area One

The effects to architectural resources during construction would be the same with Alternative 5 as with the Preferred Alternative, described above. As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for the same architectural resources as described above under the Preferred Alternative

Project Area Two

This alternative would reconstruct the section of the FDR Drive (#1, S/NR-eligible) between approximately East 13th and East 18th Streets. However, it is not expected that this work would adversely affect on the FDR Drive, as only an approximately five-block section of the 9.44-mile-long FDR Drive would be reconstructed. Further, because the FDR Drive currently has elevated sections, raising the northbound lanes within a portion of Project Area Two would not affect the overall appearance of the highway, and it would still convey its historic significance. Also, the FDR Drive has been altered over time. Further, as with other alternatives, construction affecting the FDR Drive would be coordinated with NYCDOT to ensure that it is protected during construction of Alternative 5. With a CPP in place for work north of East 18th Street, adjacent construction would not be expected to result in adverse effects to the FDR Drive.

400-Foot Portion of the Primary Area of Potential Effect

Construction of Alternative 5—like the Preferred Alternative and Alternatives 2 and 3—would occur within 90 feet of Gouverneur Hospital (#5, S/NR); Gouverneur Hospital Dispensary (#6,

S/NR-eligible); a portion of the Vladeck Houses within the Lower East Side Historic District (#7, S/NR); the Baruch Houses (#9, S/NR-eligible); Asser Levy Public Baths (#12, S/NR, NYCL); a portion of the Jacob Riis Houses (#15, S/NR-eligible); a portion of Stuyvesant Town (#16, S/NR-eligible); and a portion of Peter Cooper Village (#17, S/NR-eligible). Therefore, as will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs and, with these CPPs in place, construction would not be expected to result in adverse effects to these architectural resources.

MITIGATION

ARCHAEOLOGICAL RESOURCES

As described above, additional archaeological investigation will be performed prior to or during construction as will be stipulated in the PA. A scope of work will be prepared in consultation with LPC and SHPO, and the City will complete any further phase of archaeological work per the guidance in the *CEQR Technical Manual* and in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology*, ACHP's *Section 106 Archaeological Guidance*, and the New York Archaeological Council's *Standards for Cultural Resource Investigations and Curation of Archaeological Collection*.

ARCHITECTURAL RESOURCES

As will be stipulated in the PA, the City, in consultation with LPC and SHPO, would develop and implement CPPs for architectural resources located within 90 feet from the construction area of the proposed project to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. ✷

Chapter 6.4: Construction—Urban Design and Visual Resources

A. INTRODUCTION

While not specifically required by the 2014 *City Environmental Quality Review (CEQR) Technical Manual* as an area of analysis during construction of a project, this chapter assesses potential temporary effects on urban context and visual resources during construction of the proposed project. Chapter 5.5, "Urban Design and Visual Resources," describes in detail the existing urban design and visual resources of the project area and a surrounding study area. Consistent with the *CEQR Technical Manual* guidance, this analysis focuses on the considerations of the pedestrian experience in the public realm, such as streets and open spaces. The analysis in this chapter considers the pedestrian experience of construction activities and changes to the urban context and visual character of the project area for each of the proposed alternatives.

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to views or view corridors are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative would require the closure of East River Park for the 3.5-year construction duration. It is anticipated that the entirety of East River Park would be fenced off for construction to keep the public out of the working areas. The closed and fenced East River Park during construction would obstruct views from the FDR Drive and the upland neighborhood towards the East River. Therefore, construction of the Preferred Alternative would detract the experience of pedestrians in the vicinity and would have temporary adverse visual effects. In addition, the pedestrian experience in the vicinity of the existing bridge landings would temporarily be adversely affected during construction and views of the East River would be temporarily blocked. Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Playground, and a portion of Captain Patrick J. Brown Walk would be closed and temporarily fenced off during construction. Closure of these open space resources would detract from the experience of pedestrians in the immediate vicinity and would also cause temporary adverse effects on the urban visual context.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced

Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of their potential to obstruct views from the FDR Drive and the upland neighborhood towards the East River and detract the experience of pedestrians in the vicinity and would have temporary adverse visual effects during construction. However, since the flood protection and enhanced park and access features for these alternatives are expected to be completed over a 5-year construction period as compared to the 3.5-year period for the Preferred Alternative, the temporary adverse visual effects during construction would be longer for these alternatives.

C. REGULATORY CONTEXT

The National Environmental Policy Act (NEPA) requires the consideration of visual resources when analyzing the potential effects of a Proposed Project. However, the U.S. Department of Housing and Urban Development (HUD) has not created specific visual assessment guidelines. Therefore, the *CEQR Technical Manual* methodology for urban design and visual resources was followed.

D. METHODOLOGY

Following the methodology of the *CEQR Technical Manual*, urban context impacts for the construction of the proposed project are determined "by considering the degree to which a project would result in a change to a built environment's arrangement, appearance, or functionality such that the change would negatively affect a pedestrian's experience of the area." In assessing the significance of a visual resource effect, key considerations include "whether the project obstructs important visual resources and whether such obstruction would be permanent, seasonal, or temporary; how many viewers would be affected; whether the view is unique or do similar views exist; or whether it can be seen from many other locations."

E. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives." Construction of the proposed project is projected to start in spring 2020 with completion anticipated in 2025. Note that although the superstructure of the shared-use flyover bridge for the proposed project would be completed in 2025, the flood protection and enhanced park and access features under Alternative 4 (the Preferred Alternative) would be completed in 2023. This shorter construction duration for Alternative 4 is primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive, which would require temporary nighttime single-lane closures of the FDR Drive to facilitate the construction activities.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to views or view corridors are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE: FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK (ALTERNATIVE 4)

PROJECT AREA ONE

Construction of the Preferred Alternative would require the closure of East River Park for the 3.5-year construction duration. It is anticipated that the entirety of East River Park would be fenced off for construction to keep the public out of the working areas and maintain public safety. The closed and fenced East River Park would obstruct views from the FDR Drive and the upland neighborhood towards the East River and detract the experience of pedestrians in the vicinity and would have temporary adverse visual effects. As discussed in details in Chapter 6.2, "Construction—Open Space," there are open space resources within close proximity to East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground that provide similar recreational opportunities to the public during construction of the proposed project and the City is exploring potential on-site or off-site measures to mitigate the construction open space effects to the greatest extent practicable.

The reconstruction of the East 10th Street, Delancey Street, and Corlears Hook bridges would result in additional view disturbances in the immediate vicinity of these bridges. Views from residences in the immediate vicinity of this work would be temporarily obstructed during construction. Outside of East River Park and near Montgomery Street, the pedestrian experience in the vicinity of the floodwall and closure structures would be temporarily adversely affected during construction.

PROJECT AREA TWO

Construction activities at and near Murphy Brother Playground would last for approximately three years. During this time, Murphy Brothers Playground would be temporarily fenced off. This work would detract from the experience of pedestrians in the immediate vicinity, but it would not affect any views or the pedestrian experience on Avenue C. Construction adjacent to the Con Edison parking area to the west of Murphy Brothers Playground at Avenue C would not affect any views or the pedestrian experience as there are no public sidewalks in this area.

The experience of users of Captain Patrick J. Brown Walk would be adversely affected since a portion of these resources may need to be temporarily closed to accommodate the construction activities associated with the flyover bridge, which is anticipated to take approximately 3.5 years to complete.

Construction at and near Stuyvesant Cove Park would last for approximately two years. During this time, temporary fences would separate the working area from the public area, affecting the pedestrian experience. Closure of Stuyvesant Cove Park would also cause temporary adverse effects on the urban visual context.

Construction at and near Asser Levy Playground would last for approximately two years. During this time, temporary fences would separate the working area in Asser Levy Playground from the public and would obstruct some views toward the waterfront. The eastern half of the playground, which currently contains play equipment, basketball and handball courts, and a track, would be closed off with temporary fences during construction.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE (ALTERNATIVE 2)

As with the Preferred Alternative, Alternative 2 would involve the same general temporary effects on urban context conditions are expected for both alternatives. However, since the flood protection and enhanced park and access features for this alternative is expected to be completed over a 5-year construction period as compared to the 3.5-year period for the Preferred Alternative, the temporary visual effects during construction of this alternative would be longer.

In general, the experience of park users in the vicinity of closed and fenced sections of the park would be adversely affected, but these adverse effects would be temporary. The limits of construction for these activities would be within existing park space, roadways, or rights-of-way and would be fenced off (i.e., chain-link fences and a green screen). Views from residences and sidewalks in the immediate vicinity of this work would be temporarily obstructed during construction. In addition, views of the East River from adjacent locations would be temporarily blocked during construction.

In Project Area Two, similar or less temporary visual context effects are expected compared to the Preferred Alternative, since Murphy Brothers Playground and Asser Levy Playground would be replaced in kind and not be reconstructed and reconfigured as part of this alternative.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS (ALTERNATIVE 3)

PROJECT AREA ONE

As with the Preferred Alternative, Alternative 3 would involve the same general temporary effects on urban context conditions are expected for both alternatives. In general, the experience of park users in the vicinity of closed and fenced sections of the park would be adversely affected, but these adverse effects would be temporary. However, construction in Project Area One is anticipated to take approximately 5 years as compared to a 3.5-year duration for the Preferred Alternative; therefore, the temporary visual effects during construction of this alternative would be longer. The limits of construction for these activities would be within existing park space, roadways, or rights-of-way and would be fenced off (i.e., chain-link fences and a green screen). Views from residences and sidewalks in the immediate vicinity of this work would be temporarily obstructed during construction. In addition, views of the East River from adjacent locations would be temporarily blocked during construction.

In Project Area Two, the same visual context effects are expected as compared to those in the Preferred Alternative.

OTHER ALTERNATIVE: FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE (ALTERNATIVE 5)

PROJECT AREA ONE

Similar to the Preferred Alternative, it is anticipated that the entirety of East River Park would be fenced off during construction. The reconstruction of the East 10th Street, Delancey Street, and Corlears Hook bridges would result in the same obstructed views and pedestrian experience as described under the Preferred Alternative. Therefore, construction under Alternative 5 would have temporary adverse visual effects.

PROJECT AREA TWO

In Project Area Two, this alternative would raise the northbound lanes of the FDR Drive between East 13th Street and Avenue C by approximately six feet to meet the design flood elevation. The raised FDR Drive platform would then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property, and the Murphy Brothers Playground. The experience of users of Captain Patrick J. Brown Walk would be adversely affected since a portion of this resource may need to be temporarily closed to accommodate the construction activities associated with the raised section of the FDR Drive as well as the flyover bridge, but these adverse effects would be temporary. North of the raised platform, the flood protection measures provided in Project Area Two under this alternative would be the same as provided under Alternative 4. Closure of Stuyvesant Cove Park and Asser Levy Playground would cause temporary adverse urban context effects. ✷

Chapter 6.5: Construction—Natural Resources

A. INTRODUCTION

This chapter describes the potential effects on natural resources during construction of the proposed project on geologic and soil resources; groundwater resources; wetland resources; the 100-year Federal Emergency Management Agency (FEMA) special flood hazard area (SFHA); surface water resources and quality; aquatic resources; endangered, threatened, and special concern species; and terrestrial resources. Specifically, conditions under the With Action Alternatives (i.e., the future with the proposed project) are compared to conditions under the No Action Alternative (i.e., the future without the proposed project) to determine the potential for effects to natural resources during construction. Mitigation measures to minimize adverse effects are identified where applicable. The analyses consider two different construction timelines: Alternatives 2, 3, and 5 are designed to accommodate a five-year construction schedule from 2020 to 2025, while the Preferred Alternative is expected to be completed in a 3.5-year time frame from 2020 to 2023. The analyses were conducted using guidance on methodologies outlined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*.

B. PRINCIPAL CONCLUSIONS

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area and reducing the potential for flooding, wave damage, and the resulting scouring and erosion.

Construction of the proposed project would be performed in accordance with all applicable rules and regulations of the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (DEP), New York City Department of Design and Construction (DDC), and other regulatory agencies and procedures, as applicable.

Construction of the Preferred Alternative includes the following in-water elements: the use of construction barges and associated spuds, the installation of shafts and footings to support a shared-use flyover bridge, the reconstruction of sewer outfalls, the demolition of the existing

bulkhead for the installation of a new cut-off wall, and the demolition of the existing embayments and creation of new embayments, and the demolition of existing piles and formwork associated with the esplanade in these areas. These construction activities have the potential to result in temporary adverse effects to NYSDEC littoral zone tidal wetlands and USACE Waters of the United States, surface water resources, benthic resources, essential fish habitat (EFH), and threatened and endangered species. Turbidity curtains, water-tight cofferdams, and debris nets would be used as applicable to minimize the potential for these effects. Any adverse effects associated with the filling of the existing embayments and the additional fill at the outer perimeter of the proposed embayments is evaluated in Chapter 5.6, "Natural Resources."

Although consultation with the NOAA NMFS identified both the endangered shortnose sturgeon and Atlantic sturgeon as potentially occurring within the study area, shortnose sturgeon rarely leave tidal river habitat (e.g., the Hudson River) and on the rare occasions when shortnose sturgeon have been documented migrating to other tidal rivers such as the Connecticut River, their presence in the East River would be transient (see **Appendix G**). Additionally, the East River contains no submerged aquatic vegetation and suboptimal salinity levels. Therefore, due to the transient nature of shortnose sturgeon in the East River, the lack of suitable habitat, and the sturgeon's ability to avoid the affected area, no significant adverse effects to shortnose sturgeon from construction activities under any alternative are anticipated.

The Atlantic sturgeon is known to utilize the East River as a migratory route between spawning grounds in the Hudson River and suitable marine habitats in the New York Bight, primarily between the months of March through October. Atlantic sturgeon is uncommon in the East River (Tomechik et. al., 2015). Construction of the in-water elements associated with the Preferred Alternative would likely produce noise that has been known to affect Atlantic sturgeon. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of a cushion blocks and gradually ramping up pile driving activities, the latter of which would discourage fish species including the Atlantic sturgeon from utilizing the near-shore environment in the East River. A consultation has been reinitiated with NOAA NMFS for the Preferred Alternative, and any additional conservation measures identified as a result of that consultation will be included in the Final EIS.

Upon completion of construction, the spuds, barges, turbidity curtains and debris nets would be removed, and the affected area would be allowed to naturally restore to pre-construction conditions. All adverse effects to NYSDEC and USACE regulated tidal wetlands would be subject to the regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions. Mitigatory measures for all permanent effects to wetland resources are discussed in Chapter 5.6, "Natural Resources," and include the creation of new embayments with improved habitat within the project area as well as the restoration of off-site tidal wetland habitat or purchase of credits from the Saw Mill Creek Wetland Mitigation Bank on Staten Island, New York.

In addition, temporary adverse effects to terrestrial resources due to the removal of trees are anticipated as a result of both construction of the proposed project and to accommodate the proposed design for the Preferred Alternative and are evaluated in Chapter 5.6, "Natural Resources." As noted in that chapter, the project would implement a comprehensive planting program as part of a landscape restoration plan, and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department

of Parks and Recreation Rules) and Local Law 3 of 2010. Therefore, no significant adverse effects to natural resources are anticipated as a result of construction of the Preferred Alternative.

OTHER ALTERNATIVES

Construction of all With Action Alternatives would be performed in accordance with all applicable rules and regulations as stated for the Preferred Alternative. Alternatives 2 and 3 do not propose the reconstruction of the sewer outfalls, the removal of the existing bulkhead to be replaced by a new cut-off wall, or the relocation of two embayments within East River Park. The in-water construction elements are limited to the installation of the flyover bridge shafts and footings and the use of construction barging. In addition, while the number of tree removals under Alternatives 2 and 3 would be less as compared to the Preferred Alternative, East River Park would remain vulnerable to design storm events and sea level rise inundation over the long-term. Regardless, no significant adverse effects to natural resources under these alternatives are anticipated.

Alternative 5 includes all the components of the Preferred Alternative and increases the potential for temporary adverse effects to tidal wetlands (littoral zone), surface water resources, benthic and EFH and Atlantic sturgeon due to the construction of the support structure for the raised FDR Drive. This additional adverse effect to NYSDEC and USACE regulated tidal wetlands would be subject to the same regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions.

C. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives." The No Action Alternative (Alternative 1) assumes that no comprehensive flood protection system is constructed and, therefore, is not analyzed below.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

GEOLOGIC AND SOIL RESOURCES

The limits of disturbance associated with the Preferred Alternative span 82 acres, and construction of the Preferred Alternative would require the excavation and grading of soils in the project area wherever floodwalls, the reconstructed shared-use bike and pedestrian path, and drainage components (e.g., interceptor gates, isolation gate valve, upsizing existing sewers, and parallel conveyance) are proposed. However, as described in Chapter 5.6, "Natural Resources," and Chapter 5.7, "Hazardous Materials," soil resources in these areas consists of highly modified urban soils and fill and are likely contaminated as a result of historic land uses in the area. Any contaminated excavated soils would be containerized and disposed of in accordance with all applicable rules and regulations at a pre-approved NYSDEC disposal facility. Construction materials and backfill used for the Preferred Alternative, totaling approximately 600,000 cubic yards, would include clean fill from an offsite source and, as practicable, any excavated material that meets NYSDEC's beneficial reuse criteria. Any onsite stockpiling of soils would be placed in upland areas away from the East River and would be managed via a NYSDEC approved SWPPP that utilizes Best Management Practices (BMPs) for erosion and sediment control. Specifically, any fill that is stockpiled on site would be contained using applicable BMPs, including impervious surface covers or temporary seeding for any fill that would be held on site for extended periods of time. These measures would reduce erosion or runoff potential in the event of a storm and would provide dust control in dry weather. Additionally, recently installed turf at the Track and Field Complex in East River park will be salvaged and reused in another park space. Therefore, no

significant adverse effects to geologic and soil resources from construction of the Preferred Alternative are anticipated.

GROUNDWATER RESOURCES

Groundwater levels in the project area are approximately seven feet below ground surface. Groundwater is not used for potable purposes in Manhattan. Construction of the Preferred Alternative would involve excavation to depths where groundwater would be anticipated to be present, and therefore may require temporary dewatering. During construction, temporary dewatering could result in the localized lowering of groundwater elevations in the project area. As described in Chapter 5.7, "Hazardous Materials," the groundwater in the project area may be contaminated as a result historic land uses in the area. Any groundwater dewatering effluent would be treated prior to discharge in accordance with a NYSDEC approved SWPPP and any applicable permits and regulations. Dewatering would be temporary and would not be anticipated to significantly affect groundwater quality, levels, or movement within the project area. It is anticipated that following construction, groundwater levels would return to pre-construction levels. Therefore, no significant adverse effects to groundwater resources are anticipated from construction of the Preferred Alternative.

WETLAND RESOURCES

Construction of the Preferred Alternative would involve the following in-water elements: construction of shafts and footings for the shared use flyover bridge; construction barging; relocating and reconstructing sewer outfalls; demolition of the existing bulkhead to replace with a new cut-off wall; demolition of the existing embayments; creation of new embayments; and demolition of existing piles and formwork associated with the esplanade in the areas of existing and proposed embayments. There would be temporary effects to NYSDEC or USACE regulated tidal wetlands resulting from the construction of these elements that are evaluated in this Chapter. Permanent adverse effects to wetland resources are evaluated in Chapter 5.6, "Natural Resources."

Construction barges may include unloading barges, transit barges (which may be employed to supplement truck deliveries) and storage barges. The anchoring of construction barges would be accomplished with spuds (vertical steel shafts) located on the barges. Monopile dolphins (a cluster of piles used as a fender for the bulkhead) could also be installed to control the transverse movements of unloading barges to ensure safe barging operations. The unloading barges, typically used to support excavators and small crawler cranes used for transferring materials from transit barges to the shoreline, would be sited along the bulkhead and moved as necessary between the Fireboat House and the north end of East River Park. Transit barges would be moored to the unloading barges from which materials would be transferred to the park for installation. Construction barges used for storage may be sited along the bulkhead in up to three other locations: between Pier 36 and Pier 42, at the northern end of East River Park, and/or along Captain Patrick J. Brown Walk (see Figure 6.0-2 in Chapter 6.0, "Construction Overview"). Upon completion of construction, any spuds and monopile dolphins would be removed and the affected area would be allowed to naturally restore to pre-construction conditions.

To install the shafts and footings associated with the flyover bridge, the current assumption includes use of land-based drill rigs positioned in East River Park, the East River Greenway path, and the Con Edison pier to install these support structures south of East 15th Street. Drilling for footings to be installed along Captain Patrick J Brown walk would be performed using barge mounted drill rigs. Shaft construction activities for the flyover bridge would involve the installation of a turbidity curtain and sinking of the pipe with a rotating cutter head to push the

pipe into the river bed. After sinking the pipe, a rebar cage is lowered prior to installing a tremie pipe. Concrete is then pumped into the tremie pipe. As the tremie pipe is filled with concrete, river water and sediment within that pipe is gradually displaced or may require pumping to remove the sediment and water. A portable sediment tank or approved equivalent would be used to treat dewatering effluent. The support shafts and footings for the flyover bridge occurring within the East River would result in approximately 650 square feet of permanent disturbance within NYSDEC and USACE regulated tidal wetlands as described in Chapter 5.6, "Natural Resources." Once the installation of these components is complete, the tremie pipe and any turbidity curtains would be removed, and the shafts and footings would remain.

To relocate and reconstruct the 10 sewer outfalls, a watertight cofferdam would be installed adjacent to the bulkhead at each of the 10 outfall locations and the work area would be dewatered. The top of the cofferdam would be above the mean higher-high water line to isolate the work area from tidal influence. The work area would not contain standing water and approved dewatering measures would be installed, as necessary, and would discharge below the mean higher-high water line. A portable sediment tank or approved equivalent would be used to treat dewatering effluent. Approximately 1,000 square feet of temporary disturbance to regulated tidal wetlands between the cofferdams and East River bulkhead is anticipated for each sewer outfall for a total temporary disturbance area of 10,000 square feet. Existing sewer infrastructure is anticipated to be filled with concrete and abandoned in place.

Demolition of the existing bulkhead would require turbidity curtains to be installed. Demolition of the esplanade would require debris nets to minimize the amount of debris falling into the waterway. Any large debris would be retrieved and disposed of in accordance with applicable regulations and best management practices (BMPs). Following demolition, a cut-off wall would be installed in the approximate alignment of the existing bulkhead. The cut-off wall sheet piles would be pile driven. The piles would initially be vibrated down and then pile driven to final tip elevation. Where obstructions are encountered, some pre-drilling may be needed prior to installing the cut-off wall sheet piles.

The filling of the existing embayments would occur following the installation of the cut-off wall, which would serve to limit any potential adverse effects to water resources, specifically water quality, during construction. Esplanade demolition and reconstruction activities in the areas of existing and proposed embayments would generally consist of the removal of the existing esplanade's concrete deck and support pilings at the mudline, and the installation of new girders and deck structure.

Upon completion of construction, the spuds, barges, turbidity curtains and debris nets would be removed, and the affected area would be allowed to naturally restore to pre-construction conditions. All adverse effects to NYSDEC and USACE regulated tidal wetlands would be subject to the regulatory permitting process and would be mitigated for in accordance with NYSDEC and USACE permit conditions. Mitigatory measures for all permanent adverse effects to wetland resources are discussed in Chapter 5.6, "Natural Resources," and include the creation of new, larger embayments with improved habitat within the project area as well as off-site wetland restoration.

A detailed analysis of the proposed project's compliance with Executive Order 11990 – Protection of Wetlands as determined by the Eight-Step Decision Making Process is located in **Appendix L**. That analysis concludes that the proposed project would be in compliance with Executive Order 11990. In addition, the adverse effects would not affect the classification of the East River; would likely not diminish the habitat for a resident or migratory endangered, threatened or rare animal

or plant species or species of special concern; would not contribute to a cumulative loss of habitat or function which diminishes the ability of littoral zone habitat to perform its primary function; would not affect a resources that is large, unusual or singular; or noticeably decrease this resource's ability to serve its various functions. Therefore, the Preferred Alternative would not result in significant adverse effects to tidal wetland resources as a result of construction.

SPECIAL FLOOD HAZARD AREA

Floodplains alleviate flooding by allowing flood waters to dissipate their energy and recharge into the ground. Floodplains include Special Flood Hazard Areas (SFHA) defined by FEMA as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year.[1] SFHA in the study area were identified using preliminary FEMA Flood Insurance Rate Maps (FIRMs) for New York City. The preliminary FIRMs are currently the Best Available Flood Hazard Data (BAFHD) for New York City. FIRMs typically show the areas of inundation anticipated for the 100-year storm, or the storm that has a 1 percent chance of occurring annually, and the areas of inundation anticipated for the 500-year storm, or the storm that has a 0.2 percent chance of occurring annually. The potential for effects to SFHA was assessed by determining if any construction activities associated with the Preferred Alternative could cause disturbance to SFHA within the study area.

Construction of the Preferred Alternative would occur within the 100-year FEMA designated SFHA. During construction, there would be temporary disturbance of the SFHA due to excavation, grading, and storage of construction materials and equipment. Following construction, a comprehensive planting program would be implemented as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. No permanent residential, commercial, or industrial structures would be introduced to the SFHA and the structures proposed under the Preferred Alternative are designed to reduce the risk of flood loss; to minimize the effect of floods on human safety, health, and welfare; and to preserve the beneficial value of the existing floodplain, as determined by the Eight-Step Decision Making Process, which is consistent with Executive Order 11988 – Floodplain Management (see **Appendix L**). As concluded in that analysis, there are no practicable alternatives to locating the Preferred Alternative outside of the floodplain to address Executive Order 11988. The Preferred Alternative would protect a portion of Manhattan that lies within the existing floodplain and, thus, the flood protection system must also be sited within the floodplain. The project further includes the reconstruction of existing parkland and water and sewer infrastructure that are currently within the mapped floodplain, and it is therefore impractical to move this work out of the mapped floodplain.

Similarly, the proposed project would be consistent with the City's WRP as discussed in Chapter 5.1, "Land Use, Zoning, and Public Policy," and documented in **Appendix D**. Specifically, as documented in the WRP, physical and recreational access to the waterfront would be provided along the esplanade with stepped seating areas to offer additional locations for passive recreation and waterfront views. Improving the resiliency of the park, coupled with expanded public access, furthers the enhancement of East River Park for public access, operations, functionality, and usability during pre- and post-storm periods. The addition of resiliency measures to park amenities and facilities proposed under this alternative would reduce impacts to East River Park as a result of design storm events and sea level rise, and be consistent with the policy goals to preserve,

[1] The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.

maintain, and protect existing physical and recreational access to the waterfront. As such, the Preferred Alternative would not be likely to cause, either directly or indirectly, a noticeable decrease in the SFHA's ability to serve its primary function. Therefore, construction of the Preferred Alternative would not result in significant adverse effects to the 100-year FEMA-designated SFHA.

SURFACE WATER RESOURCES

The in-water work associated with components of the Preferred Alternative as well as the temporary barging needed for transportation of materials would temporarily affect surface water resources. The in-water components include the placement of spuds to moor construction barges, construction of the support structure to accommodate a shared-use flyover bridge, relocating and reconstructing sewer outfalls, demolition of the existing bulkhead to replace with a new cut-off wall, demolition of the existing embayments, and demolition of existing piles and formwork associated with the esplanade in the areas of existing and proposed embayments.

All construction activities would be performed in accordance with NYSDEC's technical standards for erosion and sediment control, which would be implemented in accordance with an approved SWPPP to minimize potential adverse effects to surface water resources in the East River. Any fill that is stockpiled on site would be contained using applicable BMPs, including impervious surface covers or temporary seeding for any fill that would be held on site for extended periods of time. These measures would reduce erosion or runoff potential in the event of a storm and would provide dust control in dry weather. Construction of in-water components and any necessary environmental safety protocol would be implemented as described previously under "Wetland Resources." Turbidity curtains and watertight cofferdams would be used as needed to prevent sediment from entering the East River waterbody to the maximum extent practicable. All barges would be equipped with spill and erosion prevention BMPs in accordance with a Spill Prevention, Control, and Countermeasure Plan (SPCCP) following EPA Clean Water Act guidelines and any other applicable regulations or approvals to minimize the potential for spills and/or stockpiled material (e.g., soils) entering the waterway. In addition, all equipment located on the barges would be regularly inspected for leaks and any necessary repairs would be conducted immediately.

As described in Chapter 5.7, "Hazardous Materials," sediments of the East River in the area where in-water work would be constructed could be potentially contaminated due to historic land uses. Construction of the shafts associated with the flyover bridge or the relocation of embayments would require excavation or disturbance of potentially contaminated sediments. BMPs would be implemented in accordance with all applicable permits and regulations to minimize mobilization of the contaminated sediments into the water column and any excavated sediments would be disposed of at a pre-approved NYSDEC disposal facility. Upon completion of construction, any engineering controls would be removed, and the surface water environment would be expected to return to pre-construction conditions.

The water quality of the East River would be protected to the greatest extent practicable using the above mentioned BMPs. All in-water work under the Preferred Alternative would comply with conditions stipulated by USACE and NYSDEC permits. Therefore, there are no anticipated significant adverse effects to surface waters and water quality as a result of construction of the Preferred Alternative.

AQUATIC RESOURCES

Construction of in-water components of the Preferred Alternative, including the shafts and footings to accommodate the flyover bridge, placement of cofferdams to reconstruct sewer outfalls

along the bulkhead, demolition of the existing bulkhead to install a new cut-off wall, demolition of the existing embayments and existing piles and formwork associated with the esplanade in these areas, and the filling and relocation of embayments, would occur in the East River and would result in temporary disturbance to the benthic environment. During construction, the noise from shaft drilling, demolition, pile driving to install cofferdams around reconstructed outfalls, and other construction activities would be anticipated to cause any fish to avoid the area, including any EFH and FWCA species. The construction activities would temporarily displace the benthic invertebrate community.

A NOAA NMFS consultation has been reinitiated for EFH for one or more lifestages of winter flounder, windowpane flounder, summer flounder, Atlantic herring, scup, and black sea bass, clearnose skate, little skate, and winter skate. Several species listed (cobia, Spanish mackerel, king mackerel, Atlantic mackerel, bluefish, Atlantic butterfish) as potentially occurring in the study area are either at the extreme limit of their known range or are highly migratory and are therefore anticipated to occur in the East River only as uncommon or transient individuals (see **Appendix G**). The remaining species evaluated (red hake) would not be anticipated to be found in the East River due to unsuitable environmental conditions, unsuitable depths, and unsuitable substrates or other habitat features.

The flounders and skates are bottom-dwelling species that have the potential to be affected by the Preferred Alternative. Atlantic herring and scup are pelagic species that could potentially utilize the East River as well. Due to the preference of black sea bass for structured habitats, they are not uncommonly found underneath man-made structures such as docks and piers. Therefore, it is likely that black sea bass juvenile and adults are present in the study area.

While some temporary construction related effects to EFH could occur, no significant adverse effects to EFH for any lifestage of these species are anticipated as a result of the Preferred Alternative (see **Table 6.5-1**). The temporary effects to the benthic environment represent a small percentage (<0.1 percent) of the overall benthic habitat and EFH in the New York Harbor Estuary. The majority of the East River shoreline would still be available to provide habitat for these species. Additionally, the construction of the footings for the flyover bridge would occur underneath the East River Bikeway where there are already numerous other support structures and would therefore not significantly alter the biological character of this area of the East River and, in the case of black sea bass, would provide habitat.

All noise and construction related effects to aquatic resources would be temporary and impact avoidance measures described above would be implemented. Upon completion of the construction of the Preferred Alternative, benthic invertebrates and fish would be anticipated to re-populate this area over time. In addition, the installation of new embayments may constitute not only a replacement in kind within the study area, but an improvement over the existing embayments. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. Therefore, no significant adverse effects to aquatic resources are anticipated from construction of the Preferred Alternative (see **Appendix G**).

As described in Chapter 5.6, "Natural Resources," NOAA NMFS has also identified FWCA species of particular importance including the following forage species: *Alewife (Alosa psuedoharengus),* Blueback herring *(Alosa aestivalis),* Silversides *(Menidia spp.),* Killifish *(Fundulus spp.),* Menhaden *(Brevoortia tyrannus),* Anchovies *(Anchoa spp.)* as well as estuarine-

dependent commercially and recreationally important species such as summer flounder, winter flounder, bluefish, American eel (Anguilla rostrate), striped bass (Morone saxatilis), tautog (Tautoga onitis), and weakfish (Cynoscion regalis). The identified FWCA species are predominantly pelagic species that could potentially utilize the East River. An analysis of potential effects to these species is presented in **Table 6.5-1** and indicates the potential for effects and, where applicable, whether the potential for effects would be considered substantial (i.e., rise to the level of significant adverse effects).

For EFH and FWCA species, noise from pile driving and pile drilling associated with the Preferred Alternative could potentially have minimal adverse effects on these species and their prey or prey species habitat in the immediate vicinity of the pile installation and could prevent these species from utilizing that area for the duration of construction. Disturbance of substrate and the water column due to activities associated with barging, construction of the combined sewer outfalls, and construction of the shared use flyover bridge support structures could potentially cause a temporary increase in turbidity and result in temporary effects to these species. In addition, temporary shading from barges may adversely affect some habitat. Construction BMPs such as turbidity curtains would be utilized to limit turbidity and potential effects to these species. Conservation measures to limit the noise of the pile driving and drilling to the greatest extent practicable would be implemented. These include using a cushion block to dampen the adverse effect of the pile hammer, ramping up pile driving gradually to give fish opportunities to vacate the construction area, and a bubble curtain would be implemented, as practicable, for installation of the flyover bridge support shafts. While some temporary construction related effects to EFH and FWCA species could occur, no significant adverse effects to any habitat or lifestage of these species are anticipated as a result of the Preferred Alternative. Overall, the area to be affected represents a small fraction of available habitat in the New York Harbor Estuary waters (<0.1%) and the Preferred Alternative, pending confirmation from NOAA NMFS would not significantly adversely affect any regional populations or fisheries of these species.

Table 6.5-1
Potential Construction Related Effects to EFH and FWCA under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species				
Red hake	*Urophycis chuss*	Transient	High-quality EFH for larval and juvenile red hake is not found in the East River.	No effect
Winter flounder	*Pseudopleuronectes americanus*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Windowpane flounder	*Scophthalmus aquosus*	Bottom-dwelling species with potential to occur; DO in East River in summer months can be reduced to unacceptable levels	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Atlantic herring	*Clupea harengus*	The East River does not contain suitable depth or salinity for Atlantic herring larvae, and is on the low end of the preferred salinity for juvenile and adult Atlantic herring	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Bluefish	*Pomatomus saltatrix*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	No effect
Atlantic butterfish	*Peprilus triacanthus*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	No effect
Summer flounder	*Paralichthys dentatus*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Black sea bass	*Centropristis striata*	Likely to occur under docks, piers	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
King mackerel	*Scomberomorus cavalla*	Rare and transient	Generally, favors deeper and warmer waters than are typically found in the East River	No effect

Table 6.5-1 (cont'd)
Potential Construction Related Effects to EFH and FWCA under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
EFH Species (cont'd)				
Spanish mackerel	*Scomberomorus maculatus*	Rare and transient	Limited EFH within study area; generally, favors higher salinities and warmer waters than found in the East River	No effect
Cobia	*Rachycentron canadum*	Rare and transient	No cobia lifestages documented within East River; limited EFH within study area	No effect
Atlantic mackerel	*Scomber scombrus*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Scup	*Stenotomus chrysops*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Little skate	*Leucoraja erinacea*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Clearnose skate	*Raja eglanteria*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Winter skate	*Leucoraja ocellata*	Bottom-dwelling species with potential to occur	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
FWCA Species				
Alewife	*Alosa psuedoharengus*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Blueback herring	*Alosa aestivalis*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Silversides	*Menidia spp.*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial

Table 6.5-1 (cont'd)
Potential Construction Related Effects to EFH and FWCA under the Preferred Alternative

Common Name	Scientific Name	Potential for Occurrence within Study Area	Analysis of Potential Effect	Conclusion of Potential Effects*
Killifish	*Fundulus spp*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Menhaden	*Brevoortia tyrannus*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Anchovies	*Anchoa spp*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
American eel	*Anguilla rostrate*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Striped bass	*Morone saxatilis*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Tautog	*Tautoga onitis*	Likely to occur under docks, piers	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial
Weakfish	*Cynoscion regalis*	Transient	Construction BMPs will limit potential adverse effects to water quality and allow fish opportunities to vacate the construction area.	Not substantial

Note: *Conservation measures identified as part of ongoing consultation with NOAA NMFS will be identified in Final EIS.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

As discussed in Chapter 5.6, "Natural Resources," three endangered, threatened, and special concern species have been identified as having the potential to occur within or adjacent to the project area: shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrhynchus*), and peregrine falcon (*Falco peregrinus*). A list of 58 migratory birds that could potentially occur in the project area was also provided by the United States Fish and Wildlife Service (USFWS). This list includes birds that are on the USFWS Birds of Conservation Concern (BCC) or warrant special attention to the project location.

Shortnose sturgeon rarely leave tidal river habitat (e.g., the Hudson River) and on the rare occasions when shortnose sturgeon have been documented migrating to other tidal rivers such as the Connecticut River, their presence in the East River would be transient. Additionally, the East River contains no submerged aquatic vegetation and suboptimal salinity levels. Therefore, due to the transient nature of shortnose sturgeon in the East River, the lack of suitable habitat, and the sturgeon's ability to avoid the affected area, no significant adverse effects to shortnose sturgeon from construction activities under any alternative are anticipated.

The Atlantic sturgeon is known to utilize the East River as a migratory route between spawning grounds in the Hudson River and suitable marine habitats in the New York Bight, primarily between the months of March through October. Atlantic sturgeon is uncommon in the East River (Tomechik et. al., 2015). When present, Atlantic sturgeon may forage opportunistically thus their presence would primarily be transient. The potentially affected area represents a small portion of overall habitat available in the East River.

Construction of the in-water elements associated with the Preferred Alternative produces noise that has been known to affect Atlantic sturgeon. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of bubble curtains, cushion blocks, and gradually ramping up pile driving activities. With these conservation measures in place, Atlantic sturgeon may be discouraged from utilizing the near-shore environment in the East River. Therefore, the Preferred Alternative would not be anticipated to significant adversely affect the Atlantic sturgeon population. An updated consultation with NOAA NMFS has been reinitiated for the Preferred Alternative (see **Appendix G**). Any conservation measures identified as a result of completion of the consultation will be included in the Final EIS.

The Williamsburg Bridge has been identified as potential peregrine falcon habitat and this bird of prey has been recorded utilizing the highpoints of the bridge for roosting and nesting. The area surrounding the Williamsburg Bridge is a heavily utilized and loud urban environment. Due to existing noise levels on the Williamsburg Bridge from different modes of transportation (e.g., traffic, helicopter, subway, boats), it is not anticipated that construction of the Preferred Alternative near the bridge footings would significantly alter existing noise conditions at the highpoints of the bridge or otherwise affect the suitability of the Williamsburg Bridge for peregrine falcon roosting or nesting.

Migratory birds may experience a temporary loss of habitat along the East River during construction, however, it is anticipated that the birds would relocate elsewhere during this time period. The overall habitat being disturbed represents a small fraction of the available habitat for the migratory birds listed as potentially occurring within the study area. Therefore, no significant adverse effects to endangered, threatened, or special concern species are anticipated from construction of the Preferred Alternative.

TERRESTRIAL RESOURCES

Terrestrial resources that would be affected by the construction of the Preferred Alternative include urban wildlife, lawn and landscaped areas, and trees. During construction, terrestrial habitat used by typical urban wildlife, as described in Chapter 5.6, "Natural Resources," would be temporarily disturbed. This wildlife would be anticipated to relocate to other suitable areas, including other parks and neighborhoods adjacent to the project area. Upon completion of the

construction of the Preferred Alternative, affected habitat would be restored and urban wildlife would be anticipated to return.

Construction of the Preferred Alternative would temporarily disturb lawn and landscaped areas within East River Park, Stuyvesant Cove Park, including the National Wildlife Federation (NWF)-designated "Certified Wildlife Habitat" and the Monarch Watch designated "Monarch Waystation," and other upland spaces such as Murphy Brothers Playground and Asser Levy Playground. These disturbed areas would be restored in accordance with a pre-approved NYC Parks landscape restoration plan, which would include plantings that would support typical urban wildlife upon completion of construction.

As described in Chapter 5.6, "Natural Resources," construction of the Preferred Alternative has the potential to remove 981 trees with implementation of the project. Trees provide habitat for urban wildlife. The habitat functions provided by trees, especially mature trees, include providing resting, roosting, and nesting locations for birds and squirrels. Trees also provide foraging habitat for urban wildlife due to the many invertebrates that live in trees and the variety of fruiting structures produced by trees. Trees also provide a variety of ecological services including air filtration and sequestration of carbon. Mature trees are also aesthetically important aspects of city parkland and provide shade in the summer months.

Effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored or mitigated for upon completion of construction of the Preferred Alternative. Construction of the proposed project under the Preferred Alternative would result in the removal of 981 trees, however, restoration of trees in the project area as a result of the Preferred Alternative would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan. This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. The landscape restoration plan would ultimately result in a net increase of 399 total trees within the project area. While these trees would not be as mature as some existing trees, over time, the new tree canopy would fill in and represent an improved habitat over the existing conditions, which is largely dominated by London plane trees, known for their poor response to salt-water inundation.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Effects to groundwater resources and the SFHA would be same under Alternative 2 as discussed above for the Preferred Alternative, therefore those analyses are not repeated here.

GEOLOGIC AND SOIL RESOURCES

The spatial extent of project implementation for Alternative 2 would be approximately 8 acres. Excavation and grading for Alternative 2 would be less than the Preferred Alternative. As described in Chapter 5.6, "Natural Resources," soil resources in these areas consists of highly modified urban soils and fill and as described in Chapter 5.7, "Hazardous Materials," these soils and fill are likely contaminated as a result of historic land uses in the area. All NYSDEC applicable

rules and regulations would be utilized to prevent the spread of contaminated material as described above for the Preferred Alternative. Therefore, no significant adverse effects to geologic and soil resources from construction activities under Alternative 2 are anticipated.

WETLAND RESOURCES

Under Alternative 2, only the barging elements and flyover bridge support shafts and footings would necessitate in-water construction activities, which would temporarily affect wetland resources. All construction activities would be subject to and performed in accordance with NYSDEC's technical standards for erosion and sediment control, which would be implemented in accordance with a SWPPP to minimize potential adverse effects to water quality and aquatic biota of the East River. Therefore, no significant adverse effects to tidal wetland resources are anticipated from construction activities for Alternative 2.

SURFACE WATER RESOURCES

The in-water work associated with the flyover bridge components of Alternative 2 as well as the temporary barging needed for transportation of materials would temporarily affect surface water resources. The water quality of the East River would be protected to the greatest extent practicable using the same BMPs discussed for the Preferred Alternative. The in-water work associated with the construction of the flyover bridge shafts and footings would comply with conditions stipulated by USACE and NYSDEC permits. Therefore, there are no anticipated significant adverse effects to surface waters and water quality as a result of construction of Alternative 2.

AQUATIC RESOURCES

In-water construction under Alternative 2 would be limited to the installation of spuds and/or monopile dolphins to support construction barging and construction of shafts and footings for the shared-use flyover bridge. It is expected that minor noise effects and habitat loss would be similar in nature as described under the Preferred Alternative, but noise levels, duration of in-water construction activities, and square footage of temporary disturbance would be lessened due to the limited in-water elements proposed for Alternative 2. The temporary loss of this small area of aquatic habitat would not significantly affect phytoplankton, zooplankton, benthic invertebrates, fish, and EFH. Upon completion, fish would be able to utilize the temporarily affected habitat. Therefore, no significant adverse effects to aquatic resources in the East River from construction activities under Alternative 2 are anticipated.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

The in-water construction elements of Alternative 2 would cause the same temporary disturbances to endangered, threatened, and special concern species as described for the Preferred Alternative, but the spatial extent, noise levels, and duration of construction activities would be reduced due to the fewer number of in-water construction elements. The same mitigatory measures as described above would be utilized. Therefore, there are no anticipated significant adverse effects to Atlantic and shortnose sturgeon.

The effects to peregrine falcons and migratory birds would be the same as described for the Preferred Alternative and would not result in significant adverse effects to these species.

TERRESTRIAL RESOURCES

Effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored upon completion of construction of the proposed project. The removal of 265 trees would require the restoration of

trees in the project area and would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Under Alternative 3, effects to natural resources due to construction would be similar in nature to those discussed for Alternative 2. Adverse effects to terrestrial resources in the project area from construction would be more extensive due to the larger construction footprint (approximately 76 acres) associated with the more extensive park programming, levees, enhanced recreational facilities, and neighborhood connectivity improvements. This is particularly evident in the increased number of trees that would be removed under Alternative 3. Construction of the proposed project under Alternative 3 has the potential to affect 776 trees (see Chapter 5.6, "Natural Resources").

With the inclusion of the removal of 776 trees with project implementation, effects to terrestrial resources due to construction related activities would be temporary in nature. All temporary disturbances to these terrestrial resources would be restored upon completion of construction of the proposed project. The restoration of trees in and around the project area would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 differs from the Preferred Alternative only in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. As discussed in Chapter 6.0, "Construction Overview," the raised FDR Drive platform would require drilled or pile driven support shafts under the FDR Drive, placement of a precast pre-stressed box structure/raised platform on piers supported by shafts, a new paved roadway on top of the box structure, and installation of a floodwall along the east side of the elevated roadway.

Effects to natural resources due to construction of Alternative 5 would be similar to those described for the Preferred Alternative with disturbances to groundwater resources, wetland resources, and surface water resources slightly increased due to the construction of the support structure for the raised FDR Drive. Construction methods would be the same as previously discussed, and all work would be done in accordance with all applicable NYSDEC and USACE permits, standards, and regulations. No significant adverse effects to natural resources would be anticipated due to the construction of Alternative 5.

D. MITIGATION

Mitigation associated with installation of permanent features, such as the installation of shafts and footings for the flyover bridge is discussed in detail in Chapter 5.6, "Natural Resources." Wetland mitigation for adverse effects associated with these features includes a combination of on- and off-site wetland habitat restoration. The proposed restoration for tree loss associated with the Preferred Alternative would be conducted in accordance with a pre-approved NYC Parks landscape restoration plan, as described in Chapter 5.6, "Natural Resources." All in-water work under the Preferred Alternative would comply with conditions stipulated by USACE and NYSDEC permits, including tidal wetland compensatory mitigation requirements. All construction activities would be subject to and performed in accordance with NYSDEC's technical

standards for erosion and sediment control, which would be implemented in accordance with an approved SWPPP to minimize potential adverse effects to water quality and aquatic biota. An EPA Spill Prevention, Control, and Countermeasure (SPCC) Plan would also be implemented, and all construction performed in accordance with the SPCC. During construction, erosion control BMPs would be used to prevent sediment, trash, and debris from entering the waterway. Any surplus excavated soils would be disposed of in accordance with all applicable rules and regulations at a pre-approved NYSDEC disposal facility. ✷

Chapter 6.6: Construction—Hazardous Materials

A. INTRODUCTION

This chapter addresses potential adverse effects of hazardous materials associated with construction of the proposed project, including the potential presence of subsurface hazardous materials (in soil and/or groundwater) that would be disturbed during construction. The project area has a history of commercial/industrial and residential uses. Any required disturbance to bridges, elevated roadways, or buildings could entail addressing any asbestos and/or lead-based paint (LBP) or lead-containing paint (LCP) that might be present on those structures and disturbed during construction. This chapter addresses the potential effects of hazardous materials and any remediation that may be required during construction.

B. PRINCIPAL CONCLUSIONS

During the subsurface investigation of the project area, subsurface contamination consistent with historical MGPs and other sources of petroleum waste were found in both soil and groundwater. These contaminants, including MGP-related free product (also known as non-aqueous phase liquid or NAPL), were found in the northern portion of Project Area One and throughout the majority of Project Area Two. Three nearby former MGPs (historically known as East 11th Street Works, East 14th Street Works, and East 21st Street Works) have been or are being investigated and, as deemed necessary by the New York State Department of Environmental Conservation (NYSDEC) to protect human health or the environment, remediated by the Consolidated Edison Company of New York (Con Edison). These activities were being conducted under the former NYSDEC Voluntary Cleanup Program (VCP) (Sites V00534, V00535, and V00536) and now, following termination of the VCP statewide by NYSDEC, under an Order on Consent and Administrative Settlement with NYSDEC.

Within the northern portion of Project Area Two, adjacent to the Asser Levy Recreation Center building, there is known petroleum contamination from a No. 2 fuel oil release (open-status NYSDEC Spill No. 0814102). Additionally, within the northern portion of Project Area Two, at Solar One in Stuyvesant Cove Park, there is known gasoline and No. 6 fuel oil contamination (NYSDEC Spill No. 9506959). Both of these spills have active remediation systems.

In addition, throughout the project area, historical fill material of unknown origin was encountered throughout the borings, as expected. Laboratory analysis found, as is typical with historical fill material, variable, and sometimes elevated levels of a range of contaminants—especially certain metals and semivolatile organic compounds (SVOCs).

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, no new comprehensive coastal flood protection systems would be implemented within the project area. However, several projects planned or under construction in the project area might disturb the subsurface and any hazardous materials present there, and

potentially increase pathways for human or environmental exposure. These projects are subject to applicable regulatory requirements.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative has the potential to disturb subsurface hazardous materials, as it would involve demolition and excavation activities. However, with the implementation of appropriate measures governing the construction (such as air monitoring, proper storage and handling of materials, and, if required, odor suppression), the potential for significant adverse effects related to hazardous materials would be avoided.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of all having the potential to disturb hazardous materials in existing structures and the subsurface, as they all involve demolition and excavation activities. Any potential for construction-phase effects would be avoided in the same manner as described for the Preferred Alternative. However, the level of disturbance within East River Park and the importation of fill materials would be substantially less for Alternatives 2 and 3, as compared to the Preferred Alternative.

C. ENVIRONMENTAL EFFECTS

Chapter 5.7, "Hazardous Materials," describes the regulatory context related to hazardous materials, summarizes the existing conditions in the project area, and assesses the potential environmental concerns related to hazardous materials following construction of the proposed project. The discussion below focuses on the potential effects of construction of the proposed project on hazardous materials and how applicable federal, state and local laws and guidelines would be complied with. As all alternatives that include implementation of the proposed project (i.e., Alternatives 2 through 5) involve substantial demolition, excavation, and general subsurface disturbance, the bulk of the potential effects, and methods that would be employed to mitigate those effects are described below under the Preferred Alternative. Discussions of Alternatives 2, 3, and 5 highlight issues specific to those particular alternatives, as necessary.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

As described in **Appendix A1**, there are a number of projects planned or currently under construction in the project area. These projects are independent of the proposed project and include the Pier 42 project and the Solar One Environmental Education Center project. These projects are subject to applicable regulatory requirements.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative requires both demolition and subsurface disturbance, which can increase exposure to hazardous materials if conducted without proper controls. The

demolition and subsurface disturbance required, and controls/measures that would be implemented, are described below.

To build the shared-use flyover bridge, shafts would be drilled extending to bedrock. This would likely entail additional soil disturbance and, for some of the flyover shafts, sediment disturbance. Testing of soil/sediment and groundwater would be conducted once the shaft locations are determined and any required sediment testing would be performed as a required in the permits issued by NYSDEC and the U.S. Army Corps of Engineers (USACE).

DEMOLITION

Limited demolition of existing above-grade structures (such as fencing) would be required. This work, at a minimum, would conform to the following regulatory requirements (additional requirements may be incorporated into the project specifications):

- Prior to any demolition activities with the potential to disturb (aboveground or underground) petroleum storage tanks, these tanks would be properly closed and removed, along with any contaminated soil, in accordance with applicable regulatory requirements and guidelines including NYSDEC spill reporting and tank registration requirements. If tanks are unexpectedly discovered, they would be properly registered, if required, with NYSDEC and/or the New York City Fire Department. The NYSDEC Petroleum Bulk Storage registrations would be maintained with tank status.
- Prior to any demolition activities, an asbestos survey would be completed by qualified persons, unless information exists to indicate that suspect asbestos-containing materials (ACM) do not contain asbestos. All ACM that would be disturbed by demolition would be removed and disposed of in accordance with local, state, and federal regulations and guidelines.
- Any demolition activities with the potential to disturb positively identified or suspected LBP/LCP would be performed in accordance with the applicable Occupational Safety and Health Administration regulation (OSHA 29 CFR 1926.62—Lead Exposure in Construction).
- Unless labeling or laboratory testing data indicates that suspected polychlorinated-biphenyls (PCB)-containing fluorescent lighting fixtures, transformers, or other electrical equipment do not contain PCBs, disposal would be performed in accordance with applicable federal, state, and local regulations and guidelines, including but not limited to 40 CFR Part 761, the EPA regulations implementing the Toxic Substances Control Act (TSCA). Similarly, without labeling or laboratory testing data to indicate that fluorescent lights and older thermostats do not contain mercury, disposal would be performed in accordance with applicable federal, state, and local regulations and guidelines,
- Disposal of chemicals would be done in accordance with applicable regulations and guidelines.

MGP-RELATED RECOVERY WELLS

In an effort to reduce the potential migration of MGP-related contamination associated with the former MGPs and identified during the project area subsurface investigations, a series of MGP-related recovery wells are anticipated to be installed in certain affected areas prior to, or in conjunction with, project construction, landward (west) of the proposed alignment. At the surface, it is likely that only a manhole-sized cover would be visible, but it is possible a vault or

shed-like structure would also be needed. Access to these wells by trained personnel would be required (during which time public access to the immediate vicinity would be restricted), typically for an hour or so monthly or less frequently (perhaps more frequently shortly after installation and during project construction). These wells would extend below the water table, deeper than the flood protection system foundations. These wells would be used to recover (i.e., actively pump/vacuum or hand bail) MGP residual materials from the subsurface. In accordance with a Memorandum of Agreement with NYSDEC,[1] a Mitigation Work Plan (MWP)[2] proposing these activities was previously submitted to NYSDEC for implementation prior to and/or during construction of the proposed project. However, it will be revised based upon project design changes since the previous version was submitted, and resubmitted to NYSDEC for approval. This revised plan will be approved prior to the start of construction.

SUBSURFACE DISTURBANCE

The Preferred Alternative would involve soil disturbance for foundation construction; utility relocation/installation (including construction of interceptor gates and modifications to existing combined sewer infrastructure and Con Edison utility lines); and reconstruction of three pedestrian bridges (Corlears Hook, Delancey Street, and East 10th Street bridges). The exact depth of excavation required for the Preferred Alternative would depend on construction details (e.g., conflicts with other infrastructure), which will be determined during final design. As the alignment of the Preferred includes areas that have not been fully characterized (e.g., the line of protection in East River Park, two interceptor gate house locations), additional soil and groundwater testing is also to be implemented in both Project Areas One and Two, in accordance with a work plan and Construction Health and Safety Plan (CHASP) submitted to DEP for review and approval for the purposes of identifying any soil or groundwater contamination at these locations.

All soil and groundwater management during construction would be implemented in accordance with a project Remedial Action Plan (RAP), which would be approved by DEP. As discussed above, MGP contamination has been found in the project area, and management of this material would be incorporated into the MWP, as would required health and safety procedures.

Both agencies would also need to approve Site Management Plans (SMPs), addressing post-construction requirements. The DEP SMP would address site-wide inspection and maintenance of the cap and procedures to be followed should excavation or other disturbance beneath the cap be required. The NYSDEC MGP-SMP would address additional procedures to be followed should MGP materials need to be disturbed, as well as operation and maintenance of the MGP-related recovery wells. It is anticipated that these plans would be approved during project construction.

The entire project area consists of fill material of unknown origin, even in areas not contaminated by wastes from historical manufactured gas plants or petroleum spills. Although testing did not indicate widespread contamination in this fill, localized areas with elevated metals, such as lead, were found and may be present in other locations not tested. Project-related

[1] Memorandum of Agreement between New York State Department of Environmental Conservation and The City of New York, Index No.: CO 2-20170614-01

[2] Mitigation Work Plan for Manufactured Gas Plant-Related Non-Aqueous Phase Liquid Contamination, prepared for DDC by AKRF, Inc., October 30, 2017.

excavation could disturb these soils and potentially increase pathways for human or environmental exposure.

Based on the testing and other available information discussed above, shallow subsurface soil contamination is known to be present in certain areas and possibly present in other locations not tested. However, the levels of contaminants in the shallow subsurface are generally lower than those in soils below the water table, especially in areas close to the former manufactured gas plants. This is because MGP contamination includes compounds denser than water, allowing it to migrate below the water table. Where construction requires dewatering—which is more likely for the L-walls than for levees, landscaped berms, or sheetpile walls—testing indicated pre-treatment of the removed water would be required prior to its discharge, particularly in areas affected by the former MGP operations.

The RAP and CHASP are to be submitted to DEP for review and approval. The potential effects associated with subsurface disturbance of soil and groundwater would be mitigated by performing the excavation-related procedures in accordance with the MWP, RAP, and CHASP during construction. The MWP and RAP would outline soil management procedures, described below, including appropriate clean fill importation criteria (both for surface soils in landscaped areas and for other material that would be beneath landscaping or paving) and criteria for allowable reuse of excavated soils (whether in the uppermost layer of landscaped areas or elsewhere), handling, stockpiling, testing, transportation, and disposal of excavated materials, including any unexpectedly encountered contaminated soil and petroleum storage tanks, in accordance with applicable regulatory requirements. The CHASP (and the health and safety procedures in the MWP) would ensure that soil disturbances are performed in a manner protective of workers, the community, and the environment, including procedures for odor, dust, and nuisance control.

In addition to the soil management procedures, if dewatering is required, the discharges must comply with DEP and/or NYSDEC regulatory requirements and administrative guidelines. The results of analyses performed for the DEP's groundwater discharge parameters indicated that the only exceedance of the DEP limits for effluent to the sanitary/combined sewer system was for total suspended solids (TSS) indicating the potential need for treatment in the form of settling and/or filtration prior to discharge. However, the groundwater samples were collected from shallow temporary wells, and based on the findings of the deep soil samples and Con Edison data for deeper wells located inland of the project area, there is likely more extensive deeper groundwater contamination. Therefore, it is probable that groundwater pumped during construction throughout much of the project area, especially in the vicinity of the former MGP facilities, would require treatment for organic compounds, e.g., by using oil-water separators and/or absorption on granulated activated carbon, before discharge.

SOIL MANAGEMENT PROCEDURES

The RAP would include procedures for soil screening, excavated material characterization, disposal, demarcation, stockpiling, material reuse, backfill and cover soil import, water and other fluid management, and a contingency plan, as further described below. The MWP would include appropriate procedures, specific to the management of MGP-contaminated material.

Soil Screening Methods

Visual, olfactory, and instrument-based soil screening would be performed under the supervision of a Qualified Environmental Professional during construction that involves subsurface

disturbance. Soils would be segregated based on screening results, existing environmental data, and additional data (e.g., waste characterization) into material intended for off-site disposal, material intended for re-use as backfill material, and material requiring further sampling and testing.

Characterization of Excavated Materials Intended for Disposal

Material to be transported off-site for disposal would be sampled in a manner required by the receiving facility, and in compliance with applicable laws, regulations and guidelines.

Off-Site Transportation and Disposal

Outbound trucks would be inspected and cleaned, if necessary, before leaving the site; access/egress points for trucks and equipment would be kept clean of site-derived materials. Exit locations would be inspected daily for evidence that soil is being transported off premises. Truck wash facilities would be used as necessary to limit soil transport onto adjacent streets, and adjacent streets would be cleaned, as needed. Loaded vehicles leaving the site would comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws, regulations, and guidelines. Material transport to the site would be regimented and scheduled to minimize truck queuing. A manifest-based tracking system would be used to document the proper management of material to its destination. Truck transport routes would consider the following: (1) limiting transport through residential areas and near sensitive sites; (2) using mapped truck routes; (3) using schedules to minimize or avoid queuing of trucks entering the work area; (4) limiting total distance to major highways; (5) promoting safety in access to highways; and (6) increasing overall safety in transport. All material would be managed as regulated material and would be disposed in accordance with applicable laws, regulations and guidelines. A documentation/manifest process would be used to document conformance with applicable laws, regulations and guidelines. The use of barges for soil and waste disposal is also under consideration. Barges would be loaded at predetermined locations to reduce traffic on-site and in the surrounding neighborhood. Loaded barges leaving the site would comply with applicable materials transportation requirements (including required covering, manifests, and placards) in accordance with applicable laws, regulations, and guidelines. A manifest-based tracking system would be used to document the proper management of material to its destination.

Stockpile Methods

Stockpiles of excavated material would be used only when necessary and would be removed as soon as practicable. While stockpiles are on site, they would be inspected daily, and before and after every storm event to ensure they are not subject to excessive erosion. Stockpiles of soil exhibiting evidence of contamination would be at minimum placed on double layers of 8-mil polyethylene sheeting, which would keep contaminated soil from contact with other material, and covered with anchored plastic tarps when not being loaded/unloaded. Stockpiles would be surrounded with rigid barriers and/or silt fencing, Excavated materials from suspected areas of contamination would be separated from materials intended for re-use. Imported materials would be stockpiled separately. All stockpile areas would be kept free of standing water. Stockpiles would be managed to control run-off in accordance with applicable regulatory requirements. Stockpiles would be located away from the East River and property boundaries, where possible.

Materials Reuse On-Site

Site soil and fill intended for reuse on-site beneath impervious paving or a two-foot clean soil cover layer would be managed in accordance with NYSDEC's requirements for beneficial reuse, found at 6 NYCRR 360-1.15(b)(8). These requirements apply to "*Nonhazardous, contaminated soil which has been excavated as part of a construction project… and which is used as backfill for the same excavation or excavations containing similar contaminants at the same site,"* with the additional project-specific provisions that such material be only used above the (seasonal high) water table. Soil meeting the definition of hazardous wastes or containing petroleum, MGP, or other gross contamination (e.g., visibly contaminated or petroleum/chemical odors) would not be reused, but would rather be disposed of off-site at an appropriately licensed waste disposal facility. Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing would not be reused. Re-use of materials within the two-foot soil cover layer would require sampling and testing to demonstrate compliance with 6 NYCRR Part 375 Residential and Protection of Groundwater Soil Cleanup Objectives (SCOs). Testing would be in accordance with NYSDEC DER-10 *Technical Guidance for Site Investigation and Remediation*, Table 5.4(e) 10, unless approval from NYSDEC has been obtained for alternative requirements.

Importation of Backfill and Cover Soil from Off-Site Sources

It is expected that large volumes of soil (more than 100,000 cubic yards) may be required as excavation backfill, for raising the grades and as clean cover/cap material in new landscaped areas of the park. The source(s) of this fill have not yet been determined, but evaluation of imported soils would include examination of the source location's current and historical use(s), and any applicable documentation. Materials from industrial sites, spill sites, environmental remediation sites, or other potentially contaminated sites would not be used. Testing proposed for imported soils would be conducted in accordance with DER-10 Table 5.4(e) 10, unless regulatory approval has been obtained for alternative requirements. In excavated areas, imported materials to be used either below or as a part of the surface clean cover layer would comply with the 6 NYCRR Part 375 Residential and Protection of Groundwater SCOs, though, in accordance with DER-10, the following material may be used without testing (beneath cap only), provided that it contains less than 10 percent by weight material which would pass through a size 80 sieve: virgin quarried material, clean recycled concrete aggregate derived from recognizable and uncontaminated concrete from facilities permitted or registered by NYSDEC. Testing requirements for soil from the NYC Office of Environmental Remediation (OER) New York City Clean Soil Bank would be in accordance with a NYSDEC Beneficial Use Determination and also in accordance with DER-10 Table 5.4(e) 10.

Imported Material Screening and Testing

Materials would be subject to inspection, as follows: trucks would be in compliance with applicable laws, regulations, and guidelines and would enter the site at designated locations; material would be inspected for evidence of contamination using visual, olfactory, and instrument-based screening for evidence of contamination; material would be free of solid waste, including paving materials, construction debris, municipal waste, stumps, roots, and other organic matter, as well as ashes, oil, perishables, or foreign matter. Five-part composite samples and discrete grab samples would be collected from the segregated stockpile at the source, at the frequency required in DER-10 Table 5.4(e)10 (unless approval from DEP, as part of the RAP, or in writing thereafter, has been obtained for alternative requirements) and analyzed in a laboratory, for the following: volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260C (rev. 2006) (grab, not composite

sample); SVOCs by USEPA Method 8270D (rev. 2007); Pesticides by EPA Method 8081B (rev. 2000); PCBs by USEPA Method 8082A (rev. 2000); and Target Analyte List Metals by USEPA Method 6010C (rev. 2007). The laboratory results would be provided to DEP for their review and approval. In addition to laboratory data, the following would be provided to DEP: a summary of samples collected and analyzed; tabulated data and comparison to the SCOs; analytical data sheets and chain of custody documentation; a summary of anticipated quantity (tons/cubic yards) proposed for import; photographs of the segregated stockpile with sampling locations identified; an affidavit from the source/facility on their letterhead stating that the segregated stockpile has been properly maintained and complies with the requirements above; and a copy of source/facility state permit.

Water and Other Fluids Management

Due to proximity to the East River, and elements of construction requiring deep excavation, substantial dewatering is anticipated. All liquids removed from the site would be handled, transported, and disposed of at a qualified off-site waste disposal or treatment facility in accordance with applicable laws, regulations and guidelines. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating compliance with the City's discharge criteria, possibly following pre-treatment such as settling for suspended solids and/or use of an oil-water separator and/or with activated carbon for removal of organics. Direct discharge to the East River or to sewers or outfalls draining to surface water rather than a wastewater treatment plant would require a NYSDEC permit. Limited dewatering fluids could also be managed at an off-site treatment facility.

Contingency Plan

Given the unknown origin of the fill material, the discovery of unknown structures or contaminated media during excavation is possible. Any such findings would be reported to the appropriate regulatory and/or emergency management agencies. Petroleum spills would immediately be reported to the NYSDEC Spill Hotline. Petroleum tanks would be addressed in accordance with applicable NYSDEC requirements, including those relating to spill reporting and tank registration.

Odor Control

Excavation, especially in areas with MGP contamination, can result in odor concerns, as well as health and safety issues. All necessary means would be employed to prevent on- and off-site odor nuisances, including the following: (1) limiting the area of open excavations; (2) shrouding open excavations with tarps and other appropriate covers; and/or (3) using foams to cover exposed odorous soils. If odors cannot otherwise be controlled, additional means to eliminate odor nuisances include direct load-out of soil to trucks for off-site disposal and chemical odorants in spray or misting systems. Appropriate regulatory agencies would be notified of any such odor issues. In addition, during excavation/and loading of any hazardous waste or MGP-contaminated or petroleum-contaminated soil, real-time vapor monitoring would be performed through a Community Air Monitoring Program (CAMP). If necessary, additional odor mitigation measures as approved by NYSDEC and outlined in the MWP would be implemented during disturbance of MGP materials.

Dust Control and Monitoring

Dust management during soil-disturbing work would include the following: (1) use of water spray for roads, trucks, excavation areas and stockpiles; (2) use of anchored tarps to cover

stockpiles; (3) use of truck covers during soil transport within site limits and during off-site transport; (4) employment of extra care during dry and/or high-wind periods; (5) use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface; and (6) use of a truck wheel wash at site access/egress points to prevent fugitive dust and off-site migration of dust and other particulates. The source(s) of any dust emissions would be identified and addressed immediately and appropriately. In addition, during excavation/and loading of any hazardous waste or MGP-contaminated or petroleum-contaminated soil, real-time dust monitoring would be performed through a CAMP. If necessary, additional dust mitigation measures as approved by NYSDEC and outlined in the MWP would be implemented during disturbance of MGP materials.

CLOSEOUT DOCUMENTATION

Following completion of the demolition and soil disturbance associated with construction, a Closure Report would be prepared documenting compliance with the MWP, RAP, and the CHASP. The Closure Report would include documentation of off-site soil disposal, imported material, locations of clean soil cap, and other relevant information. Two SMPs would also be prepared: one for DEP addressing inspection and maintenance of the cap and procedures to be followed should excavation or other disturbance beneath the cap be required and the other for NYSDEC addressing additional procedures to be followed should MGP materials need to be disturbed, as well as operation and maintenance of the MGP-related recovery wells. These documents would be subject to agency approval.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Compared with the Preferred Alternative, Alternative 2 would have substantially less volume and areal extent of soil disturbance and excavation within East River Park. This alternative would not include the removal and replacement of the existing bulkhead and the park's underground water and drainage infrastructure (including existing stormwater outfalls).

The procedures related to soil and groundwater management during construction to minimize adverse construction effects associated with this alternative would be similar to those described for the Preferred Alternative. A system of MGP-related recovery wells would also be installed. Additional soil testing is expected to be required related to soil management during construction, including waste characterization testing that will need to be performed shortly before construction to determine the most appropriate off-site soil disposal facilities for soils that are contaminated or otherwise excess.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Soil disturbance under Alternative 3 would be of a similar type to that described above for the Preferred Alternative, with the exception of the level of disturbance within East River Park and a lesser importation of fill materials. This alternative would also not include the removal and replacement of the existing bulkhead and the park's underground water and drainage infrastructure (including existing stormwater outfalls). A system of MGP-related recovery wells would be installed. The procedures to minimize the potential for adverse construction-phase effects (associated with demolition and subsurface disturbance) related to hazardous materials would be similar to those described above for the Preferred Alternative.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 changes the alignment and the area of soil and groundwater disturbance. However, the level of activities required to construct the raised FDR Drive platform would not represent a substantial change in disturbance as compared to the construction of flood protection elements described in the other alternatives. Therefore, the procedures to minimize the potential for adverse construction-phase effects associated with demolition and subsurface disturbance would be similar to Alternatives 2 through 4.

D. MITIGATION MEASURES

As described above, construction of the proposed project has the potential to disturb hazardous materials due both to demolition and excavation. Demolition would be addressed in accordance with the existing regulatory programs, e.g., for asbestos-containing materials (ACM) and LBP. Asbestos surveys would be completed by a qualified individual/contractor, and all ACM that would be disturbed by the demolition would be removed in advance, accordance with local, state, and federal regulations and guidelines. LBP would be addressed in accordance with applicable regulatory requirements including OSHA *Lead in Construction* requirements. If PCBs, or mercury containing fluorescent lights or older thermostats require removal, disposal would be performed in accordance with applicable regulations and guidelines. In addition, disposal of any chemicals would be performed in accordance with applicable local, state, and federal regulations and guidelines.

To avoid any impacts due to the potential presence of subsurface hazardous materials during project construction, the following measures would be included as part of the construction specifications:

- A Materials Handling Plan that covers the management, handling, transportation, and disposal of non-hazardous contaminated soils, regulated hazardous wastes, and all other soil/fill would be prepared and submitted to DDC for review and approval.
- It is expected that dewatering would be necessary for construction of the proposed project. If dewatering is proposed to discharge into a New York City sewer, then a DEP Sewer Discharge Permit must be obtained in advance of dewatering. In addition, any discharges proposed to the East River, either directly or via a storm sewer, must comply with NYSDEC effluent discharge limitations and a NYSDEC SPDES permit will likely be required. Pretreatment may also be required prior to discharge. It is expected that additional water sampling would also be required for as part of the review of these approvals.
- Prior to demolition or excavation activities with the potential to disturb aboveground or underground petroleum storage tanks, the tanks would be properly closed and removed along with any associated contaminated soil in accordance with applicable regulations and guidelines, including NYSDEC spill reporting and tank registration requirements.
- Dust suppression would be employed during excavation, grading and other soil disturbing activities and it is expected that a Community Air Monitoring Plan (CAMP) would be implemented to provide protections for the workers and the surrounding community from potential airborne releases.
- To address contamination in the soil and groundwater during construction, a MWP, RAP, and CHASP would be prepared and submitted to NYSDEC and/or DEP for review and approval. The MWP would provide soil and groundwater management procedures for any excavated material with MGP-related contamination including criteria for identifying,

handling, storing, transportation, and disposal of soil and groundwater affected by MGP-related wastes.

- The RAP would provide soil management procedures for all other soils, including soils for filling and grading (including raising the grade of East River Park) and the appropriate clean fill importation criteria; criteria for allowable reuse of soil as backfill; handling; stockpiling; testing; transportation; and disposal.
- The RAP would also address encountering known and unexpected petroleum storage tanks.
- The CHASP, describing worker safety protocols would ensure that subsurface disturbance would be performed in a manner protective of workers, the community, and the environment and would also address odor, dust and nuisance control. The CHASP would include security measures to prevent public access (to areas where soil disturbance is taking place or where other hazards might be present).
- Additionally, to reduce the potential migration of MGP-related contamination, the design plan for recovery wells, as part of the MWP, would be updated and then implemented prior to, or in conjunction with, construction. The MWP would be submitted to NYSDEC for review and approval.
- Both NYSDEC and DEP agencies would also approve SMPs, addressing post-construction requirements. The DEP SMP would address site-wide inspection and maintenance of the cap and procedures to be followed should excavation or other disturbance beneath the cap be required. The NYSDEC MGP-SMP would address additional procedures to be followed should MGP materials need to be disturbed, as well as operation and maintenance of the MGP-related recovery wells.
- ACM and LCP surveys were conducted in 2018 of the East 10th Street Comfort Station, and the East 10th Street and Delancey Street bridges (Asbestos and Lead Paint Survey Report for East Side Coastal Resiliency, AKRF, Inc., revised June 2018). No ACM was identified in samples collected but ACM may be present in areas that were not accessible. Before any demolition or other disturbance, additional testing would be performed once it is possible to obtain samples from the inaccessible areas and contractor specifications would address the contingency that ACM is hidden or will otherwise not be encountered until later. Lead was detected in nine of the 22 paint chip samples. Demolition or other activities with the potential to disturb lead-based paint and LCP must be performed in accordance with applicable regulations (including OSHA 29 CFR 1926.62-Lead Exposure in Construction). Based on the testing results, all paint on steel components of the East 10th Street Comfort Station and East 10th Street bridge, and all paint throughout the Delancey Street bridge should be considered to be LCP. Independent of the environmental review associated with the proposed project, management and/or removal of these materials during construction is subject to a large number of federal, state, and local regulatory requirements that would be incorporated into the project documents and contractor specifications. ✷

Chapter 6.7: Construction—Water and Sewer Infrastructure

A. INTRODUCTION

This chapter describes the potential effects on water and sewer infrastructure during construction of the proposed project. The protected area includes existing water and sewer infrastructure, including conveyance, regulators, and outfalls. Any disturbance or alterations to existing infrastructure would require measures to minimize disruptions in service. This chapter compares conditions under the With Action Alternatives (i.e., in the future with the proposed project) against conditions under the No Action Alternative (i.e., in the future without the proposed project) to determine the potential for significant adverse effects to water and sewer infrastructure during construction. The analyses were conducted pursuant to the methodologies outlined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*.

B. PRINCIPAL CONCLUSIONS

Construction of the proposed project would be performed in accordance with all methods and standards approved by New York State Department of Environmental Conservation (NYSDEC), the New York City Department of Environmental Protection (DEP), the New York City Department of Design and Construction (DDC) and other appropriate regulatory agencies and procedures. Prior to excavation, interferences with existing water and sewer infrastructure would be identified. Existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work. Water mains and sewers will be replaced, where required, per DEP and DDC standards. All construction activity associated with drainage isolation, drainage management, infrastructure reconstruction, or relocation/replacement of existing water and sewer infrastructure would be undertaken without affecting the conveyance of flow through the water or combined sewer system. This work would be performed throughout the duration of construction in accordance with methods and standards approved by DEP and DDC. Therefore, no disruption to existing water or sewer services is anticipated, and no adverse impacts to water or sewer infrastructure would occur.

C. ENVIRONMENTAL EFFECTS

The No Action Alternative (Alternative 1) assumes that no comprehensive flood protection system is constructed and, therefore, is not analyzed.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK ALTERNATIVE

The Preferred Alternative proposes to move the line of flood protection further into East River Park, thereby protecting both the community and the park from design storm events, as well as increased tidal inundation resulting from sea level rise. The Preferred Alternative would raise the majority of East River Park. This plan would limit the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. A shared-use pedestrian/bicyclist flyover bridge linking East River Park and Captain Brown Walk would

be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, substantially improving the City's greenway network and north-south connectivity in the project area. and reducing the potential for flooding, wave damage, and the resulting scouring and erosion.

The Preferred Alternative would raise the majority of East River Park. This will require the reconstruction of existing park structures and recreational features as well as reconstruction of the park's underground water and sewer infrastructure (including sewers, outfalls, tide gate chambers, and regulators) to withstand the loads of the elevated parkland. In some cases, the sewer infrastructure will be rebuilt with additional capacity compared to existing conditions.

The Preferred Alternative also includes modifications to the existing sewer system to control flow into the protected area from the larger sewershed (i.e., drainage isolation) and manage flooding within the protected area (i.e., drainage management) as described in Chapter 5.8, "Water and Sewer Infrastructure."

Work associated with construction of the floodwalls, levees, raised landscapes, and pedestrian bridge landings may require existing water and sewer infrastructure to be either relocated or replaced. Existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work where relocation or replacement is not proposed. Prior to excavation, any interference with existing water and sewer infrastructure would be identified. This work would require the use of excavators and loaders for excavation and grading, backfill and placement of utility lines, and trucks to transport materials.

INTERCEPTOR GATES

The work required to install the interceptor gates would include excavating sections of roadway near the intersection of East 20th Street and Avenue C, and the pathway between Corlears Hook Park and the FDR Drive within New York City-owned rights-of-way. Construction of the interceptor gates would begin with site preparation, pavement excavation, support of excavation (installing sheeting and grouting to hold open the excavation during construction), dewatering, and excavation to fully expose the interceptor where the interceptor gate chambers are to be constructed. Once the excavation is complete, the crown of the interceptor would be opened to install a temporary flume within the interceptor to allow flow to pass uninhibited during construction. Next, a concrete chamber would be constructed around the existing interceptor to house the gate and associated operators. The chamber may be constructed on piles, as described in Chapter 6.0, "Construction Overview," and would extend from the bottom of the interceptor to the ground surface.

Installation of the interceptor gates would be followed by removal of the flume, backfill of the excavation and site restoration, including patching and restoring the street surface. Closure of lanes to local traffic would be required while the necessary areas are excavated, and the interceptor gate work is completed. The New York City Department of Transportation (NYCDOT) has provided work stipulations for road closures as discussed in Chapter 6.9, "Construction—Transportation." Construction of each interceptor gate is anticipated to require approximately one year. Following this construction, the two gate chambers would be installed without affecting the conveyance of sanitary flow through the combined sewer system.

In conjunction with the construction of the below-grade interceptor gate chambers, a building would be constructed adjacent to each chamber to house the controls, electrical panels, and other components to support the interceptor gates. These single-story buildings would be approximately 500 square feet, sited within the right-of-way. Pedestrian walkways and roadway

curbs would be realigned as needed to maintain adequate clearance for pedestrian, bike, and/or vehicular traffic.

REGULATORS, DRAINAGE STRUCTURES, AND MANHOLES

The construction proposed for the regulator chambers and other combined sewer structures would begin with an inspection of each structure to determine existing structural capacity and methods of floodproofing, which may include lining, patching, jet-grouting, or sheet piling or excavating to expose and reinforce the exterior of the existing structures' walls. Excavation would follow the approach typical for any deep excavation, as was described for the interceptor gate chambers, and would include installation of support of excavation, dewatering and excavation, and backfill.

Any vented hatches or manholes on the unprotected side of the flood protection alignment, through which stormwater or floodwater could infiltrate, would be replaced with water-tight hatches or manhole covers. These hatches and manholes are located on both the existing regulators and on the combined sewers and sewer infrastructure. The watertight covers would consist of an inner pressure cover and outer traffic cover. The inner cover could be positioned to allow the sewer to vent as under existing conditions. In advance of a design storm, the inner covers would be engaged to effectively seal them to prevent water entry. Following the design storm event, covers that were locked would be unsealed and returned to the venting position. In addition, durable accessways designed for heavy work vehicle loads (H-20 loading) would be installed to allow for future maintenance access. Following construction, the area would be backfilled and restored.

The amount of work required to make these manholes watertight would depend on the structural stability of the manhole. The manholes that are less structurally stable would be either partially or fully reconstructed in addition to the replacement of the frame and cover. Manholes requiring additional support would follow the methods described above for the regulators. Minimally, to make any manhole watertight, excavation of the top one-to-two feet of asphalt, concrete, or soil would need to be removed. At that time, the manhole frame and cover would be replaced with the watertight cover and the area would be restored to its previous condition or better.

Storm drainage that currently connects to the combined sewer system that would be located on the unprotected side of the flood protection system would be rerouted and connected to the outfalls downstream of the tide gates, therefore isolating them from the combined sewer system and eliminating the need to floodproof those portions of the drainage system. Storm drainage that currently connects to the combined sewer system that would be located on the protected side of the flood protection system would maintain its current configuration. Storm drainage that currently outlets downstream of the tide gates or to separate storm sewer outfalls that would be located on the protected side of the flood protection system would be rerouted to convey wet weather flow to the combined sewer system or outfitted with a tide gate to prevent against potential backflow into the protected area storm drain system under a design storm event. The storm drainage modifications would follow the procedures described for tide gate replacement and drainage piping construction. For storm drainage modifications, open-cut excavation would be used, in which shallow trenches would be excavated, to facilitate construction of pipe supports and piles and installation of new storm drainage piping. The new drainage piping would connect to the existing or reconstructed tide gate chambers or outfall pipes (as described below). In conjunction, some existing storm drainage structures and pipes would be capped and abandoned in place while others would be removed.

TIDE GATES

For all existing outfalls within the project protected area that would remain as part of the proposed project, the existing tide gates would be replaced for each of the outfalls and new tide gates would be installed on outfalls without tide gates in the existing condition. These gates would isolate the protected area from flow entering from the river side of the flood protection system during a design storm surge event. Construction of these tide gates would follow the same construction approach as the regulators described above. Installation of stop logs (temporary barriers that are used to isolate the area of work) upstream and downstream of the tide gate would prevent flow to the outfall and allow for installation of a new gate to replace the existing gate. Closure of stop logs on outfall pipes is a typical procedure performed during regular replacement of existing tide gates. Depending on the configuration of the existing tide gate and outfall pipe, an additional concrete chamber may be constructed around the outfall pipe to house the new gate. Following gate installation, the excavated site would be backfilled and restored, and the stop logs would be removed. Under the Preferred Alternative, the majority of the tide gates in East River Park will be constructed anew as part of the infrastructure reconstruction effort, as described below.

ISOLATION GATE VALVE

An isolation gate valve is proposed to be installed within regulator M-39 on a sewer that crosses the alignment of the flood protection system. This isolation gate valve would reduce the risk of floodwaters from outside the protected area inundating the protected area. This valve would be anchored to the wall within the existing regulator and would be operated manually from the ground surface. The isolation gate valve could be installed using bypass pumping to redirect flow around the construction area while maintaining service. Alternatively, the work could be performed by professionals capable of installing the isolation gate valve while the sewer is in service. Neither method would result in changes to sewer service. Construction of the isolation gate valve is anticipated to require approximately one to three months. The regulator is located within Asser Levy Playground. The construction will require minor excavation and resurfacing of the park in the vicinity of the regulator.

DRAINAGE MANAGEMENT

The Preferred Alternative includes drainage management elements to manage potential sewer surcharge and above-grade flooding within the protected area. This flooding could occur during a coastal flood event as a result of rainfall coincident with a storm surge. These drainage elements include installing parallel conveyance pipes for 9 regulators and upsizing branch interceptor sewers for three additional regulator tributary areas.

Parallel conveyance pipes would be constructed for regulators M-22, M-23, M-27, M-28, M-31, M-37, M-38, M-38A, and M-38B and upsized branch interceptor pipes would be constructed downstream of regulators M-33, M-34, M-35 to increase and support the full flow capacity of the main interceptor. This construction would take place primarily in the right-of-way, in the roadways and properties along Avenue C, Avenue D, Columbia Street, Delancey Street, South Street, Water Street, and Jackson Street.

As described in Chapter 5.8, “Water and Sewer Infrastructure,” the drainage management infrastructure consists of three components: (1) an upstream connection to a lateral sewer or regulator; (2) a length of piping; and (3) a downstream connection to the interceptor. Construction of the upstream connection would involve a shallow excavation around the existing sewer or regulator, as described for the interceptor gate. The existing sewer or regulator would

be supported while connecting the drainage management piping. The parallel conveyance would be installed during dry weather conditions, above the regular flow level in the lateral sewers, so as not to interfere with operation of the existing sewer infrastructure. Bypass pumping can be used if needed. For the sewer upsizing for regulators M-33, M-34, and M-35, the existing downstream pipes would be excavated and demolished, and the new upsized pipes would be installed at the same elevations as the existing sewers. This work would require bypass pumping during the construction of the connection between the regulator and the new pipe. To install the drainage management piping, open-cut excavation would be used, in which shallow trenches would be excavated to facilitate construction of pipe supports and piles and installation of piping. The branch interceptor for M-33, M-34, and M-35 would also require tunneling below the FDR Drive near East 10th Street to install piping. This tunneling work would be constructed according to DDC and DEP specifications.

The downstream connection to the interceptor would be constructed either by connecting to an existing manhole on the interceptor or by constructing a new manhole on the interceptor. Connection to an existing manhole would be constructed as described for the upstream connection, by supporting the existing manhole structure while the connection is made. Additional structural modifications or enlargements may also be required to provide personnel access to the inside of the manhole and to direct flow to the interceptor. If a new downstream connection manhole is required, a new manhole would be constructed for the drainage management pipe to tie into, using the same method described for the interceptor gate chamber construction. Neither of these construction methods would result in changes to sewer service. All excavated sites would be backfilled and restored after construction. All utilities in the construction zone of influence would be supported, replaced or relocated. Construction of each drainage management component is anticipated to require about three to seven months on average, depending on the location, size of conveyance, type of downstream interceptor connection, and complexity of construction. This work would require lane closures to local traffic throughout the duration of construction. NYCDOT has provided work stipulations for road closures as discussed in Chapter 6.9, "Construction—Transportation."

All construction activity associated with drainage isolation, drainage management, or relocation/replacement of existing water and sewer infrastructure would be undertaken without affecting the conveyance of flow through the water or combined sewer system. This work would be performed throughout the duration of construction in accordance with methods and standards approved by DEP and DDC. Therefore, no disruption to existing water or sewer services is anticipated, and no adverse impacts to water or sewer infrastructure would occur.

INFRASTRUCTURE RECONSTRUCTION

To reconstruct the water and sewer infrastructure within East River Park, open-cut excavation would be used to prepare for construction of the new structures (e.g., regulators, tide gate chambers, etc.) and piping. Support of exaction and dewatering, as described for the interceptor gates, would be used to hold the excavation open during construction. The water and sewer infrastructure would be constructed with reinforced concrete and would be built in a similar configuration as the existing infrastructure. The new piping would be installed in open-cut shallow trenches on pipe supports and piles, with the exception of any pipe that crosses the FDR Drive, which would require microtunneling or similar trenchless construction method, for installation, and would be completed in coordination with NYCDOT. Other infrastructure (e.g., regulators, tide gate chambers, etc.) would also be constructed on pile foundations.

To reconstruct the outfalls, a watertight cofferdam would be installed adjacent to the bulkhead and the work area would be dewatered. The top of the cofferdam would be above the mean higher-high water line to isolate the work area from tidal influence. The work area would not contain standing water and approved dewatering measures would be installed, as necessary, and would discharge below the mean higher-high water line. A portable sediment tank or approved equivalent would be used to treat dewatering effluent.

Throughout construction, the existing sewer infrastructure would remain in service until the new infrastructure is completed and ready to be connected to the portions of the existing sewer system that will remain under this alternative. Connecting the reconstructed infrastructure to the existing infrastructure would require bypass pumping. Once completed, the existing infrastructure would be filled and abandoned in place.

For the remainder of the project construction, any conflicts with existing water and sewer infrastructure would be identified. Depending on the nature of the conflict, water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work. Where appropriate, relocation of water mains or combined sewer lines would be undertaken without affecting the conveyance of flow through the existing water and sewer supply system. All water and sewer work would be performed in accordance with methods and standards approved by the DEP. Therefore, no disruption to existing water supply or combined sewer services is anticipated, and no impacts to water and sewer infrastructure would occur.

OTHER ALTERNATIVES

Under Alternatives 2 and 3, reconstruction of the water and sewer infrastructure would be less extensive, compared to the Preferred Alternative. However, due to the line of protection being located closer to the FDR Drive than the East River under these alternatives, there is the need to floodproof some additional sewer infrastructure beyond what is described above for the Preferred Alternative. The process for floodproofing this infrastructure would be the same as described above and would not result in additional effects to the sewer system or sewer service during construction.

Alternative 5 would increase the extent of construction in the segment between East 13th and 18th Streets but would otherwise be the same as described for the Preferred Alternative. Effects on water and sewer infrastructure would be the same as described for the Preferred Alternative. As described in the construction of the alternatives above, prior to any excavation, interferences with existing water and sewer infrastructure would be identified. Depending on the nature of the conflict, existing water and sewer infrastructure would be protected, supported, and maintained in place throughout the duration of work. Utility work associated with the elevation of the FDR Drive or construction of the flyover bridge would likely also include relocation of existing water mains and combined sewer lines where protection, support, and maintenance in place is not feasible. Relocation of water mains or combined sewer lines would be undertaken without affecting the conveyance of flow through the existing water supply and sewer system. All relocation work would be performed in accordance with methods and standards approved by the DEP. These methods would be maintained until the work is complete. Therefore, no disruption to existing water supply or combined sewer services is anticipated, and no impacts to water and sewer infrastructure would occur. ✷

Chapter 6.8: Construction—Energy

A. INTRODUCTION

This chapter assesses the effects of the proposed construction activities on existing utility infrastructure including transmission lines and other energy infrastructure operated by the Consolidated Edison Company of New York (Con Edison). The evaluation of energy demands and use during construction of the proposed project, including those associated with any construction equipment is discussed in Chapter 6.11, "Construction—Greenhouse Gas Emissions."

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to energy are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The Preferred Alternative would involve excavation, pile driving, and other potentially disruptive construction activities in proximity to existing energy transmission and generation infrastructure. To avoid potential adverse effects, protective measures, described further in Section D below, would be implemented to ensure that construction of the proposed project would not disrupt the function of this infrastructure and the electrical supply in Lower Manhattan.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of their potential to disturb existing energy transmission and generation infrastructure, as they all involve excavation, pile driving, and other potentially disruptive construction activities. Any potential for construction-phase effects would be avoided in the same manner as described below for the Preferred Alternative.

C. REGULATORY CONTEXT

The New York Public Service Commission regulates utilities in that state[1] under the New York Energy Law[2] and this requirement was followed where applicable in the determination of environmental effects during construction of the proposed project.

D. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No changes to energy are expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative would accommodate existing water and electrical transmission lines. Most important of these are the high-voltage electrical transmission lines (owned by Con Edison) that extend beneath the entire length of East River Park, generally running beneath the park access service road, and beneath Stuyvesant Cove Park under the existing bicycle path. As discussed in Chapter 6.0, "Construction Overview," these high-voltage transmission lines within the project area present a variety of challenges to the design and construction of the flood protection measures in Project Area One and Project Area Two. These transmission lines, critical to the delivery of electricity in Lower Manhattan and throughout New York City, are currently buried in the fill and natural soils in the project area at a depth that allows for effective dissipation of the heat associated with the transmission of electricity (heat dissipation is required for the operation of the lines). Additionally, the transmission lines were installed in locations that are accessible to Con Edison for purposes of maintenance and repair, when needed.

In order to avoid damage to or disruption of the transmission lines during the construction of the proposed project, measures would be taken to minimize vibration, to carefully control excavation around existing infrastructure, and to manage the placement of fill and soil stockpiles. Because the transmission lines are highly sensitive to vibration, installation of sheet piles in proximity to the lines could be achieved with a press-in sheet piling machine, rather than vibratory hammer. Vibration monitoring would also be employed to confirm that specified vibration limits are not exceeded. To avoid unexpected utility line strikes or other hazardous conditions, the location of transmission lines would be confirmed via test pits inspections performed by Con Edison. While much of the excavation associated with the proposed project would be performed with heavy equipment, excavation in proximity to the transmission lines

[1] Companies Regulated by the Commission. New York Public Service Commission. October 17, 2013.

[2] The New York Consolidated Laws includes a statutory code called the "Energy Law." The New York Energy Law is the statutory, regulatory, and common law of the State of New York concerning the policy, conservation, taxation, and utilities involved in energy, which became effective on July 26, 1976 as Chapter 17-A of the Consolidated Laws.

would be performed manually to avoid disturbance of or damage to the infrastructure. To maintain the required heat dissipation capacity and ensure functionality of the transmission lines, soil stockpiles and additional fill storage during construction would be located away from the transmission lines.

Additional Con Edison electrical and steam transmission and generation infrastructure in the vicinity of the proposed project—including a head house at the southern limit of East River Park, the East 13th Street Substation, the East River Generating Station, and the fuel transfer pier—would not be disturbed as part of construction of the proposed project. Con Edison subsurface infrastructure, including transmission and distribution lines located within the ROW may be impacted or need to be relocated. However, the flood protection system for the proposed project would tie into the Con Edison East River Generating Station building north of East 14th Street. Close coordination with Con Edison would ensure that construction activities do not interfere with operations of these facilities.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would be similar in terms of their potential to disturb existing energy transmission and generation infrastructure, as they all involve excavation, pile driving, and other potentially disruptive construction activities. Any potential for construction-phase effects would be avoided in the same manner as described above for the Preferred Alternative. ✶

Chapter 6.9: Construction—Transportation

A. INTRODUCTION

This chapter examines the potential effects on the transportation systems that could occur during the construction of the proposed project. Specifically, it compares conditions for the proposed project against the No Action Alternative in order to determine the potential for significant adverse effects to transportation systems during construction. The analyses were conducted pursuant to the methodologies outlined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*. Construction of the proposed project is projected to start in spring 2020 with Alternatives 2, 3, and 5 projected to be completed in 2025 and the Preferred Alternative expected to be completed in 2023 (the flood protection system, raised East River Park, and foundations for the shared-use flyover bridge for Alternative 4 would be completed in 2023, with the prefabricated bridge span be installed and completed in 2025). This shorter construction duration for the Preferred Alternative is primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive and these alternatives also allow full closure of East River Park so it can be reconstructed in a single stage.

The proposed project has two project sub-areas for analysis: Project Area One extends from Montgomery Street on the south to the north end of East River Park (or about East 13th Street). This project area includes all of East River Park, and the four existing pedestrian bridges to the park over the Franklin Delano Roosevelt East River Drive (FDR Drive) (the Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges) as well as the Houston Street overpass. Project Area Two includes the FDR Drive gate crossing and northward (the equivalent of East 13th Street) to East 25th Street. Construction in this area is along and within the FDR Drive right-of-way, the Con Edison East 13th Street Substation and the East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, street segments along and under the FDR Drive, and through Asser Levy Playground to connect with the VA Hospital system on the north.

B. PRINCIPAL CONCLUSIONS

The potential for significant adverse effects to transportation systems during construction were assessed for the proposed project. Based on the magnitude of construction automobile and truck trips during the peak construction period, construction of the proposed project would have the potential to result in significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction analysis peak traffic hour. These effects could be fully mitigated with the implementation of standard traffic mitigation measures (e.g., signal timing changes). In addition, the proposed project may require a rerouting of the bikeway/walkway along the proposed project area to inland routes and would therefore have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Moreover, Alternative 5 would result in

additional significant adverse traffic effects due to the temporary lane closures that are required along the FDR Drive to accommodate construction activities under this alternative. Construction of the proposed project would not result in any significant adverse transit, and parking effects. A summary of the anticipated significant adverse effects under each of the alternatives is provided below.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, no new comprehensive coastal protection system is installed in the proposed project area, and no new trips are generated by the proposed project. As described in Chapter 5.9, "Transportation," there are a number of projects planned or under construction within a ½-mile of the project area that are expected to be complete by 2025. These projects will generate traffic, transit, pedestrian trips, and parking demands that are background growth not associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

TRAFFIC

Construction of the Preferred Alternative would generate 251 passenger car equivalents (PCEs) during the 6:00 to 7:00 AM peak hour and 131 PCEs during the 3:00 to 4:00 PM peak hour, exceeding the *CEQR Technical Manual* analysis threshold of 50 vehicle trips. Based on this trip generation, traffic assignments were prepared and six intersections for the AM peak hour and one intersection for the PM peak hour were selected for detailed traffic analysis. The analysis disclosed temporary significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the AM peak hour. However, these effects could be fully mitigated as described below. As discussed below, the same significant adverse traffic effects and mitigation measures are expected for Alternative 3, however, the effects would be for a shorter duration under the preferred Alternative. In addition, with the full reconstruction of East River Park under this alternative, barging of fill materials to East River Park could be employed, thereby reducing the volume of truck trips from what would otherwise be needed to reconstruct and raise the park.

PARKING

An inventory of on- and off-street parking within a ¼-mile radius of the project area showed approximately 70 on-street parking spaces available near Project Area One and 30 on-street parking spaces available near Project Area Two. The off-street survey showed approximately 60 spaces available near Project Area One and 800 spaces available near Project Area Two.

Construction under the Preferred Alternative is anticipated to generate a maximum parking demand of 92 spaces for Project Area One and 52 spaces for Project Area Two. The Project Area Two demand would be fully accommodated by the large inventory of available on- and off-street parking spaces near the project area. The Project Area One demand would not be fully accommodated within ¼-mile and could result in a parking shortfall of up to approximately 35 spaces. It is expected that excess parking demand within Project Area One would need to be accommodated by on-street parking or off-street parking beyond a ¼-mile walk from the project area. Alternatively, motorists could choose other modes of transportation. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not

constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, construction of the preferred Alternative would not result in any significant adverse parking effects.

TRANSIT

Construction of the Preferred Alternative would generate 144 transit trips (total of Project Area One and Project Area Two) during the peak hour of the peak construction period, below the *CEQR Technical Manual* analysis threshold of 200 transit trips. Therefore, construction of this alternative would not result in any significant adverse transit effects.

PEDESTRIANS

Construction under the Preferred Alternative would generate 200 pedestrian trips for Project Area One and 112 pedestrian trips for Project Area Two. Given the number of available pedestrian routes to/from area parking facilities and transit services and the various access/egress points to the East River Park, no sidewalks or crosswalks are expected to experience 200 or more pedestrian trips during an hour. However, because this alternative would require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, the Preferred Alternative would require the development and implementation of a rerouting plan.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Since Alternative 2 is expected to yield comparable worker and truck estimates during peak construction as the Preferred Alternative, Alternative 2 would have the potential to result in significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the 6:00 to 7:00 AM construction peak hour. However, these significant adverse effects could be fully mitigated with the implementation of signal timing changes. This alternative would not have any significant adverse transit, pedestrian, or parking effects.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

TRAFFIC

Peak construction activities under Alternative 3 would generate 153 PCEs during the 6:00 to 7:00 AM peak hour and 85 PCEs during the 3:00 to 4:00 PM peak hour, exceeding the *CEQR Technical Manual* analysis threshold of 50 vehicle trips during the peak hour. Based on this trip generation, traffic assignments were prepared and six intersections for the AM peak hour and one intersection for the PM peak hour were selected for detailed traffic analysis. Similar to the Preferred Alternative, significant adverse traffic effects were identified at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the AM peak hour. However, these effects could be fully mitigated as described below.

PARKING

Construction under Alternative 3 is estimated to generate a maximum parking demand of 55 spaces for Project Area One and 31 spaces for Project Area Two. Similar to the Preferred Alternative, the Project Area Two demand would be fully accommodated by the large inventory of available on- and off-street parking spaces near the project area and the Project Area One demand could result in a parking shortfall within ¼-mile. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, construction of Alternative 3 would not result in any significant adverse parking effects.

TRANSIT

Construction of Alternative 3 would generate 86 peak hour transit trips (total for Project Areas One and Two) during the peak construction period, which is well below the *CEQR Technical Manual* analysis threshold of 200 transit trips. Therefore, construction under Alternative 3 would not result in any significant adverse transit effects.

PEDESTRIANS

Construction of Alternative 3 would generate 188 peak hour pedestrian trips during the peak construction period, below the *CEQR Technical Manual* analysis threshold of 200 pedestrian trips. Therefore, construction under Alternative 3 would not result in any significant adverse pedestrian effects. However, because this alternative may require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, Alterative 3 would require the development and implementation of a rerouting plan for the full 5-year construction duration through 2025.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Captain Patrick J. Brown Walk to the north and raises the northbound lanes of the FDR Drive by approximately six feet between East 13th Street and Avenue C, thereby placing the line of protection generally on the east side of the FDR Drive in this segment. Construction of Alternative 5 would require either a temporary full 24-hour closure of the FDR Drive in the northbound direction and one-lane closure in the southbound direction for two consecutive months or partial closure in both directions. Both of these scenarios have the potential to result in significant adverse traffic effects beyond those identified above for the Preferred Alternative. The use of Traffic Enforcement Agents (TEAs) would help mitigate any additional significant adverse traffic effects that could occur due to the closure of the FDR Drive; however, as a result of the closure, some effects could remain unmitigatable.

MITIGATION

As described above, the proposed project would require mitigation for temporary construction traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C, temporary closures of bikeway/walkway along the proposed project area to inland routes and closure of the FDR Drive under Alternative 5.

For the proposed project, the temporary significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Second Avenue could be fully mitigated by implementing standard traffic mitigation measures (e.g., signal timing changes).

Because the proposed project may require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, the proposed project would require the development and implementation of a rerouting plan.

For Alternative 5, the effects due to the closure of the FDR Drive would be mitigated through the development of a detailed NYCDOT-approved Traffic Management Plan and deployment of New York City Police Department (NYPD) TEAs that would manage traffic and pedestrian circulation at the intersections that are temporarily and significantly affected near the project area. Additional mitigation measures are expected to include transportation management on an area-wide level with public outreach and the use of variable message signs and other measures to alert motorists. If a construction plan can be developed that does not require full closure of the FDR Drive, the potential significant adverse transportation effects could be reduced. Since Alternatives 2 through 4 would not require a 24-hour closure of the FDR Drive, a Traffic Management Plan is not needed for those alternatives.

C. REGULATORY CONTEXT

The transportation modes in the study area are regulated and/or monitored by Federal, state, and local agencies, including U.S. Coast Guard (USCG), New York State Department of Transportation (NYSDOT), New York City Department of Transportation (NYCDOT), New York's Metropolitan Transportation Authority (MTA), and the New York City Economic Development Corporation (EDC).

D. METHODOLOGY

The construction transportation analysis assesses the potential for construction activities to result in significant adverse effects to traffic, transit (i.e., subway and bus), pedestrian elements (i.e., sidewalks, corners, and crosswalks), and parking conditions. The analysis is based on the peak worker and truck trips during construction of the proposed project, taking into account several factors including worker modal splits (how the workers access the sites per mode of transportation: automobile, transit, or walking); vehicle occupancy and trip distribution; truck PCEs; and arrival/departure patterns. The effects of the construction activities for the proposed project were compared with the No Action Alternative to assess the potential transportation effects during construction. As discussed above, the flood protection system and raised East River Park proposed under the Preferred Alternative would be constructed in 3.5 years and completed in 2023 compared to the 5-year construction duration anticipated under Alternatives 2, 3, and 5. Construction activities in Project Area One are anticipated to be divided into three primary segments (see Figure 6.0-1): Segment 1 encompasses construction from Montgomery Street to the Williamsburg Bridge; Segment 2 encompasses construction from the Williamsburg Bridge to the northern end of the Track and Field Complex; and Segment 3 encompasses construction from the northern end of the Track and Field Complex to the northern end of East River Park. Construction activities in Project Area Two under Alternative 3 are also anticipated to proceed in three segments: Segment 4 encompasses construction from south of the Con Edison Complex at approximately East 14th Street to Murphy Brothers Playground and includes the closure structure across the FDR Drive; Segment 5 encompasses construction within and

immediately adjacent to Stuyvesant Cove Park; and Segment 6 encompasses construction at and near Asser Levy Playground, including the wall spanning Asser Levy Place that connects to the VA Medical Center resiliency project.

TRANSPORTATION PLANNING ASSUMPTIONS

CONSTRUCTION WORKER MODAL SPLITS AND VEHICLE OCCUPANCY

Trip generation factors for the proposed project were developed based on information from U.S. Census data. The trip generation is based on an estimated quarterly construction work schedule and average daily construction worker and truck projections. Based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is expected that 48 percent of construction workers commute to the project site by private autos at an average occupancy of approximately 1.30 persons per vehicle.

VEHICULAR ACCESS AND CIRCULATION

As discussed in detail in Chapter 6.0, "Construction Overview," there is one existing vehicular access/egress location to East River Park at Montgomery Street and South Street. There is one existing vehicular access/egress location to Stuyvesant Cove Park at East 23rd Street but a potential new vehicular access/egress point at East 20th Street may be temporarily available during construction of the proposed project if the barrier within the existing EDC parking lot under the FDR Drive is removed. However, in order to present a conservative analysis, only the existing access/egress at East 23rd Street was assumed for the transportation analysis.

The area under the Williamsburg Bridge is currently cordoned off to restrict access to the six 30-foot by 30-foot bridge footings, but additional safety measures such as additional fencing and flaggers would be implemented, where necessary, during construction to protect the footings from the construction traffic streams passing through this area.

PEDESTRIAN/CYCLIST ACCESS AND CIRCULATION

As discussed in Chapter 5.9, "Transportation," pedestrians and bicyclists can access East River Park at Montgomery Street and South Street, at four pedestrian bridges, including Corlears Hook Park, Delancey Street, East 6th Street, and East 10th Street pedestrian bridges as well as the overpass at Houston Street. However, Alternatives 3 through 5 would include the reconstruction of the Delancey Street and East 10th Street bridges, and for Alternatives 4 and 5, also the reconstruction of the Corlears Hook Bridge. Based on the preliminary construction schedule, these bridges would each be closed for approximately one and a half years during construction for Alternatives 2 and 3, and for the full duration of the construction period for Alternatives 4 and 5. Pedestrian and bicyclist circulation through Stuyvesant Cove Park may also be closed for a portion of the construction period for the proposed project and the analysis conservatively assumes that circulation through this area would be closed during construction. The proposed project would also include the temporary closure of Captain Patrick J. Brown Walk during a portion of the construction period to accommodate activities associated with the flyover pedestrian bridge.

TRANSPORTATION ASSESSMENT

SCREENING ASSESSMENT

The *CEQR Technical Manual* identifies procedures for evaluating the proposed project's potential effects on traffic, transit, pedestrian, and parking conditions. This methodology begins with the preparation of a trip generation analysis to determine the volume of person and vehicle trips associated with the construction of the proposed project. The results are then compared with the *CEQR Technical Manual*-specified thresholds (Level 1 screening analysis) to determine whether additional screening and/or quantified analyses are warranted. If the proposed project would result in 50 or more peak hour vehicle trips or 200 or more peak hour transit or pedestrian trips, a Level 2 screening analysis is performed.

For the Level 2 screening analysis, project-generated trips are assigned to specific intersections, transit routes, and pedestrian elements. If the results of this analysis show that the proposed project would generate 50 or more peak hour vehicle trips through an intersection, 50 or more peak hour bus riders on a bus route in a single direction, 200 or more peak hour subway passengers at any given station, or 200 or more peak hour pedestrian trips per pedestrian element, further quantified analyses may be warranted to evaluate the potential for significant adverse effects on traffic, transit, and pedestrian safety.

DETAILED TRAFFIC ANALYSIS

Traffic Operations

If a detailed analysis is warranted, the operation of all signalized intersections in the study area would be assessed using methodologies presented in the *2000 Highway Capacity Manual (HCM)* using the *Highway Capacity Software (HCS+ 5.5)*. The *HCM* procedure evaluates the levels of service (LOS) for signalized intersections using average stop control delay, in seconds per vehicle, as described below.

Signalized Intersections

The average control delay per vehicle is the basis for LOS determination for individual lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersection. The levels of service are defined in **Table 6.9-1**.

Table 6.9-1
Level of Service Criteria for Signalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds

Source: Transportation Research Board. *Highway Capacity Manual*, 2000.

Although the HCM methodology calculates a volume-to-capacity (v/c) ratio, there is no strict relationship between v/c ratios and LOS as defined in the *HCM*. A high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay actually represents the most efficient condition in terms of traffic engineering

standards, where an approach or the whole intersection processes traffic close to its theoretical maximum capacity with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, progression, and green time. LOS A and B indicate good operating conditions with minimal delay. At LOS C, the number of vehicles stopping is higher, but congestion is still fairly light. LOS D describes a condition where congestion levels are more noticeable and individual cycle failures (a condition where motorists may have to wait for more than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels, and cycle breakdowns are frequent. The *HCM* methodology also provides for a summary of the total intersection operating conditions. The analysis chooses the two critical movements (the worst case from each roadway) and calculates a summary critical v/c ratio. The overall intersection delay, which determines the intersection's LOS, is based on a weighted average of control delays of the individual lane groups. Within New York City, the midpoint of LOS D (45 seconds of delay) is generally considered as the threshold between acceptable and unacceptable operations.

Significant Effect Criteria

According to the criteria presented in the *CEQR Technical Manual*, effects are considered significant and require examination of mitigation if they result in an increase for the proposed project of 5 or more seconds of delay in a lane group over No Action levels beyond mid-LOS D. For No Action LOS E, a 4-second increase in delay is considered significant. For No Action LOS F, a 3-second increase in delay is considered significant. In addition, effects are considered significant if levels of service deteriorate from acceptable A, B, or C in the No Action condition to marginally unacceptable LOS D (a delay in excess of 45 seconds, the midpoint of LOS D), or unacceptable LOS E or F for the proposed project.

E. AFFECTED ENVIRONMENT/EXISTING CONDITIONS

EXISTING CONDITIONS

ROADWAY NETWORK AND TRAFFIC STUDY AREA

The key roadways in the traffic study area (a geographical area that encompasses the potential analysis intersections or elements near the project area) include the FDR Drive, South Street, Avenue C, First Avenue, Second Avenue, Montgomery Street, Grand Street, Delancey Street, East Houston Street, East 20th Street, and East 23rd Street. The physical and operational characteristics of the study area roadways are as follows:

- **FDR Drive** is a major two-way northbound-southbound parkway open to passenger cars only and is closed to commercial traffic. The FDR Drive starts north of the Battery Park Underpass at South and Broad Streets and runs along the entire length of the East River to the 125th Street/Robert F. Kennedy Bridge exit, where it becomes the Harlem River Drive. The FDR Drive has three lanes in each direction for the majority of its span. It is elevated south of Montgomery Street, between East 18th Street and East 25th Street, between East 29th Street and East 38th Street, and between East 93rd Street and East 99th Street and is not elevated for the remaining stretch of roadway. The elevated sections of the FDR Drive are within NYSDOT jurisdiction while the local roadways/non-elevated roadways are within NYCDOT jurisdiction. FDR Drive entrance/exit ramps provide access/egress to multiple

corridors within the study area, including, South Street, East Houston Street, East 18th Street, and East 23rd Street.

- **South Street** is a local two-way northbound-southbound roadway to the south of Montgomery Street and a one-way southbound roadway between Montgomery Street and Jackson Street. South Street is located immediately adjacent to the East River and operates from Whitehall Street to Jackson Street near the Williamsburg Bridge. South Street is approximately 34 feet wide curb-to-curb and is a NYCDOT-designated truck route south of Pike Street. There is a designated two-way bicycle lane along South Street that connects to/from the shared-use pathway within East River Park and Stuyvesant Cove Park. South Street provides vehicular, pedestrian, and bicycle access/egress to the East River Park at Montgomery Street.
- **Avenue C** is a major two-way northbound-southbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 45 feet. South of East Houston Street, Avenue C is known as Pitt Street and operates one-way northbound from north of Grand Street to East Houston Street with a curb-to-curb width ranging from 25 feet to 70 feet. South of Grand Street, Pitt Street becomes Montgomery Street and runs two-way northbound-southbound with a curb-to-curb width of approximately 70 feet. The M9 bus route operates along Avenue C in both directions north of East Houston Street. Curbside parking is provided along both sides of the street for the majority of the roadway. There is a designated two-way bicycle lane along Avenue C to the north of East Houston Street. Avenue C provides pedestrian and bicycle access/egress to the waterfront at East 18th and East 20th Streets and vehicular, pedestrian, and bicycle access/egress at East 23rd Street.
- **First Avenue** is a major one-way northbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 70 feet. South of East Houston Street, First Avenue is known as Allen Street and operates two-way northbound-southbound with a curb-to-curb width of approximately 115 feet. First Avenue/Allen Street is a NYCDOT-designated truck route and the M15 local and Select Bus Service (SBS) bus routes operate along Allen Street in both directions and operates northbound along First Avenue and southbound along Second Avenue. Curbside parking is provided along both sides of the street. There is a designated two-way bicycle lane along Allen Street and a one-way northbound bicycle lane along First Avenue.
- **Second Avenue** is a major one-way southbound roadway that operates north of East Houston Street with a curb-to-curb width of approximately 60 feet. South of East Houston Street, Second Avenue is known as Chrystie Street and operates two-way northbound-southbound with a curb-to-curb width of approximately 70 feet. Second Avenue/Chrystie Street is a NYCDOT-designated truck route and the M15 local and SBS bus routes operate southbound along Second Avenue north of East Houston Street. Curbside parking is provided along both sides of the street. There is a designated two-way bicycle lane along Chrystie Street and a one-way southbound bicycle lane along Second Avenue.
- **Grand Street** is a local street that operates one-way eastbound west of Chrystie Street and two-way eastbound-westbound east of Chrystie Street and provides curbside parking on both sides of the street. West of Chrystie Street the curb-to-curb width is approximately 40 feet and east of Chrystie Street the curb-to-curb width is approximately 65 feet. Grand Street is a NYCDOT-designated truck route between Church Street and Allen Street and the M14A bus route operates along Grand Street in both directions to the east of Essex Street. There is a designated two-way bicycle lane along Grand Street east of Chrystie Street and a one-way eastbound bicycle lane west of Chrystie Street.

- **Delancey Street** is a major two-way eastbound-westbound roadway with pedestrian refuge islands within the roadway's median to separate the two-directional traffic and provide storage for pedestrians. Delancey Street generally consists of four travel lanes in each direction with curbside parking on both sides of the street with a curb-to-curb width of approximately 110 feet. East of Clinton Street, the Delancey Street mainline leads onto the Williamsburg Bridge and its service roads extend to/from the FDR Drive. Delancey Street is a NYCDOT-designated truck route and the M14D bus route operates along Delancey Street in the westbound direction only between Columbia Street and the FDR Drive. There is a designated two-way bicycle lane along Delancey Street to the east of Chrystie Street that connects to/from the Williamsburg Bridge. Delancey Street provides access/egress for pedestrians and bicyclists to the East River Park via the existing pedestrian bridge.
- **Houston Street** is a major two-way east-west roadway with three moving lanes in each direction and provides curbside parking on both sides of the street. East Houston Street is approximately 100 feet wide curb-to-curb and is a NYCDOT-designated truck route west of Allen Street/First Avenue. The M14D bus route operates along Houston Street in the eastbound direction only between Avenue D and the FDR Drive. The M21 bus route operates along Houston Street in both directions. There is a designated two-way bicycle lane along Houston Street. East Houston Street provides access/egress for pedestrians and bicyclists to the East River Park via the existing pedestrian overpass.
- **East 10th Street** is a local roadway that operates one-way eastbound west of Avenue A and two-way eastbound-westbound east of Avenue A and provides curbside parking on both sides of the street. West of Avenue A the curb-to-curb width is approximately 30 feet and east of Avenue A the curb-to-curb width is approximately 45 feet. The M8 bus route operates along East 10th Street in both directions between Avenue A and the traffic circle to the east of Avenue D. There is a designated two-way bicycle lane along East 10th Street east of Avenue A and a one-way eastbound bicycle lane west of Avenue A. East 10th Street provides access/egress for pedestrians and bicyclists to the East River Park via the existing pedestrian bridge.
- **East 20th Street** operates one-way eastbound west of First Avenue and two-way eastbound-westbound east of First Avenue and provides curbside parking on both sides of the street. West of First Avenue the curb-to-curb width is approximately 35 feet and east of First Avenue the curb-to-curb width is approximately 55 feet. The M23 SBS bus route operates westbound along East 20th Street between Avenue C and First Avenue. There is a designated two-way bicycle lane along East 20th Street east of First Avenue and a one-way eastbound bicycle lane west of First Avenue. East 20th Street provides pedestrian and bicycle access/egress to the waterfront at Avenue C.
- **East 23rd Street** is a local two-way east–west roadway with two moving lanes in each direction and provides curbside parking on both sides of the street. East 23rd Street is approximately 65 feet wide curb-to-curb and is a NYCDOT-designated truck route west of First Avenue. The M23 SBS bus route operates along East 23rd Street in both directions. East 23rd Street provides vehicular, pedestrian, and bicycle access/egress to the waterfront at Avenue C.

TRAFFIC CONDITIONS

Traffic data were collected in May 2015 and November 2015 for the weekday AM, midday, PM, and Saturday peak periods via a combination of manual intersection counts and 24-hour

automatic traffic recorder (ATR) counts. The existing peak period traffic volumes were developed based on these counts. Since the data was collected in 2015, volume comparisons (between 2015 and 2017) at selected study area locations were also prepared to validate the 2015 data. The comparisons showed that the 2017 weekday traffic volumes are lower than the 2015 traffic volumes by approximately 10 percent. Therefore, the baseline conditions presented below provide a conservative assessment.

Inventories of roadway geometry, traffic controls, bus stops, and parking regulations/activities were recorded to provide appropriate inputs for the operational analyses presented in Chapter 5.9, "Transportation." Official signal timings were also obtained from NYCDOT for use in the analysis of the study area signalized intersections. **Figures 6.9-1 and 6.9-2** show the existing traffic volumes for the weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours, respectively.

LEVELS OF SERVICE

A summary of the existing conditions traffic analysis results is presented in **Table 6.9-2**. Details on LOS v/c ratios, and average delays are presented in **Table 6.9-3**. Overall, the capacity analysis indicates that most of the intersection approaches/lane groups near the project area operate acceptably—at mid-LOS D or better (delays of 45 seconds or less per vehicle) for the peak hours. Approaches/lane groups operating beyond mid-LOS D and those with v/c ratios of 0.90 or greater are listed below.

Table 6.9-2
Summary of Existing Traffic Analysis Conditions

	Analysis Peak Hours	
Level of Service	**Weekday AM (6:00 AM to 7:00 AM)**	**Weekday PM (3:00 PM to 4:00 PM)**
Lane Groups at LOS A/B/C	20	4
Lane Groups at LOS D	7	0
Lane Groups at LOS E	3	0
Lane Groups at LOS F	0	0
Total	30	4
Lane Groups with v/c ≥ 0.90	1	0

Notes: LOS = Level-of-Service; v/c = volume-to-capacity ratio.

- Eastbound left-turn at the East 23rd Street and First Avenue intersection (LOS D with a v/c ratio of 0.56 and a delay of 51.0 seconds per vehicle [spv] during the weekday AM peak hour);
- Westbound right-turn at the East 23rd Street and First Avenue intersection (LOS E with a v/c ratio of 0.78 and a delay of 64.9 spv during the weekday AM peak hour);
- Northbound left-turn at the East 23rd Street and First Avenue intersection (LOS E with a v/c ratio of 0.77 and a delay of 67.4 spv during the weekday AM peak hour);
- Southbound approach at the East 23rd Street and Avenue C intersection (LOS E with a v/c ratio of 0.97 and a delay of 66.5 spv during the weekday AM peak hour); and
- Northbound left-turn at the East Broadway and Allen Street/Pike Street intersection (LOS D with a v/c ratio of 0.39 and a delay of 45.5 spv during the weekday AM peak hour).

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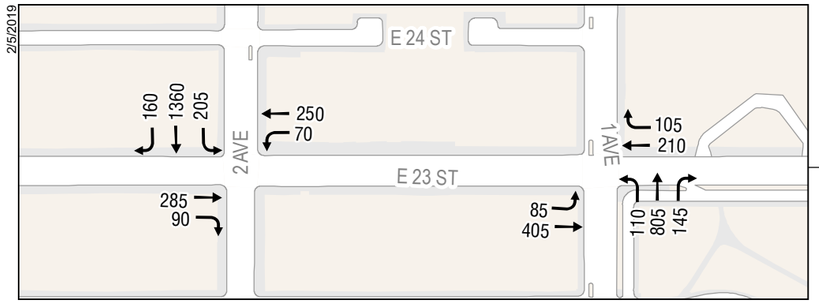

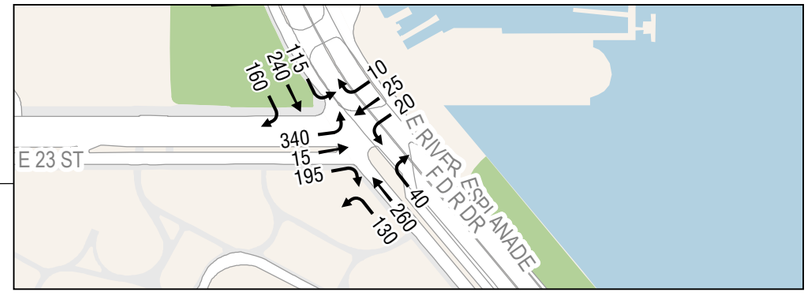

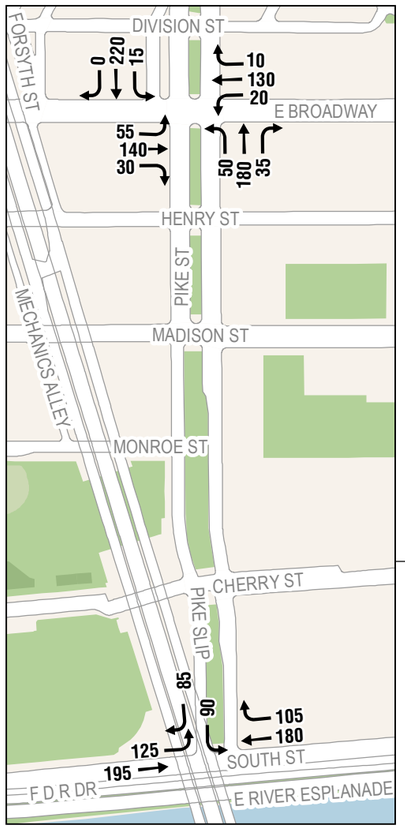

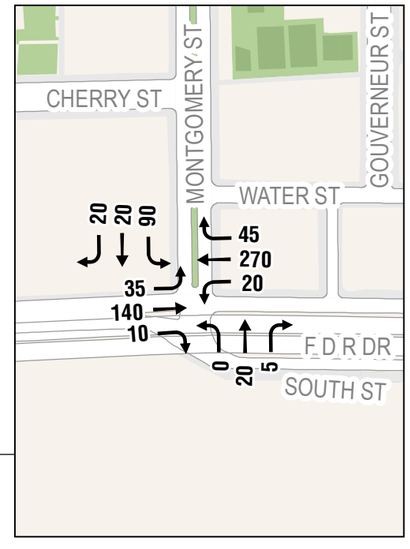

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Project Area One

Project Area Two

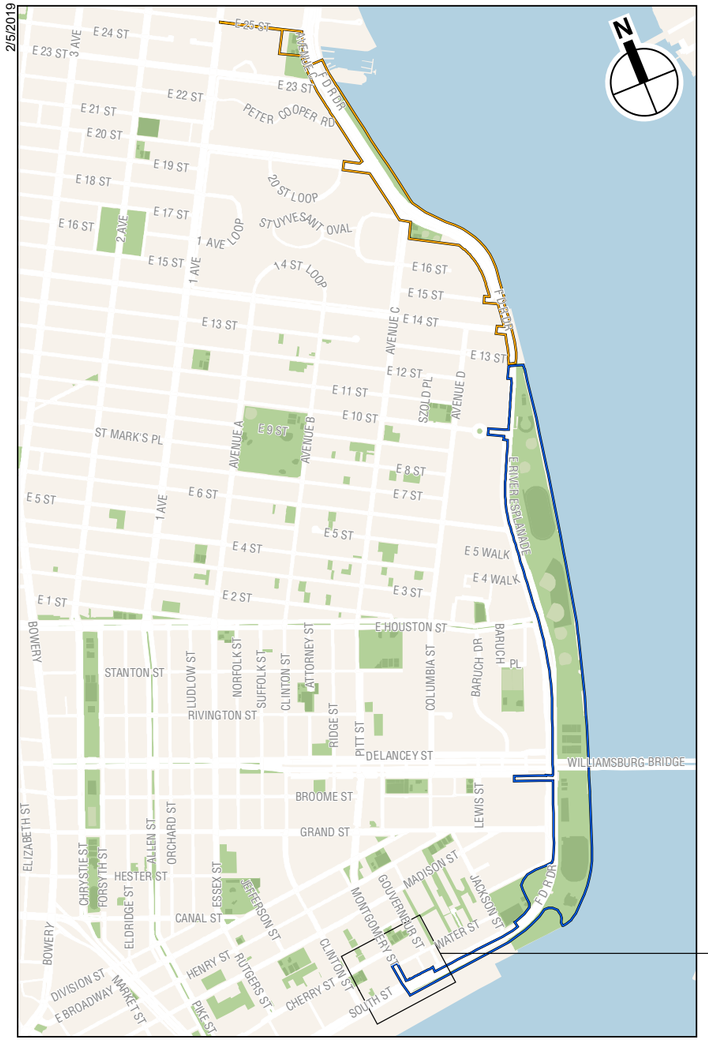
NYC DDC Capital Project: SANDRESM1

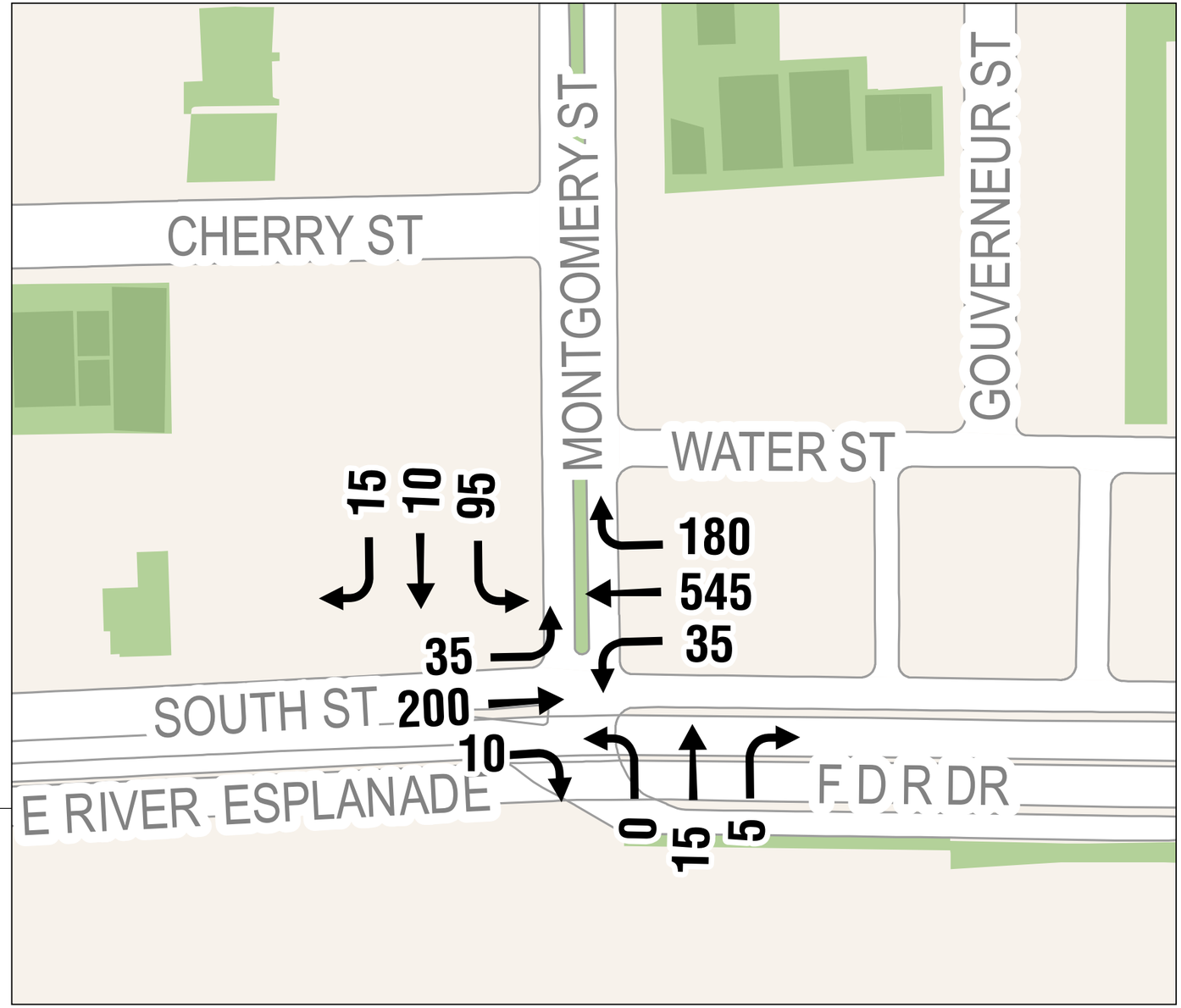
EAST SIDE COASTAL RESILIENCY

Existing Traffic Volumes
6-7 AM Peak Hour

Figure 6.9-1

2/5/2019





Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Existing Traffic Volumes
3-4 PM Peak Hour

Figure 6.9-2

Table 6.9-3
Existing Conditions Level of Service Analysis

Intersection	AM Peak Hour (6:00 AM to 7:00 AM)				PM Peak Hour (3:00 PM to 4:00 PM)			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and Second Avenue								
EB	TR	0.63	31.4	C	Analysis not warranted during PM peak hour.			
WB	LT	0.67	34.2	C				
SB	L	0.69	43.8	D				
	TR	0.56	12.1	B				
	Intersection		21.0	C				
East 23rd Street and First Avenue								
EB	L	0.56	51.0	D	Analysis not warranted during PM peak hour.			
	T	0.34	16.0	B				
WB	T	0.32	26.2	C				
	R	0.78	64.9	E				
NB	L	0.77	67.4	E				
	TR	0.66	27.2	C				
	Intersection		30.4	C				
East 23rd Street and Avenue C								
EB (Mainline)	LTR	0.84	43.6	D	Analysis not warranted during PM peak hour.			
WB	LTR	0.08	14.0	B				
NB	LTR	0.40	18.5	B				
SB	LTR	0.97	66.5	E				
EB (Service Road)	R	0.23	38.0	D				
	Intersection		42.9	D				
East Broadway and Allen Street/Pike Street								
EB	LTR	0.70	37.6	D	Analysis not warranted during PM peak hour.			
WB	LTR	0.48	28.0	C				
NB	L	0.39	45.5	D				
	TR	0.25	18.0	B				
SB	L	0.17	41.4	D				
	T	0.28	19.6	B				
	Intersection		26.9	C				
South Street and Allen Street/Pike Street								
EB	L	0.30	10.8	B	Analysis not warranted during PM peak hour.			
	T	0.35	21.0	C				
WB	TR	0.54	25.0	C				
SB	L	0.31	32.5	C				
	R	0.31	32.6	C				
	Intersection		23.1	C				
South Street and Montgomery Street								
EB	LTR	0.18	10.7	B	LTR	0.25	11.4	B
WB	LTR	0.33	12.2	B	LTR	0.83	24.4	C
NB	LTR	0.06	19.9	B	LTR	0.04	19.7	B
SB	LTR	0.29	22.8	C	LTR	0.28	22.7	C
	Intersection		14.4	B	Intersection		21.4	C

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

Under the No Action Alternative, no new comprehensive coastal protection system is installed in the proposed project area, and no new trips are generated by the proposed project. As described in Chapter 5.9, "Transportation," there are a number of projects planned or under construction within a ½ mile of the project area that are expected to be complete by 2025. These projects will generate traffic, transit, pedestrian trips, and parking demands that are background growth not associated with the proposed project.

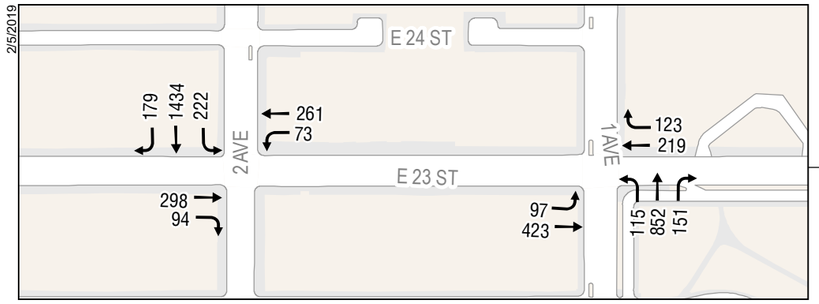
As discussed in greater detail below, the peak quarter of construction for Alternative 3 would occur in the first quarter of 2023 and the peak quarter of construction for the Preferred Alternative would occur in the first quarter of 2022, resulting in an analysis year of 2023 for Alternative 3 and 2022 for the Preferred Alternative. For comparison to the proposed project's construction peak quarter traffic conditions in 2022 and 2023, the No Action Alternative was developed by increasing existing traffic levels by the expected growth in overall travel through and within the study area. As per *CEQR Technical Manual* guidelines, an annual background growth rate of 0.25 percent was assumed for the first five years (year 2016 to year 2020) and then 0.125 percent for the remaining years (year 2021 to the construction peak quarter in the year 2022 for the Preferred Alternative and 2023 for Alternative 3) in Manhattan, resulting in an overall growth rate of approximately 1.50 percent by 2022 and 1.65 percent by 2023. As shown in detail in **Appendix A1**, a total of 168 development projects expected to occur in the No Action Alternative (No Action projects) were identified as being planned for the ½-mile study area by the end of 2025. However, many of these planned projects are modest in size and would be very modest traffic generators. Additionally, the construction analysis peak hours of 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM are atypical and would generate a marginal amount of trips as compared to the typical commuter peak hours of 8:00 AM to 9:00 AM and 5:00 PM to 6:00 PM. Three of the planned developments would generate more substantial traffic increases during the analysis peak hours, the *Brookdale Campus EIS* (including the four-story New York City Department of Sanitation garage complex to store equipment and provide personnel support services and operational space as well as approximately 1.5 million square feet of mixed-use commercial, retail, and community facility space), the *Alexandria Phase 3 EIS* (including approximately 1.30 million square feet of mixed-use commercial, academic, and community facility space), and the *Two Bridges Large Scale Residential Development EIS* (including approximately 2,775 new dwelling units and 27,996 square feet of mixed-use retail and community facility space). Mitigation measures from the *Two Bridges Large Scale Residential Development EIS* at the East Broadway and Allen Street/Pike Street intersection (consisting of lane restriping) that would be implemented prior to the peak construction quarter were also assumed in the No Action Alternative presented below. In 2017, the intersection of South Street and Montgomery Street was restriped, resulting in updated lane widths at this intersection. These modifications were similarly assumed in the No Action Alternative.

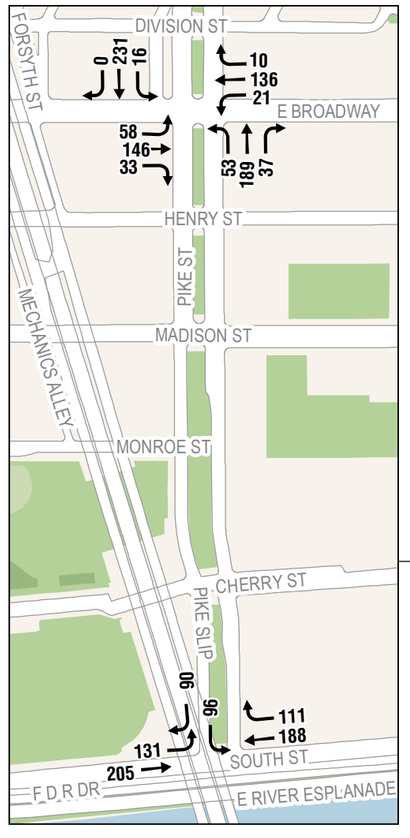
The trips associated with the three proposed projects were developed and included in the No Action Alternative traffic volumes. In order to prepare a conservative analysis, an additional background growth rate of 3.0 percent was assumed to account for traffic increases resulting from the remaining No Action projects.

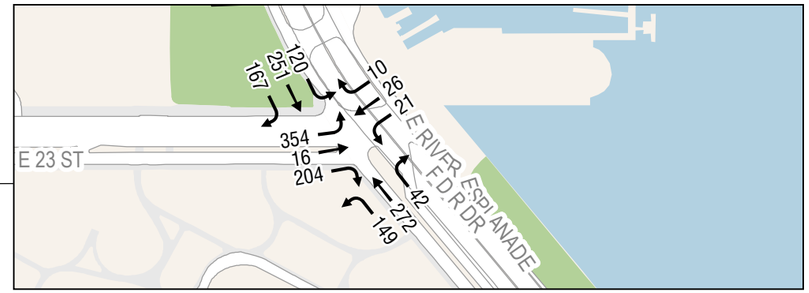
TRAFFIC OPERATIONS

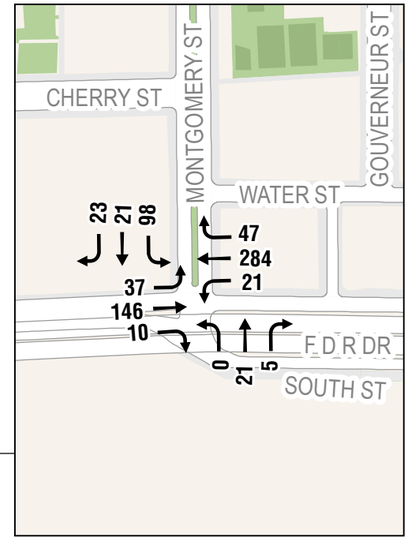
The 2022 No Action Alternative traffic volumes are shown in **Figures 6.9-3 and 6.9-4** and the 2023 No Action Alternative traffic volumes are shown in **Figures 6.9-5 and 6.9-6** for the

2/5/2019









Project Area One

Project Area Two

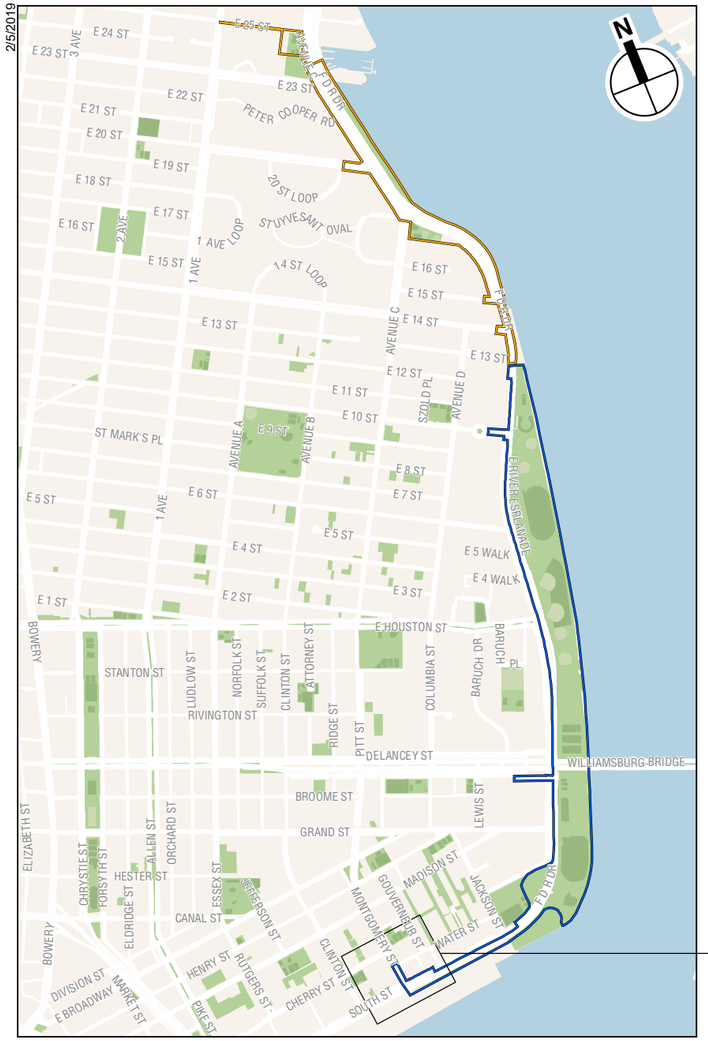
NYC DDC Capital Project: SANDRESM1

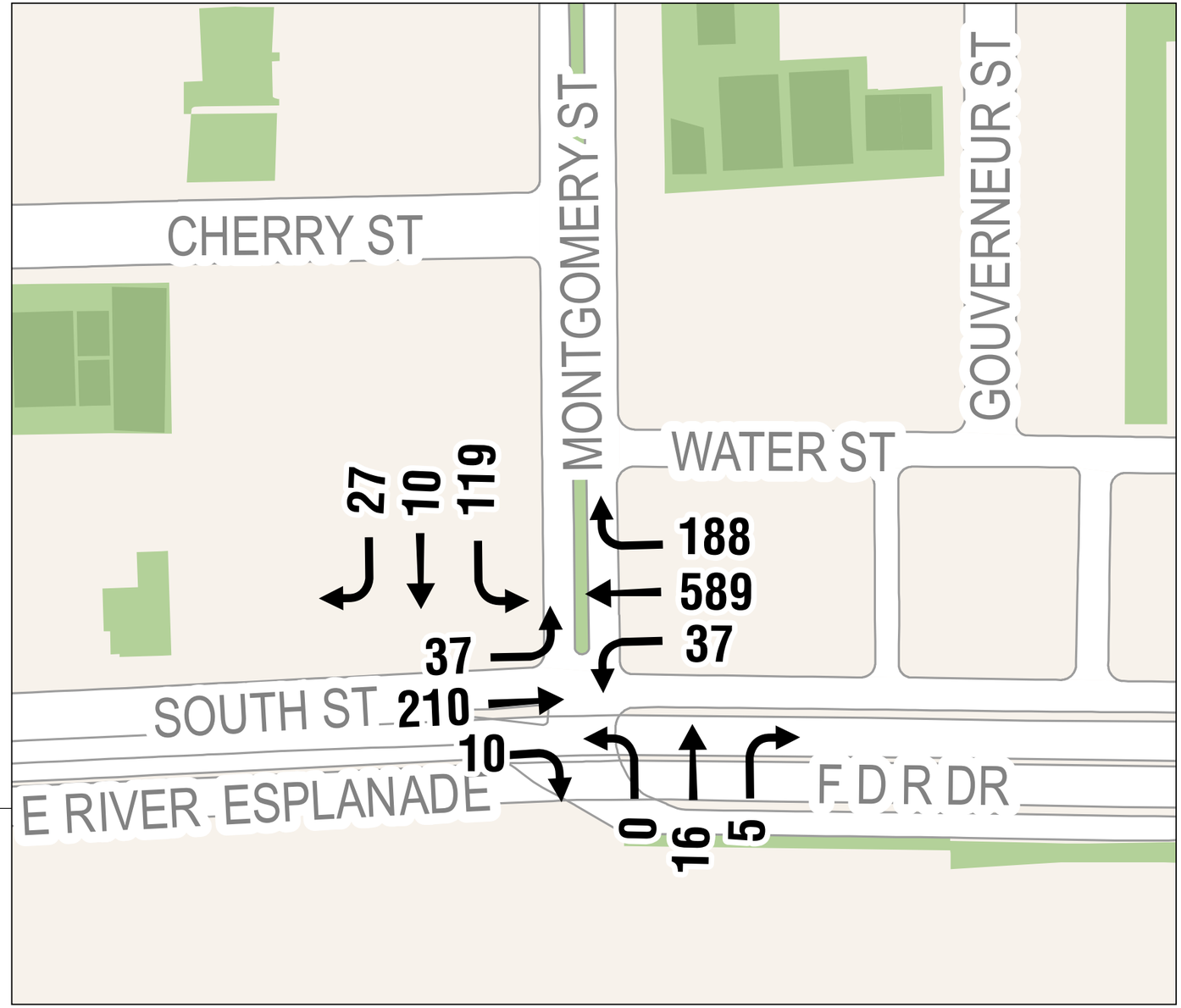
EAST SIDE COASTAL RESILIENCY

2022 No Action Traffic Volumes
6-7 AM Peak Hour

Figure 6.9-3

2/5/2019





Project Area One

Project Area Two

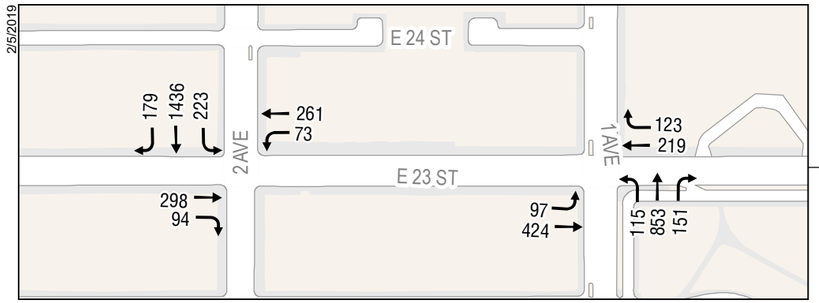
NYC DDC Capital Project: SANDRESM1

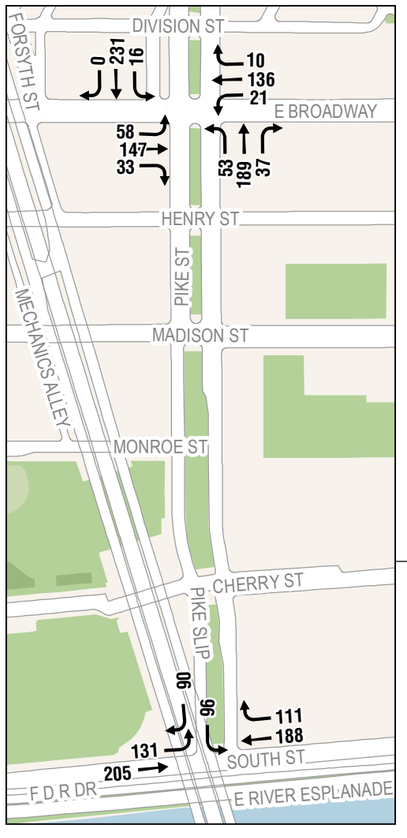
EAST SIDE COASTAL RESILIENCY

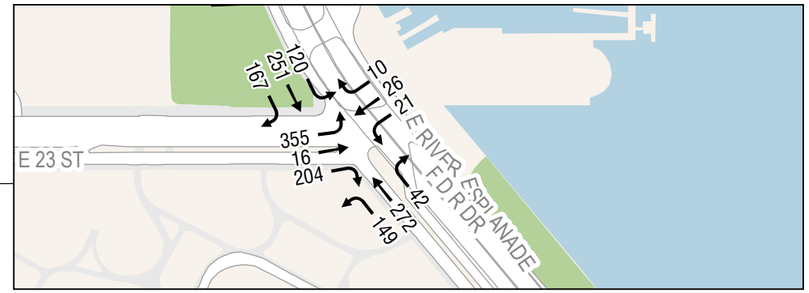
2022 No Action Traffic Volumes
3-4 PM Peak Hour

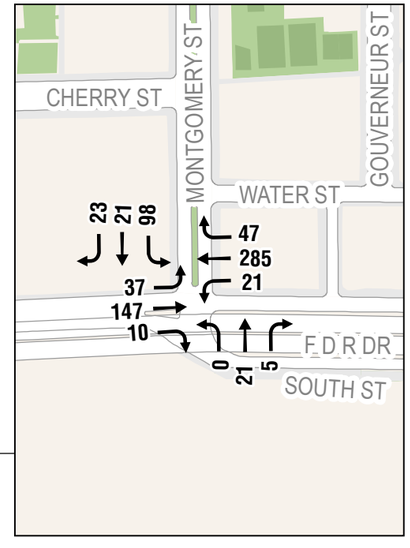
Figure 6.9-4

2/5/2019









Project Area One

Project Area Two

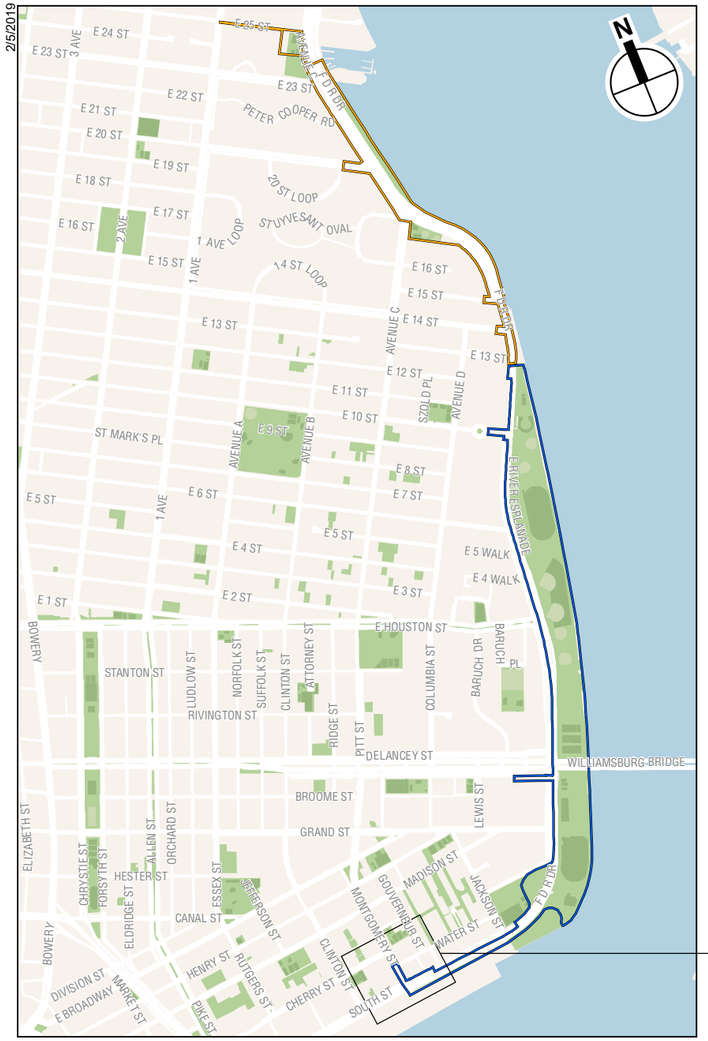
NYC DDC Capital Project: SANDRESM1

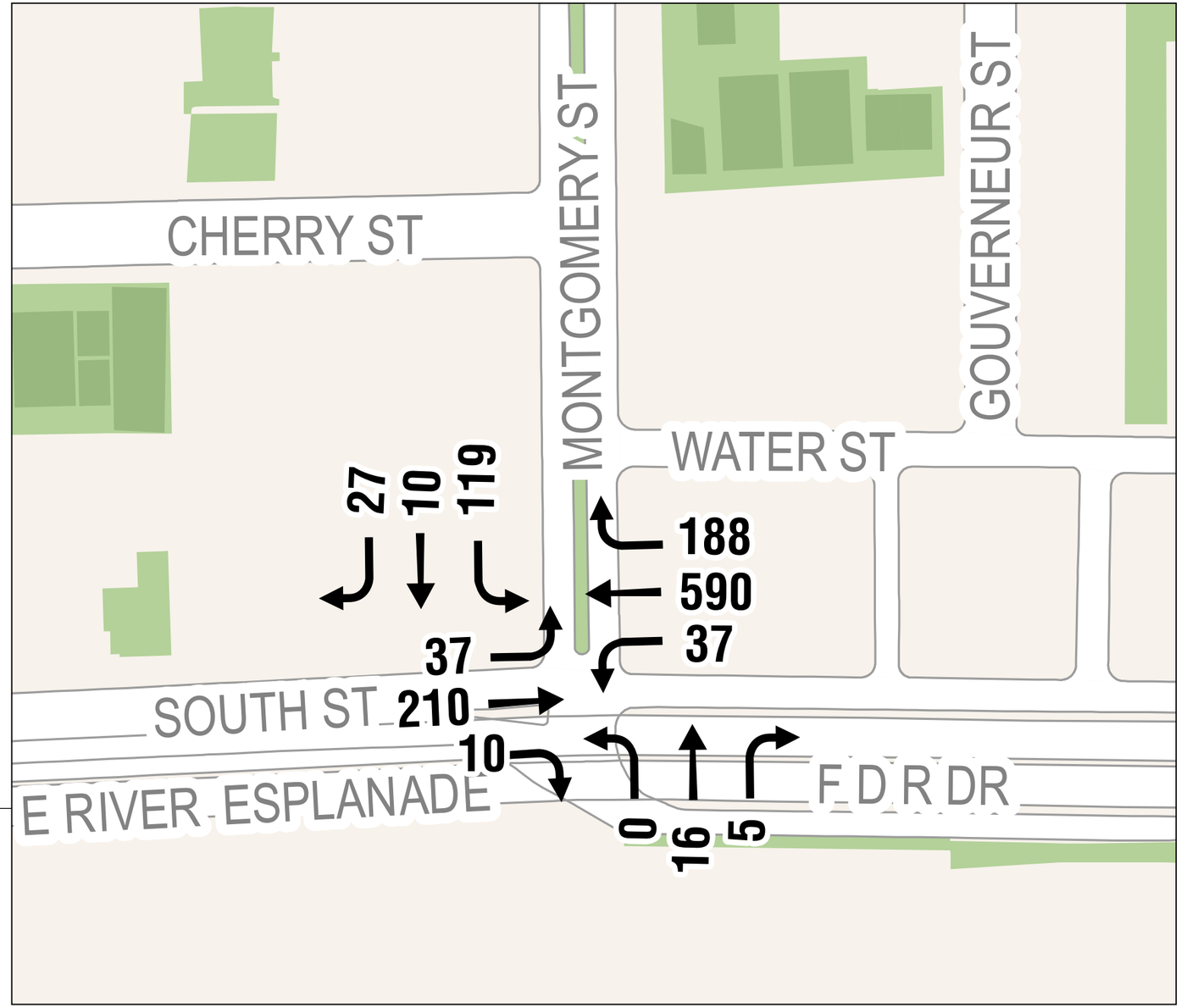
EAST SIDE COASTAL RESILIENCY

2023 No Action Traffic Volumes
6-7 AM Peak Hour

Figure 6.9-5

2/5/2019





Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

2023 No Action Traffic Volumes
3-4 PM Peak Hour

Figure 6.9-6

weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours, respectively. The No Action traffic volumes for both Alternatives were projected by layering on top of the existing traffic volumes the following: *CEQR* background growth, background growth to account for No Action projects in the area, and incremental trips generated by the three No Action projects described above. A summary of the 2022 and 2023 No Action Alternative traffic analysis results is presented in **Table 6.9-4**. Details on level-of-service, v/c ratios, and average delays are presented in **Tables 6.9-5 and 6.9-6**.

Table 6.9-4
Summary of 2022 and 2023 No Action Traffic Analysis Results

Level of Service	Analysis Peak Hours	
	Weekday AM (6:00 AM to 7:00 AM)	Weekday PM (3:00 PM to 4:00 PM)
2022 No Action (Preferred Alternative) & 2023 No Action (Alternative 3)		
Lane Groups at LOS A/B/C	21	4
Lane Groups at LOS D	6	0
Lane Groups at LOS E	3	0
Lane Groups at LOS F	1	0
Total	31	4
Lane Groups with v/c ≥ 0.90	2	0

Notes: LOS = Level-of-Service; v/c = volume-to-capacity ratio

Based on the analysis results presented in **Tables 6.9-5 and 6.9-6**, the majority of the approaches/lane-groups will operate at the same LOS as in the existing conditions. The following approaches/lane-groups are expected to operate at deteriorated LOS when compared to the existing conditions:

- Southbound left-turn at the East 23rd Street and Second Avenue intersection will deteriorate within LOS D with a v/c ratio of 0.75/0.75 and a delay of 47.5/47.7 spv during the weekday AM peak hour in 2022/2023;
- Eastbound left-turn at the East 23rd Street and First Avenue intersection will deteriorate to LOS E with a v/c ratio of 0.64 and a delay of 55.8 spv during the weekday AM peak hour in 2022 and 2023;
- Westbound right-turn at the East 23rd Street and First Avenue intersection will deteriorate to LOS F with a v/c ratio of 0.93 and a delay of 90.8 spv during the weekday AM peak hour in 2022 and 2023; and
- Eastbound (mainline) approach at the East 23rd Street and Avenue C intersection will deteriorate within LOS D with a v/c ratio of 0.88/0.88 and a delay of 47.1/47.3 spv during the weekday AM peak hour in 2022/2023.

Table 6.9-5
2022 No Action Alternative Level of Service Analysis – Preferred Alternative

Intersection	AM Peak Hour (6:00 AM to 7:00 AM)				PM Peak Hour (3:00 PM to 4:00 PM)			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and Second Avenue								
EB	TR	0.66	32.3	C	Analysis not warranted during PM peak hour.			
WB	LT	0.72	36.3	D				
SB	L	0.75	47.5	D				
	TR	0.60	12.6	B				
	Intersection		22.0	C				
East 23rd Street and First Avenue								
EB	L	0.64	55.8	E	Analysis not warranted during PM peak hour.			
	T	0.36	16.2	B				
WB	T	0.34	26.4	C				
	R	0.93	90.8	F				
NB	L	0.80	71.4	E				
	TR	0.70	28.0	C				
	Intersection		33.3	C				
East 23rd Street and Avenue C								
EB (Mainline)	LTR	0.88	47.1	D	Analysis not warranted during PM peak hour.			
WB	LTR	0.08	14.1	B				
NB	LTR	0.43	18.9	B				
SB	LTR	1.02	77.5	E				
EB (Service Road)	R	0.23	38.0	D				
	Intersection		47.8	D				
East Broadway and Allen Street/Pike Street								
EB	LT	0.54	29.7	C	Analysis not warranted during PM peak hour.			
	R	0.11	21.5	C				
WB	LTR	0.50	28.7	C				
NB	L	0.42	46.3	D				
	TR	0.26	18.2	B				
SB	L	0.19	41.9	D				
	T	0.29	19.7	B				
	Intersection		25.0	C				
South Street and Allen Street/Pike Street								
EB	L	0.32	11.1	B	Analysis not warranted during PM peak hour.			
	T	0.37	21.3	C				
WB	TR	0.57	25.8	C				
SB	L	0.33	32.9	C				
	R	0.33	33.0	C				
	Intersection		23.6	C				
South Street and Montgomery Street								
EB	LTR	0.20	10.9	B	LTR	0.27	11.6	B
WB	LTR	0.35	12.4	B	LTR	0.89	28.9	C
NB	LTR	0.06	20.0	B	LTR	0.04	19.8	B
SB	LTR	0.32	23.4	C	LTR	0.37	24.5	C
	Intersection		14.8	B	Intersection		24.6	C

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

Table 6.9-6
2023 No Action Alternative Level of Service Analysis – Alternative 3

Intersection	AM Peak Hour (6:00 AM to 7:00 AM)				PM Peak Hour (3:00 PM to 4:00 PM)			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and Second Avenue								
EB	TR	0.66	32.3	C	Analysis not warranted during PM peak hour.			
WB	LT	0.72	36.3	D				
SB	L	0.75	47.7	D				
	TR	0.60	12.6	B				
	Intersection		22.1	C				
East 23rd Street and First Avenue								
EB	L	0.64	55.8	E	Analysis not warranted during PM peak hour.			
	T	0.36	16.2	B				
WB	T	0.34	26.4	C				
	R	0.93	90.8	F				
NB	L	0.80	71.4	E				
	TR	0.70	28.0	C				
	Intersection		33.3	C				
East 23rd Street and Avenue C								
EB (Mainline)	LTR	0.88	47.3	D	Analysis not warranted during PM peak hour.			
WB	LTR	0.08	14.1	B				
NB	LTR	0.43	18.9	B				
SB	LTR	1.02	77.5	E				
EB (Service Road)	R	0.23	38.0	D				
	Intersection		47.9	D				
East Broadway and Allen Street/Pike Street								
EB	LT	0.55	29.7	C	Analysis not warranted during PM peak hour.			
	R	0.11	21.5	C				
WB	LTR	0.50	28.7	C				
NB	L	0.42	46.3	D				
	TR	0.26	18.2	B				
SB	L	0.19	41.9	D				
	T	0.29	19.7	B				
	Intersection		25.0	C				
South Street and Allen Street/Pike Street								
EB	L	0.32	11.1	B	Analysis not warranted during PM peak hour.			
	T	0.37	21.3	C				
WB	TR	0.57	25.8	C				
SB	L	0.33	32.9	C				
	R	0.33	33.0	C				
	Intersection		23.6	C				
South Street and Montgomery Street								
EB	LTR	0.20	10.9	B	LTR	0.27	11.6	B
WB	LTR	0.35	12.4	B	LTR	0.89	29.0	C
NB	LTR	0.06	20.0	B	LTR	0.04	19.8	B
SB	LTR	0.32	23.4	C	LTR	0.39	24.5	C
	Intersection		14.8	B	Intersection		24.7	C

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Preferred Alternative would raise the majority of East River Park. This plan would reduce the length of wall between the community and the waterfront to provide for enhanced neighborhood connectivity and integration. In addition to the Delancey Street and 10th Street Bridges, the Corlears Hook Bridge would be reconstructed to be universally accessible and ADA-compliant and would improve safety and access/egress to East River Park for pedestrians and bicyclists.

The Preferred Alternative would also include modifications of the existing sewer system, including installation of gates underground near the northern and southern extents of the project area within the existing large capacity sewer pipe (interceptor), and flood-proofing manholes and regulators located on the unprotected side of the proposed project alignment, to control flow into the project area from the larger combined sewer drainage area. One interceptor gate would be installed along the service road in Corlears Hook Park just west of the FDR Drive between Jackson and Cherry Streets, and another along the eastbound approach of East 20th Street just west of Avenue C (referred to as the "south gate" and "north gate," respectively, in the subsequent description). Each interceptor gate would consist of a below-ground interceptor chamber and above-ground interceptor house. The south gate chamber and house would not occupy any part of the service road, sidewalks, or nearby streets. As part of the south gate installation, there would be a lane shift within the service road for approximately 150 feet so that the existing shared use path could be realigned to a minimum width of 10 feet. This lane shift would not affect vehicular or pedestrian circulation or safety and would not result in any significant adverse effects on transportation systems. As part of the north gate construction, potential No Standing Anytime parking regulations would be sought for a length that would displace no more than three passenger car parking spaces in what is currently a commercial loading zone by day and alternate side parking by night. The north gate house would be located within the raised concrete divider between the eastbound service road and mainline of East 20th Street just west of Avenue C. This divider is currently paved with cobblestones and trees, and is not used for pedestrian circulation. To site the gate house next to the gate chamber and safely accommodate workers within the raised curb area of the divider who may need to access the gate house, the divider will be widened into the parking lanes north and south of it. This widening may remove up to 4 passenger car parking spaces on each side in what are currently alternate side parking zones, resulting in a total of up to 11 parking spaces that could be lost on East 20th Street. Vehicles currently using these parking spaces would park on-street or at off-street parking facilities within ¼-mile of the project area where capacity was observed. Therefore similar to the south gate, the north gate installation would not result in any significant adverse effects on transportation systems. The lane shift is a temporary measure during construction only and would not affect operational conditions once construction is completed. The parking removal on East 20th Street would continue after construction is completed and would affect both construction and operational conditions.

Installation of additional sewer pipes and, in one location, enlargement of existing sewer pipe, is also proposed within and adjacent to the project area to reduce the risk of street and property flooding within the protected area during a storm event. Under this alternative, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. During construction of the flyover bridge, the pinch point near the Con Edison facility would be closed.

The flood protection system and raised East River Park proposed under this alternative would be constructed in 3.5 years and completed in 2023 compared to the 5-year construction duration anticipated under Alternatives 2, 3, and 5. The foundations for the shared-use flyover bridge would also be completed in 2023, with the prefabricated bridge span be installed and completed in 2025. Construction associated with the flyover bridge would require temporary FDR Drive lane closures, which would conform to the lane closure schedule currently permitted by

NYCDOT's OCMC during off-peak hours. Therefore, no significant adverse effects on transportation systems are anticipated.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 6.9-7 shows the estimated average daily numbers of workers and deliveries to Project Area One by calendar quarter for the duration of the construction period for the proposed project under the Preferred Alternative. The average number of workers throughout the entire period would be approximately 216 per day and the peak number of workers would reach 250 per day from the third quarter of 2020 to the second quarter of 2022. The average number of trucks throughout the entire construction period would be 60 per day, and the peak would occur from the fourth quarter of 2021 to the first quarter of 2022, with 147 trucks per day.

Table 6.9-7
Average Number of Daily Workers and Trucks by Year and Quarter
Project Area One – The Preferred Alternative[1]

Year	2020				2021				2022					
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
Workers/Worker Autos	27/10	173/64	**250/92**	**250/92**	**250/92**	**250/92**	**250/92**	**250/92**	**250/92**	**250/92**	230/85	230/85		
Trucks	6	34	45	111	111	39	39	**147**	**147**	39	39	39		
Year	2023				2024				2025					
Quarter	1st	2nd	3rd	4th[1]	1st[1]	2nd[1]	3rd[1]	4th[1]	1st[1]	2nd	3rd	4th	Average	Peak
Workers/Worker Autos	230/85	183/68	160/59	12/5	12/5	12/5	12/5	12/5	12/5	-	-	-	216/80	250/92
Trucks	39	31	27	4	4	4	4	4	4	-	-	-	60	147

Note:
[1] The build year for the proposed project is 2025. Under the Preferred Alternative, the flood protection, reconstruction of three existing pedestrian bridges, foundations for a new shared use flyover bridge, and park access features are expected to be completed in 2023, with the superstructure of the shared-use flyover bridge would then be completed in 2025.
Source: AKRF/KSE Joint Venture (JV), November 2018.

Table 6.9-8 shows the estimated average daily numbers of workers and deliveries to Project Area Two by calendar quarter for the duration of the construction period for the proposed project under the Preferred Alternative. The average number of workers throughout the entire period would be approximately 94 per day and the peak number of workers would reach 140 per day in the second quarter of 2022. The average number of trucks throughout the entire construction period would be 29 per day, and the peak would occur from the third quarter of 2021 to the second quarter of 2022, with 44 trucks per day.

Table 6.9-8
Average Number of Daily Workers and Trucks by Year and Quarter
Project Area Two – Preferred Alternative[1]

Year	2020				2021				2022					
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
Workers/Worker Autos	20/7	60/22	90/33	97/36	110/41	110/41	**140/52**	**140/52**	**140/52**	133/49	120/44	110/41		
Trucks	4	11	36	37	40	40	**44**	**44**	**44**	43	40	32		
Year	2023				2024				2025					
Quarter	1st	2nd	3rd	4th[1]	1st[1]	2nd[1]	3rd[1]	4th[1]	1st[1]	2nd	3rd	4th	Average	Peak
Workers/Worker Autos	60/22	50/18	30/11	12/5	12/5	12/5	12/5	12/5	12/5	-	-	-	94/35	140/52
Trucks	8	7	4	4	4	4	4	**4**	**4**	-	-	-	29	44

Note:
[1] The build year for the proposed project is 2025. Under the Preferred Alternative, the flood protection, reconstruction of three existing pedestrian bridges, foundations for a new shared use flyover bridge, and park access features are expected to be completed in 2023, with the superstructure of the shared-use flyover bridge would then be completed in 2025.
Source: AKRF/KSE Joint Venture (JV), November 2018.

PEAK-HOUR CONSTRUCTION-WORKER VEHICLE AND TRUCK TRIPS

As discussed in Chapter 6.0, "Construction Overview," the preliminary construction schedule for the proposed project assumes five workdays per week with one 8-hour shift day shift and one 6-hour night shift. For the daytime work shift, similar to other construction projects in New York City, most of the construction activities are expected to take place from 7:00 AM to 3:30 PM. While construction truck trips would occur throughout the day (with more trips during the early morning), most trucks would remain in the area for short durations, and construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips (one "in" and one "out"), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart near the work shift end hour. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would generally occur during the hour before and after each work shift. Construction truck deliveries typically peak during the hour before each shift (25 percent), overlapping with construction worker arrival traffic. Further, in accordance with the *CEQR Technical Manual*, the traffic analysis assumed that each truck has a PCE of 2.

Due to the proximity of the expected floodwall alignment to the FDR Drive, excavation, and pile driving activities for the floodwall will likely require night work due to the need for FDR Drive single lane closures, which are only permitted at night. Appropriate work permits from NYCDOT would be obtained for any necessary night time work. **Table 6.9-9** shows the schedule for FDR Drive lane closures currently permitted by NYCDOT's Office of Construction Mitigation and Coordination (OCMC).

In addition, as discussed in Section D, "Affected Environment/Existing Conditions," during the installation of closure structures (including gates and associated foundations) across the FDR Drive near East 13th Street, the FDR Drive may require temporary lane closures for Alternatives 2 through 4. Installation of these closures structures is discussed in further detail below under "Swing Gates Construction across the FDR Drive." Construction of the raised FDR Drive platform and flyover bridge under Alternative 5 would require more extensive work within the FDR Drive. The preliminary assumptions for construction phasing and required lane closures are discussed in further details below under "Alternative 5: Flood Protection System Alignment East of FDR Drive."

Table 6.9-9
Schedule for Permitted FDR Drive Lane Closures
Brooklyn Bridge to East 125th Street

Day of Week	One Lane	Two Lanes[1]
Weekdays	11:00 PM to 5:30 AM	1:00 AM to 5:00 AM
Saturday	12:00 AM to 6:00 AM	1:00 AM to 5:00 AM
Sunday	1:00 AM to 11:00 AM	1:00 AM to 5:00 AM

Note:
[1] OCMC generally allows for closure of up to two lanes of traffic for 4 hours beginning at 1:00 AM, with clearance, and full re-opening by 5:00 AM; full closure (3 lanes) is generally limited to 15 minutes.
Source: NYCDOT comment letter, April 22, 2015.

TRANSPORTATION SCREENING ASSESSMENT

As discussed above in "Methodology," based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is expected that 48 percent of construction workers commute to the project site by private autos at an average occupancy of approximately 1.30 persons per vehicle.

Level 1 Screening Analysis

Table 6.9-10presents the hourly-trip projections for the peak construction quarter (first quarter of 2022) for Project Area One when activities are anticipated to occur throughout the project area. As shown, the maximum construction-related traffic increments would be approximately 166 PCEs between 6:00 AM and 7:00 AM and 82 PCEs between 3:00 PM and 4:00 PM. **Table 6.9-11** presents the hourly-trip projections for the peak construction quarter (second quarter of 2022) for Project Area Two when activities are anticipated to occur throughout the project area. As shown, the maximum construction-related traffic increments would be approximately 85 PCEs between 6:00 AM and 7:00 AM and 49 PCEs between 3:00 PM and 4:00 PM.

Table 6.9-10
Peak Construction Vehicle Trip Projections
Project Area One – Preferred Alternative

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	**74**	**0**	**74**	**23**	**23**	**18**	**97**	**23**	**120**	**120**	**46**	**166**
7 AM–8 AM	18	0	18	18	18	36	36	18	54	54	36	90
8 AM–9 AM	0	0	0	18	18	36	18	18	36	36	36	72
9 AM–10 AM	0	0	0	18	18	36	18	18	36	36	36	72
10 AM–11 AM	0	0	0	17	17	34	17	17	34	34	34	68
11 AM–12 PM	0	0	0	17	17	34	17	17	34	34	34	68
12 PM–1 PM	0	0	0	17	17	34	17	17	34	34	34	68
1 PM–2 PM	0	0	0	15	15	30	15	15	30	30	30	60
2 PM–3 PM	0	5	5	2	2	4	2	7	9	4	9	13
3 PM–4 PM	0	74	74	2	2	4	2	76	78	4	78	82
4 PM–5 PM	0	13	13	0	0	0	0	13	13	0	13	13
Daily Total	92	92	184	147	147	294	239	239	478	386	386	772

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

Table 6.9-11
Peak Construction Vehicle Trip Projections
Project Area Two – Preferred Alternative

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	41	0	41	11	11	22	52	11	63	63	22	85
7 AM–8 AM	11	0	11	5	5	10	16	5	21	21	10	31
8 AM–9 AM	0	0	0	5	5	10	5	5	10	10	10	20
9 AM–10 AM	0	0	0	5	5	10	5	5	10	10	10	20
10 AM–11 AM	0	0	0	4	4	8	4	4	8	8	8	16
11 AM–12 PM	0	0	0	4	4	8	4	4	8	8	8	16
12 PM–1 PM	0	0	0	4	4	8	4	4	8	8	8	16
1 PM–2 PM	0	0	0	2	2	4	2	2	4	4	4	8
2 PM–3 PM	0	3	3	2	2	4	2	5	7	4	7	11
3 PM–4 PM	0	41	41	2	2	4	2	43	45	4	45	49
4 PM–5 PM	0	8	8	0	0	0	0	8	8	0	8	8
Daily Total	52	52	104	44	44	88	96	96	192	140	140	280

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

The cumulative construction trips in PCEs for Project Areas One and Two are presented in **Table 6.9-12**. The peak quarter construction-related traffic increments would be approximately 251 PCEs between 6:00 AM and 7:00 AM and 131 PCEs between 3:00 PM and 4:00 PM. As was done for Alternative 3, a Level 2 assessment was conducted, as discussed below.

Table 6.9-12
Total Peak Construction Vehicle Trip Projections – Preferred Alternative

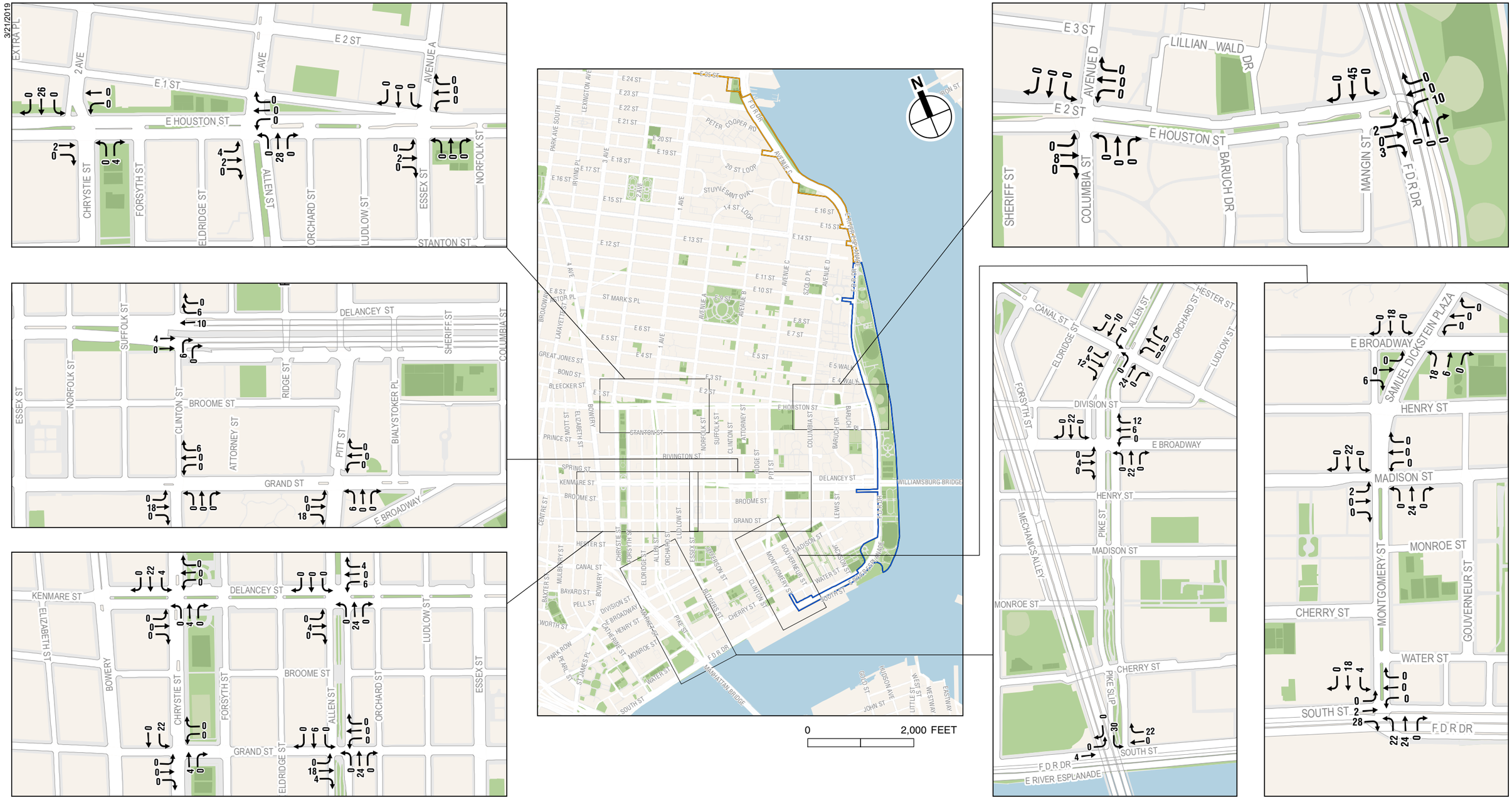
	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	**115**	**0**	**115**	**34**	**34**	**68**	**149**	**34**	**183**	**183**	**68**	**251**
7 AM–8 AM	29	0	29	23	23	46	52	23	75	75	46	121
8 AM–9 AM	0	0	0	23	23	46	23	23	46	46	46	92
9 AM–10 AM	0	0	0	23	23	46	23	23	46	46	46	92
10 AM–11 AM	0	0	0	21	21	42	21	21	42	42	42	84
11 AM–12 PM	0	0	0	21	21	42	21	21	42	42	42	84
12 PM–1 PM	0	0	0	21	21	42	21	21	42	42	42	84
1 PM–2 PM	0	0	0	17	17	34	17	17	34	34	34	68
2 PM–3 PM	0	8	8	4	4	8	4	12	16	8	16	24
3 PM–4 PM	0	115	115	4	4	8	4	119	123	8	123	131
4 PM–5 PM	0	21	21	0	0	0	0	21	21	0	21	21
Daily Total	144	144	288	191	191	382	335	335	670	526	526	1,052

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

LEVEL 2 SCREENING ANALYSIS

The assignments of the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hour incremental construction trips in PCEs described above are shown in **Figures 6.9-7a and 6.9-7b, Figures 6.9-8a and 6.9-8b**, and **Table 6.9-13**. As presented in **Table 6.9-21**, the same six intersections selected for quantified analysis for Alternative 3 (see below) were also analyzed for the Preferred Alternative.

3/21/2019



Project Area One

Project Area Two

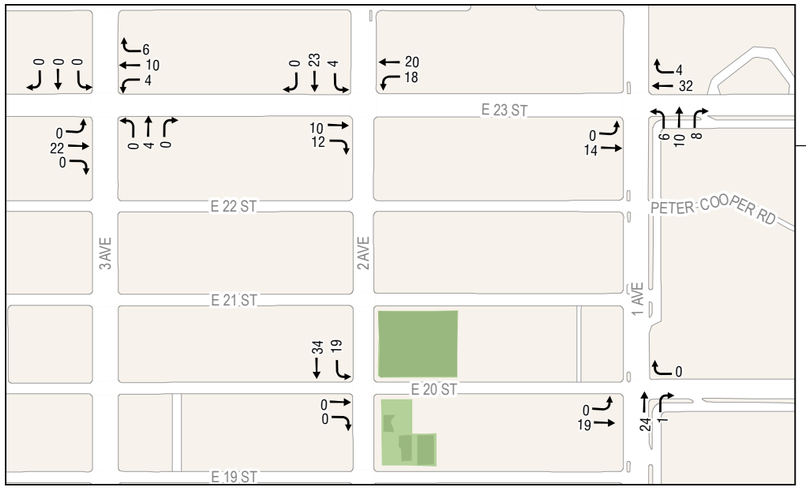
NYC DDC Capital Project: SANDRESM1

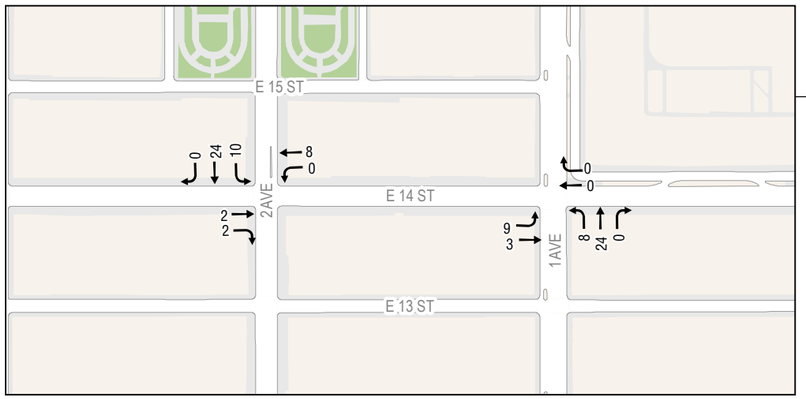
EAST SIDE COASTAL RESILIENCY

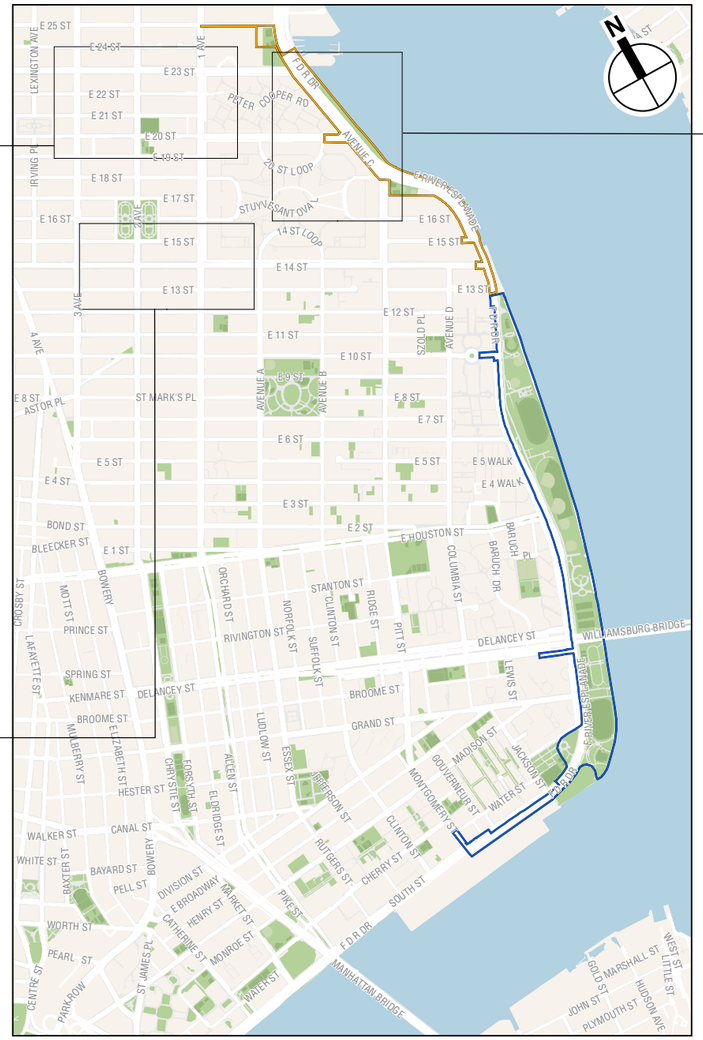
Preferred Alternative Total Construction PCE Trips: Project Area One Study Area
6-7 AM Peak Hour

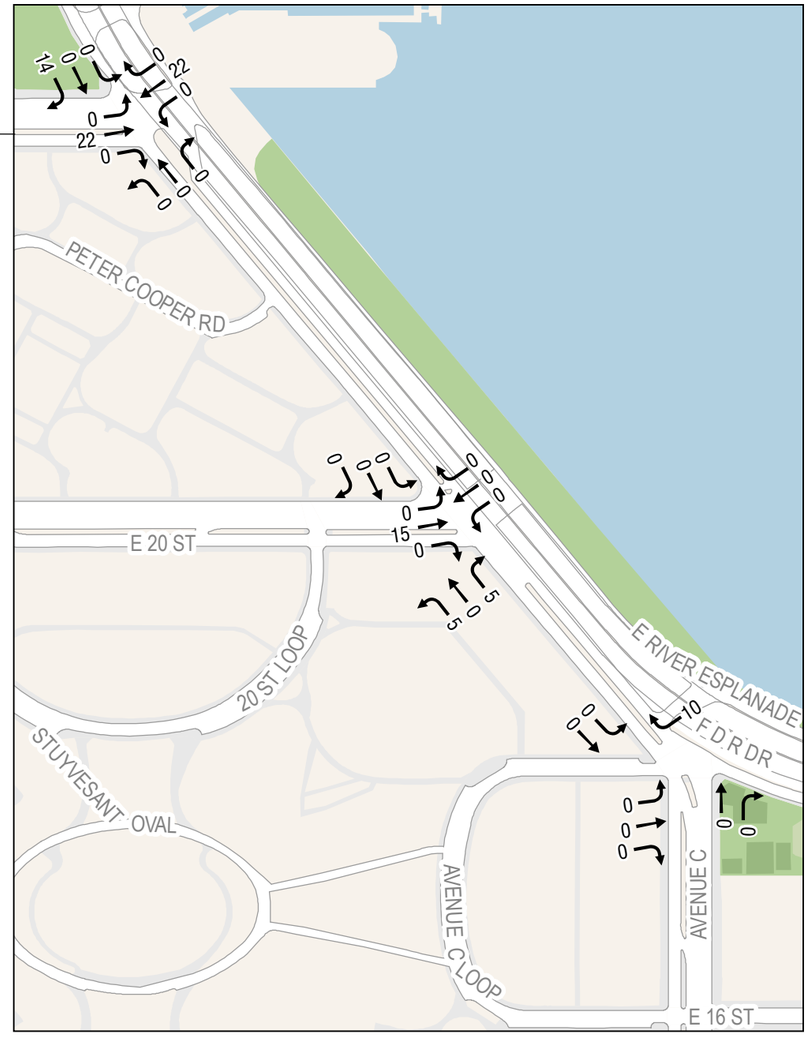
Figure 6.9-7a

3/21/2019









Project Area One

Project Area Two

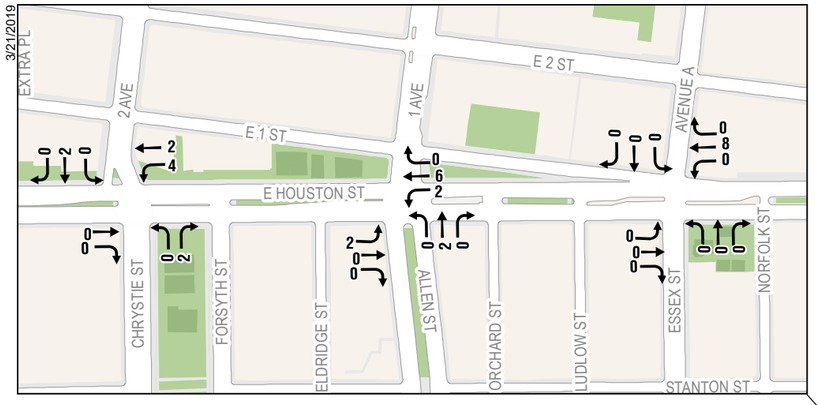
NYC DDC Capital Project: SANDRESM1

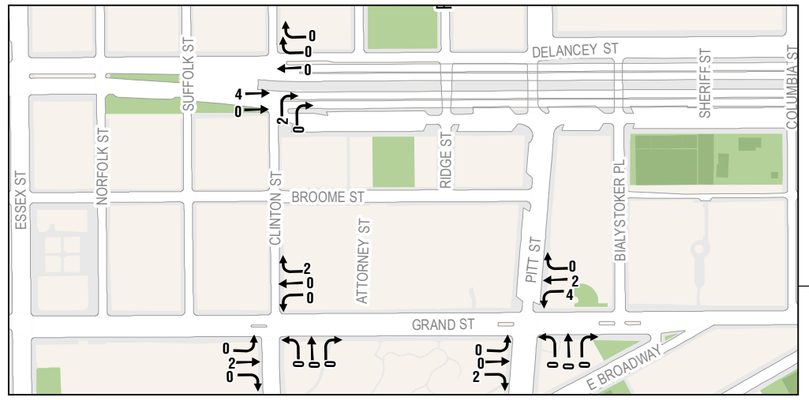
EAST SIDE COASTAL RESILIENCY

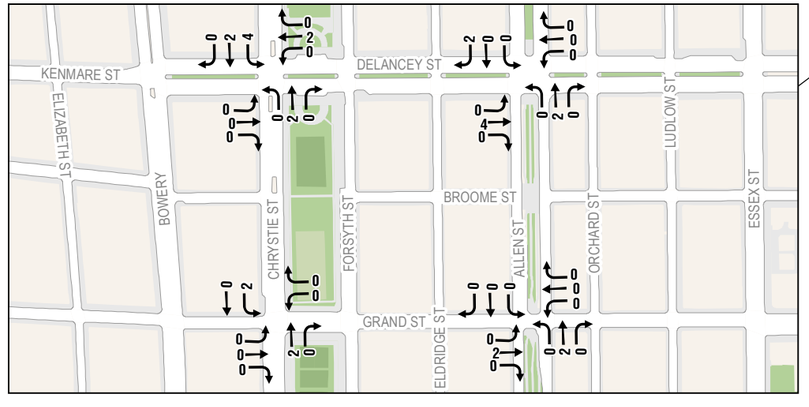
Preferred Alternative Total Construction PCE Trips: Project Area Two Study Area
6-7 AM Peak Hour

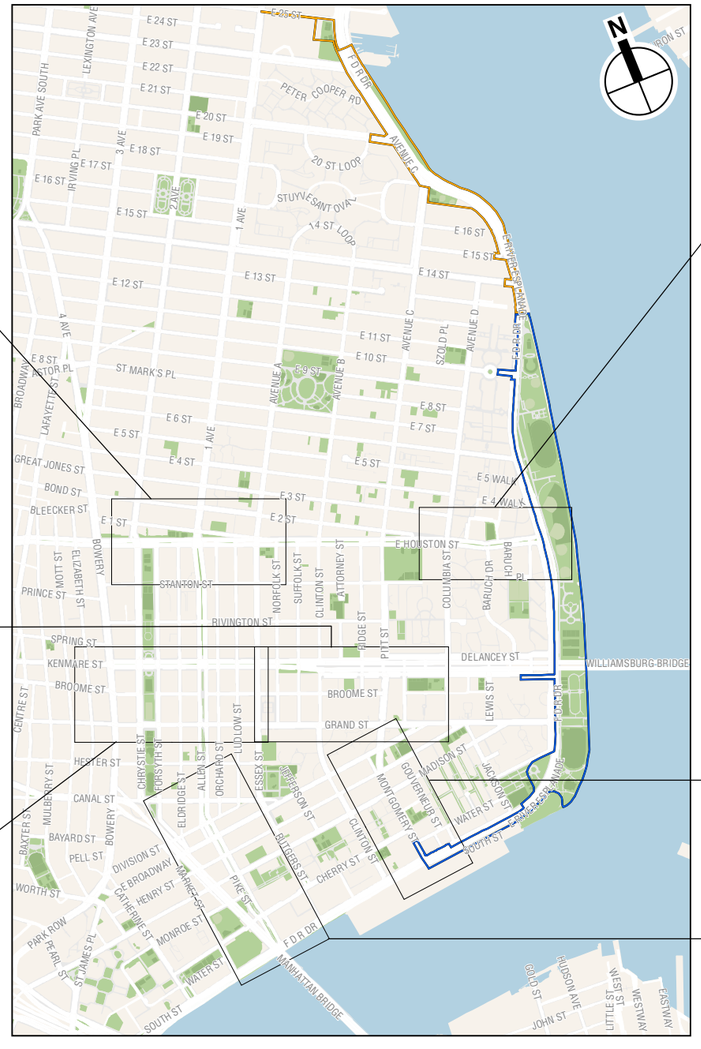
Figure 6.9-7b

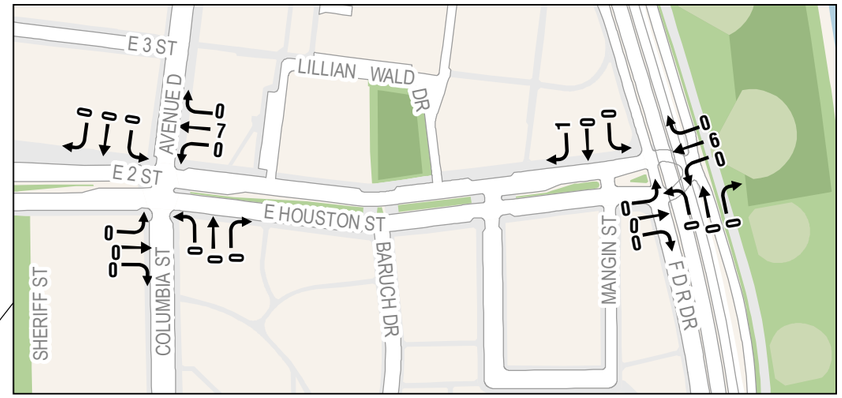
3/21/2019

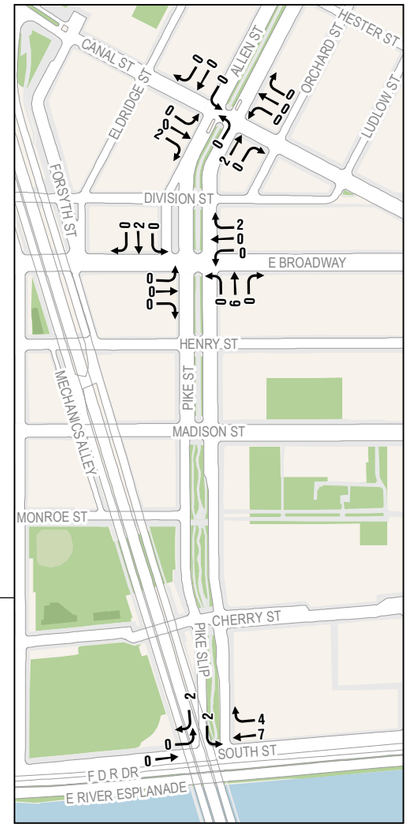












Project Area One

Project Area Two

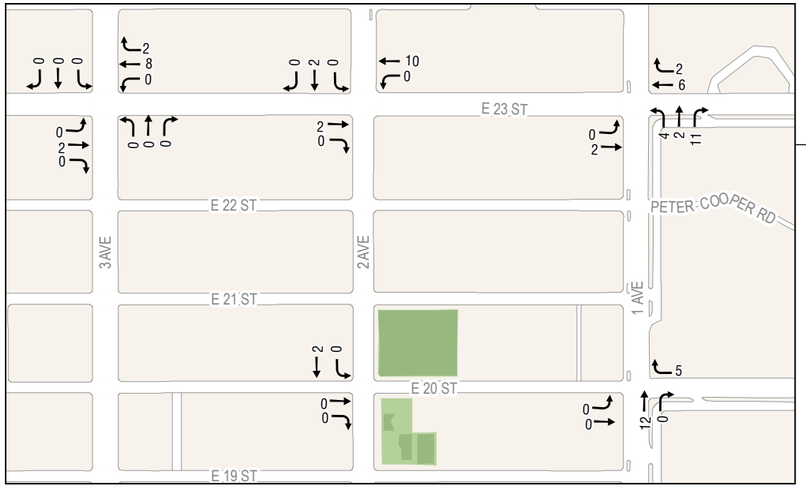
NYC DDC Capital Project: SANDRESM1

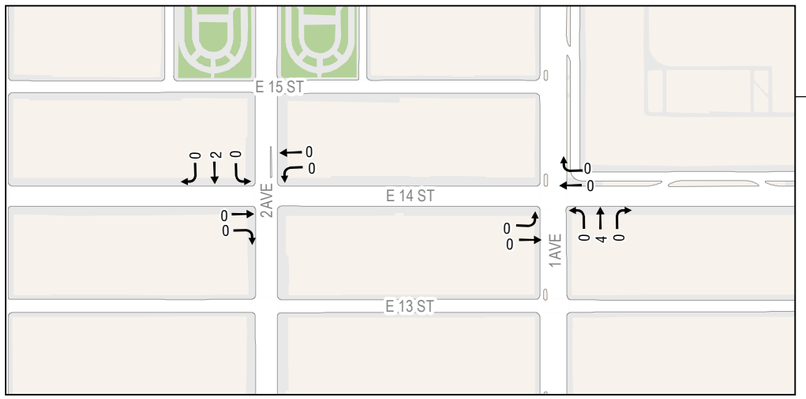
EAST SIDE COASTAL RESILIENCY

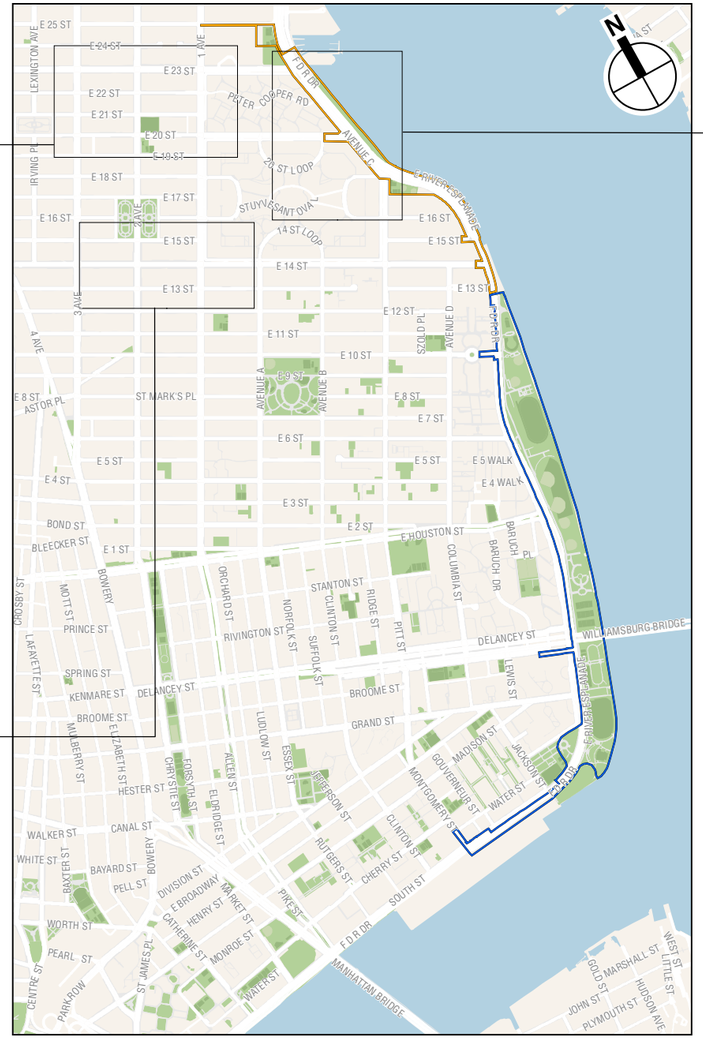
Preferred Alternative Total Construction PCE Trips: Project Area One Study Area
3-4 PM Peak Hour

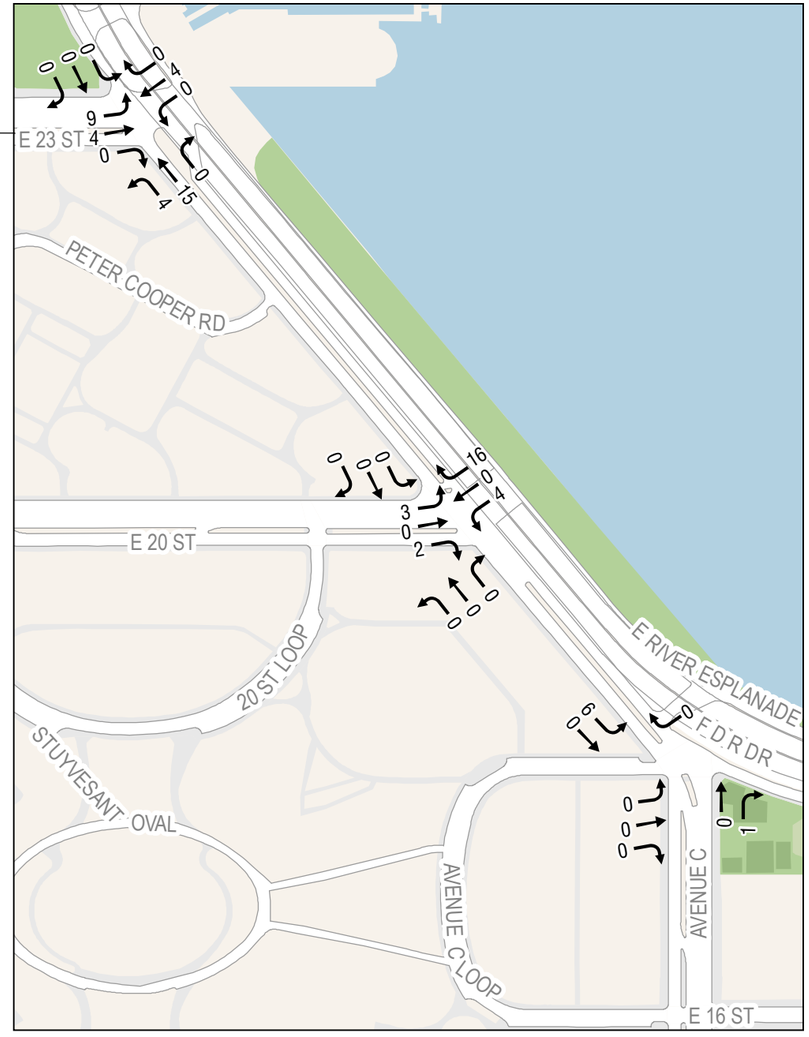
Figure 6.9-8a

3/21/2019









Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Preferred Alternative Total Construction PCE Trips: Project Area Two Study Area
3-4 PM Peak Hour

Figure 6.9-8b

Table 6.9-13
Traffic Level 2 Screening Analysis Results
Selected Analysis Locations – Preferred Alternative

Intersection	Weekday		Selected Analysis Locations
	6:00 AM–7:00 AM	3:00 AM–4:00 PM	
23rd Street and Third Avenue	46	12	
23rd Street and Second Avenue	**87**	14	✓
23rd Street and First Avenue	**74**	27	✓
23rd Street and Avenue C	**58**	36	✓
20th Street and Second Avenue	**53**	2	
20th Street and First Avenue	44	17	
20th Street and Avenue C	25	25	
18th Street and Avenue C	10	7	
14th Street and Second Avenue	46	2	
14th Street and First Avenue	44	4	
Houston Street and Chrystie Street/Second Avenue	32	10	
Houston Street and Allen Street/First Avenue	34	12	
Houston Street and Essex Street/ Avenue A	2	8	
Houston Street and Columbia Street/ Avenue D	8	7	
Houston Street and FDR Drive	**60**	7	
Delancey Street and Chrystie Street/Second Avenue	30	10	
Delancey Street and Allen Street/First Avenue	38	8	
Delancey Street and Clinton Street/Avenue B	26	6	
Grand Street and Chrystie Street/Second Avenue	26	4	
Grand Street and Allen Street/First Avenue	52	4	
Grand Street and Clinton Street/Avenue B	24	4	
Grand Street and Pitt Street/Montgomery Street	24	8	
Canal Street and Allen Street/First Avenue	50	4	
East Broadway and Allen Street/Pike Street	66	10	□
East Broadway and Montgomery Street	48	8	
Madison Street and Montgomery Street	48	14	
South Street and Allen Street/Pike Street	56	15	□
South Street and Montgomery Street	98	66	□

Notes: ✓ denotes intersections selected for the detailed traffic analysis. South Street and Montgomery Street were selected for analysis for both peak hours and the remaining locations were selected only for the 6:00–7:00 AM peak hour.

Traffic Assignment Assumptions

The construction vehicle trips were assigned to area intersections based on the most likely travel routes to and from the project area, prevailing travel patterns, commuter origin-destination (O–D) summaries from the census data, the configuration of the roadway network, and the expected locations of site access and egress. Construction workers are generally prohibited from parking their vehicles on-site during the construction period and would be accommodated by available on-street and off-street parking facilities within a ½-mile radius of the project area.

Construction Worker Autos

The assignments for construction workers were based on the 2006–2010 U.S. Census Bureau American Community Survey (ACS) RJTW origin-destination estimates (for Manhattan census tracts 2.01, 2.02, 10.01, 10.02, 12, 14.01, 20, 22.01, 22.02, 24, 26.01, 26.02, 28, 34, 44.01, 60, and 62). Many of the trips would originate from north of the project area, from Manhattan north of the project area (7 percent), from Queens (23 percent), from the Bronx (10 percent), from counties in upstate New York (10 percent), from Connecticut (1 percent), and from Long Island (11 percent). The remaining trips would originate from New Jersey (15 percent), Brooklyn (15 percent), Staten Island (5 percent), and within Manhattan west of the project area (3 percent). All

of the auto trips for Project Area One were assigned to the nearby available on-street parking spaces and all of the auto trips for Project Area Two were assigned to the available on-street parking spaces and off-street parking facilities available within a ½-mile radius of the East River. The majority of trips from north of the project area were expected to reach the sites via Harlem River crossings, the Queensboro Bridge, Queens-Midtown Tunnel, and subsequently along the FDR Drive or West Side Highway. Trips from Brooklyn and Staten Island are expected to use the Manhattan Bridge, Brooklyn Bridge, and Williamsburg Bridge and access the sites via the FDR Drive or the most direct local routes available. Trips originating in New Jersey were assigned through the Holland Tunnel or Lincoln Tunnel to the West Side Highway or the FDR Drive.

Deliveries

Truck delivery trips were assigned to NYCDOT-designated truck routes (see **Figure 6.9-9**). Trucks were assigned to the vehicular access/egress locations at Montgomery Street and East 23rd Street via the Holland Tunnel, Lincoln Tunnel, Williamsburg Bridge, Manhattan Bridge, Ninth Avenue, Tenth Avenue, Lexington Avenue, Third Avenue, Second Avenue, First Avenue, 23rd Street, 14th Street, the West Side Highway, Delancey Street, Allen Street, and South Street. They would remain on the designated truck routes as long as possible, until reaching the project area.

DETAILED TRAFFIC ANALYSIS

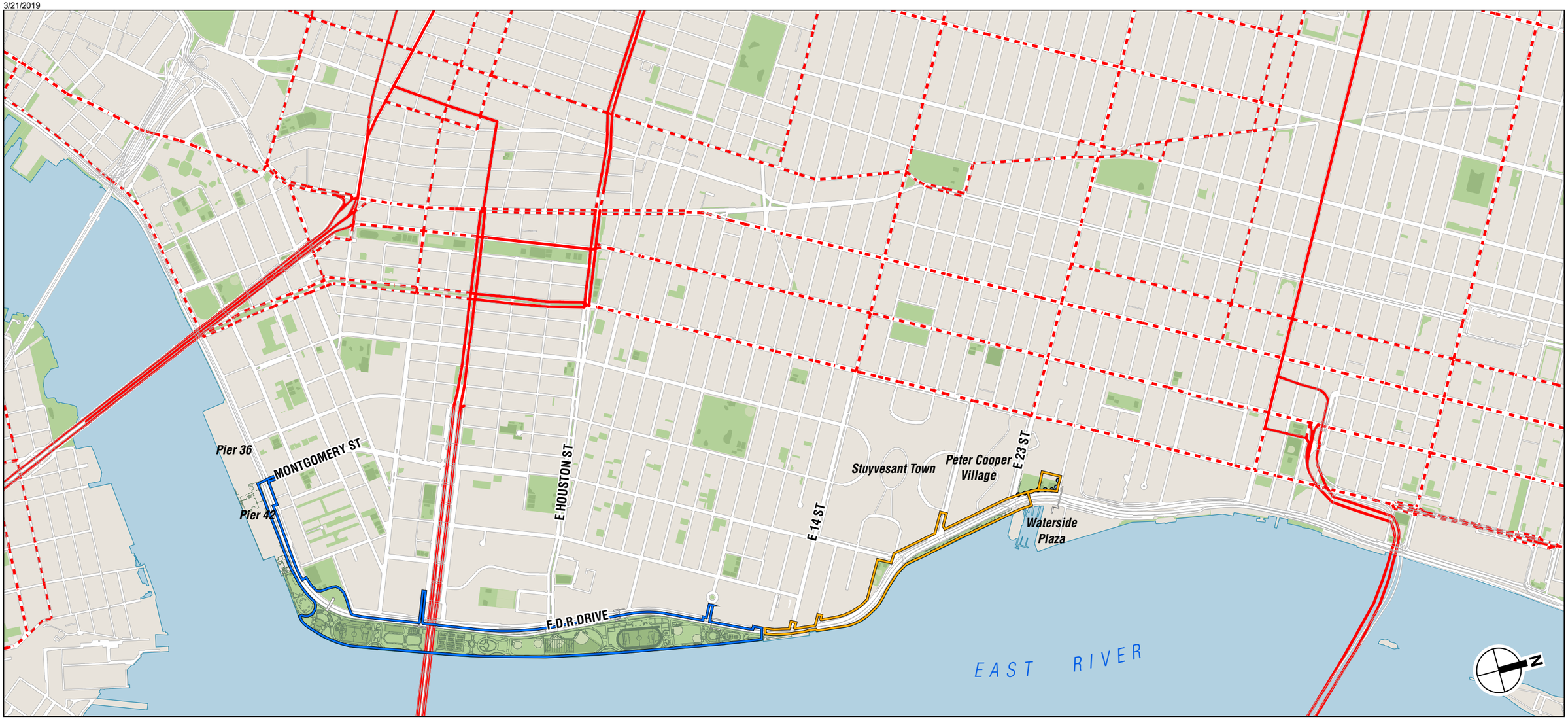
Overall, the proposed project would result in approximately 183 and 123 construction-related traffic increments between 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM, respectively. The incremental construction worker auto trips were assigned to the nearby available on-street parking spaces and off-street parking facilities available within a ½-mile radius of the East River. All delivery trips were assigned to the project area via NYCDOT designated truck routes. The incremental construction-related vehicle trips are shown in **Figures 6.9-10 and 6.9-11** for the weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours.

The Preferred Alternative's traffic volumes are shown in **Figures 6.9-12 and 6.9-13** for the weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours. The Preferred Alternative's traffic volumes were constructed by layering on top of the No Action Alternative traffic volumes the incremental vehicle trips shown in **Figures 6.9-10 and 6.9-11**. A summary of the Preferred Alternative's traffic analysis results is presented in **Table 6.9-14**.

Table 6.9-14
Summary of Preferred Alternative's Traffic Analysis Results

	Analysis Peak Hours	
Level of Service	**Weekday AM (6:00 AM to 7:00 AM)**	**Weekday PM (3:00 PM to 4:00 PM)**
Lane Groups at LOS A/B/C	21	3
Lane Groups at LOS D	6	1
Lane Groups at LOS E	2	0
Lane Groups at LOS F	2	0
Total	31	4
Lane Groups with v/c ≥ 0.90	2	1
Notes: LOS = Level-of-Service; v/c = volume-to-capacity ratio		

3/21/2019



Project Area One

Project Area Two

Alternative Flood Protection System Alignment

NYCDOT Truck Routes

Local

Through

0 1,000 FEET

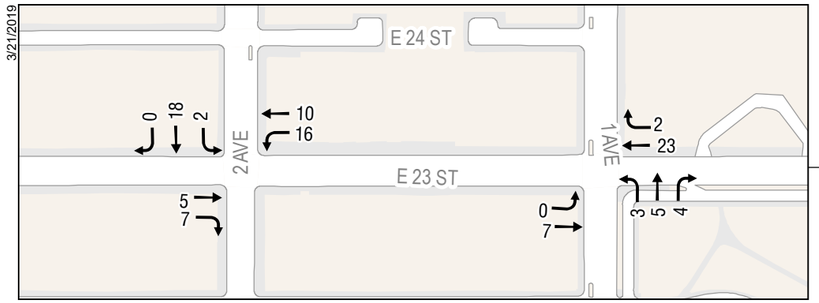
Capital Project SANDRESM1

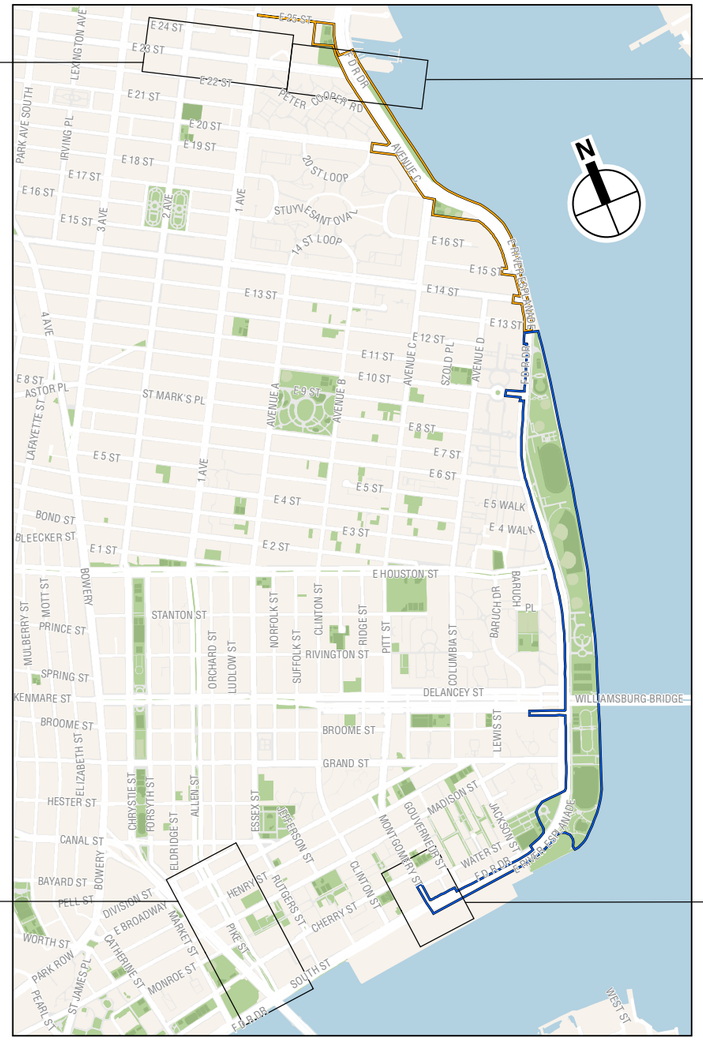
EAST SIDE COASTAL RESILIENCY PROJECT

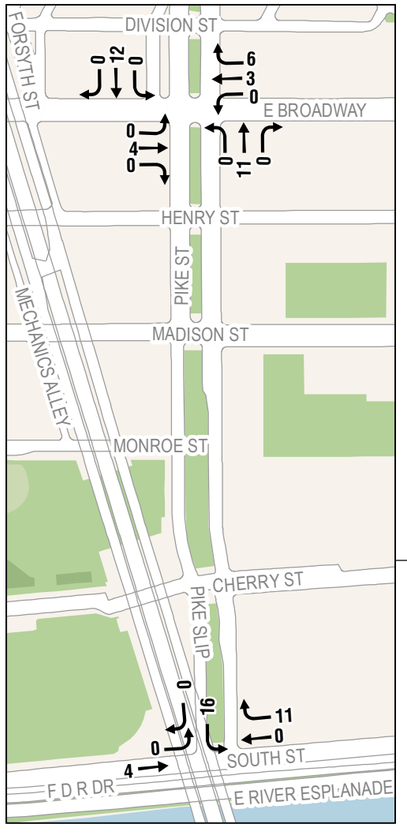
Truck Routes

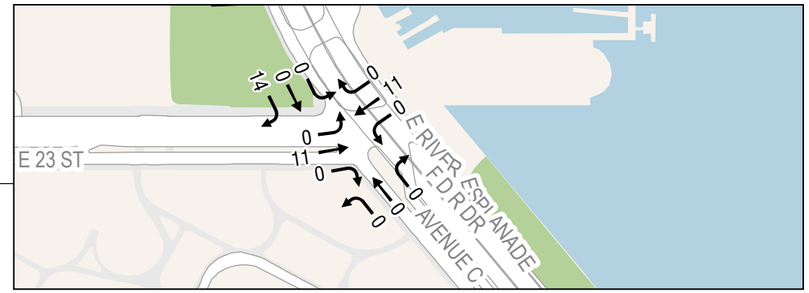
Figure 6.9-9

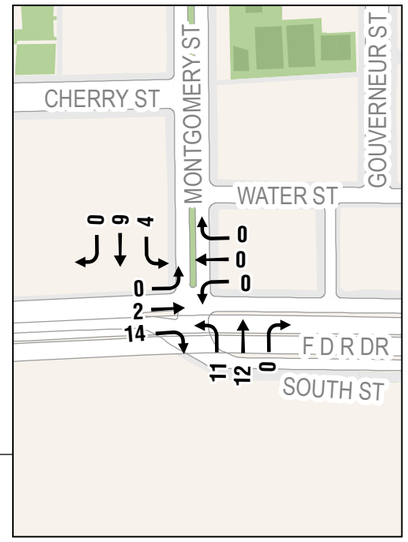
3/21/2019











0 2,000 FEET

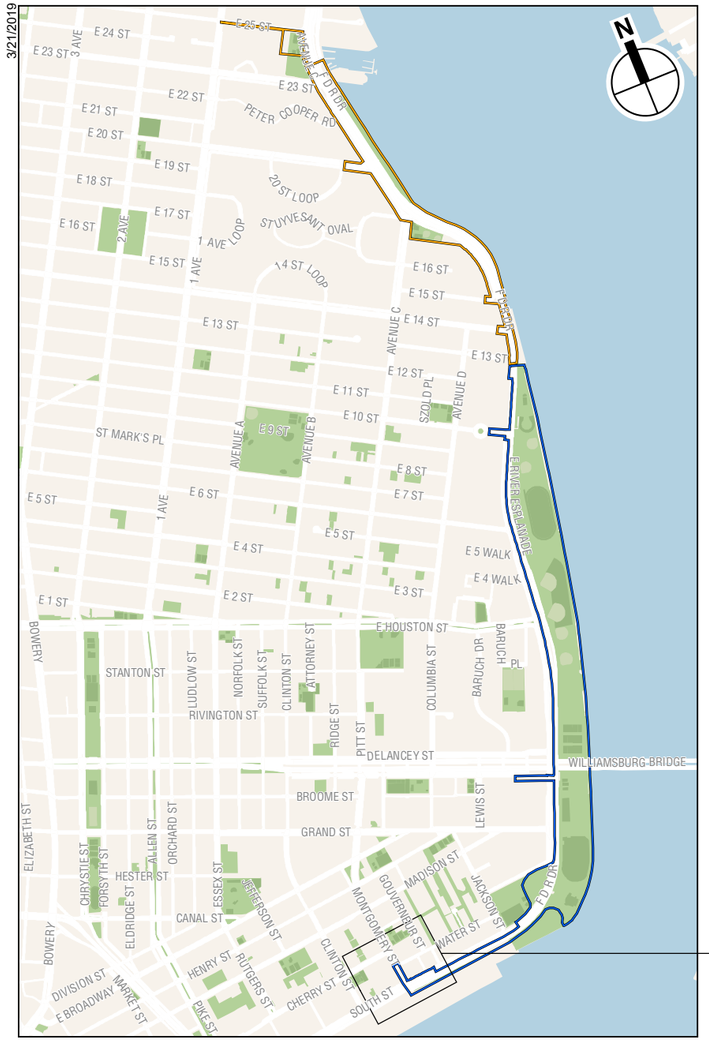
Project Area One

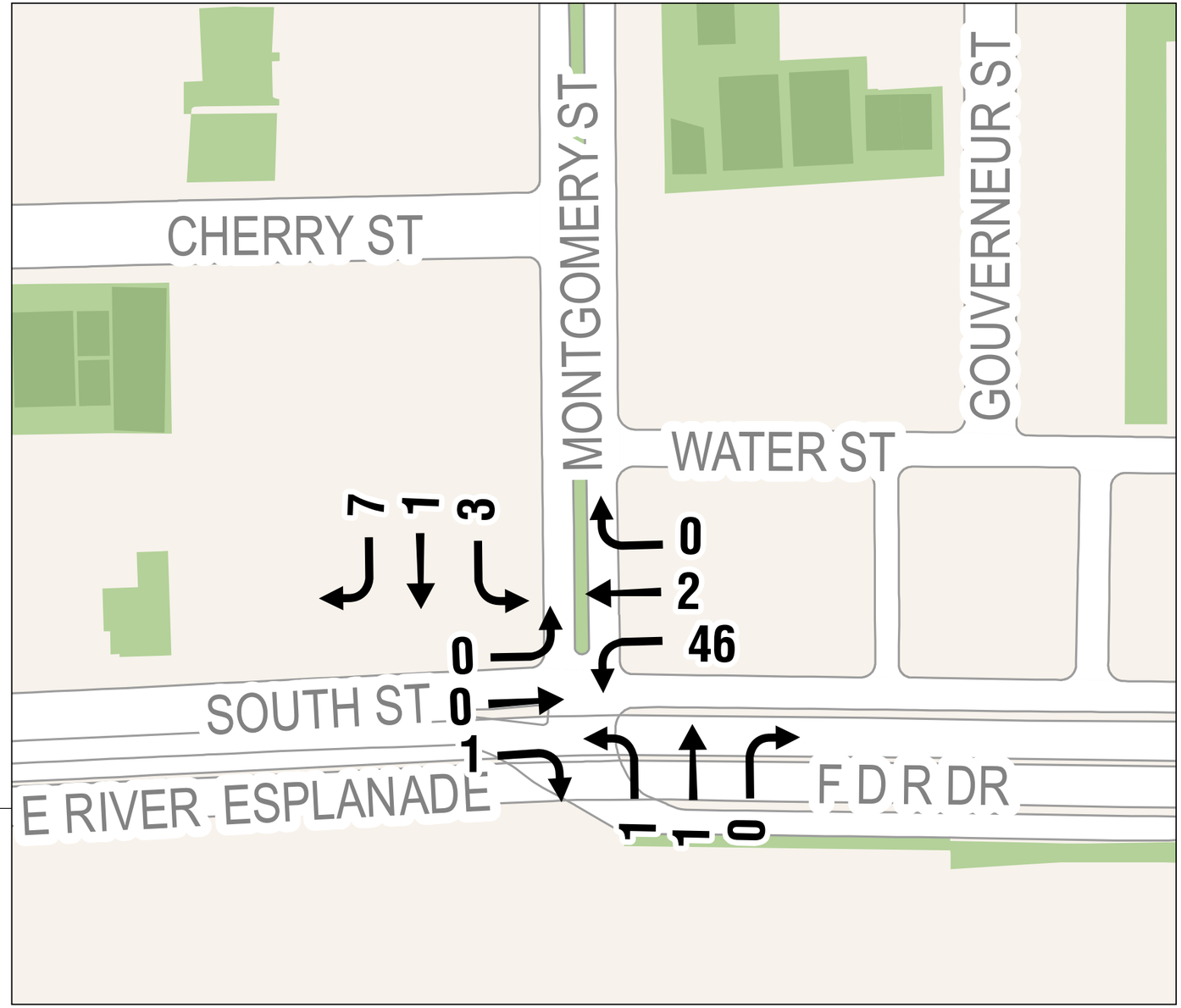
Project Area Two

NYC DDC Capital Project: SANDRESM1
EAST SIDE COASTAL RESILIENCY

Preferred Alternative Total Construction Traffic Increments
6-7 AM Peak Hour
Figure 6.9-10

3/21/2019





Project Area One

Project Area Two

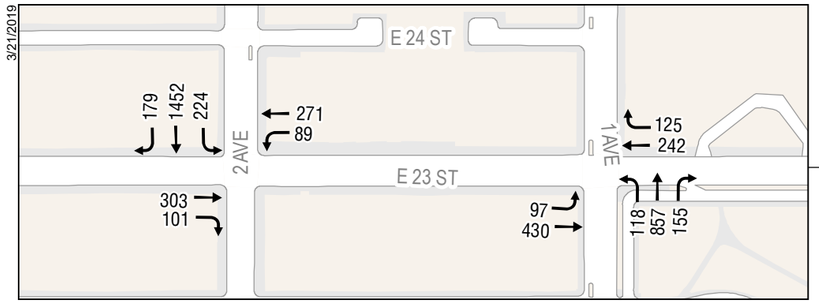
NYC DDC Capital Project: SANDRESM1

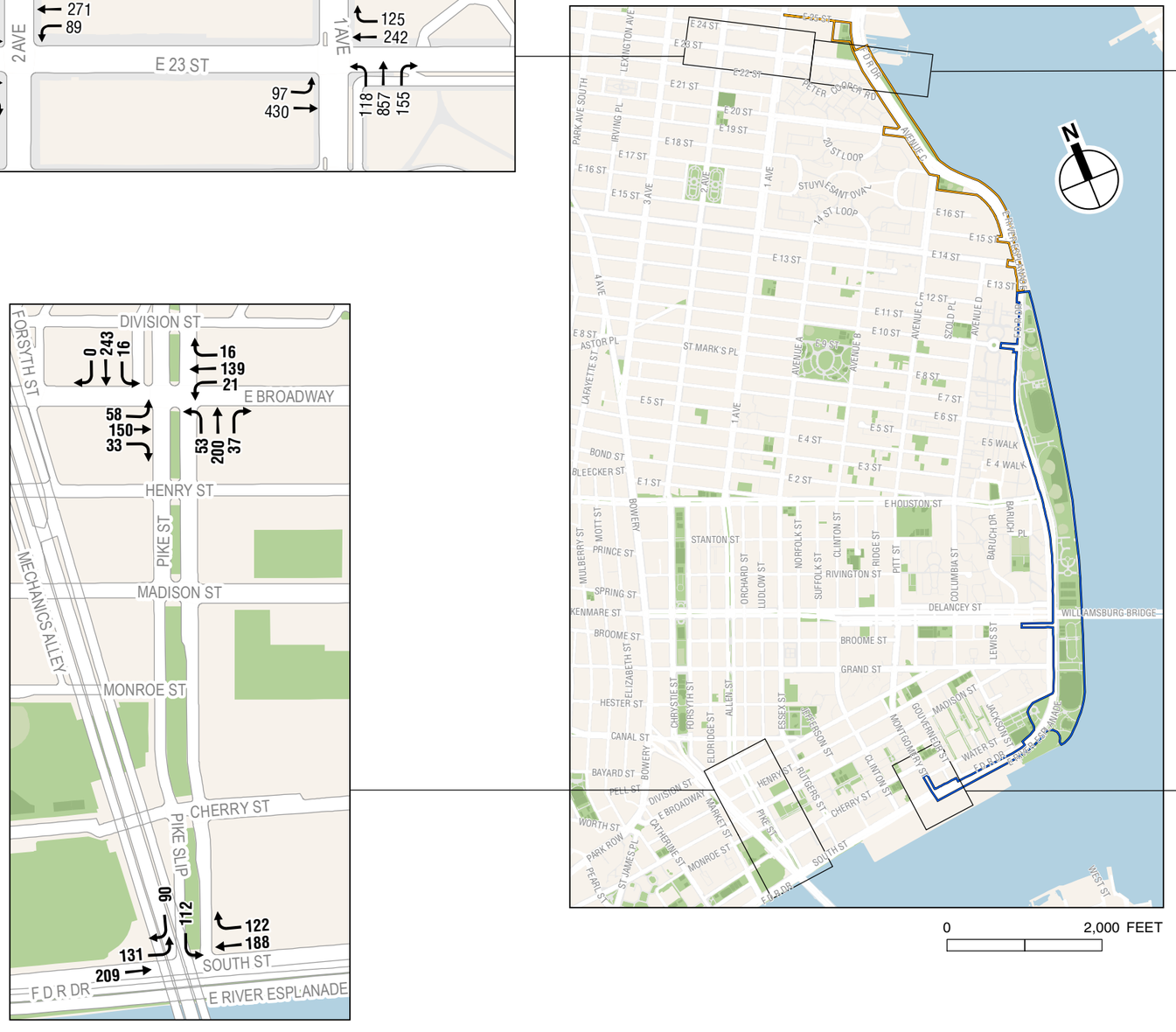
EAST SIDE COASTAL RESILIENCY

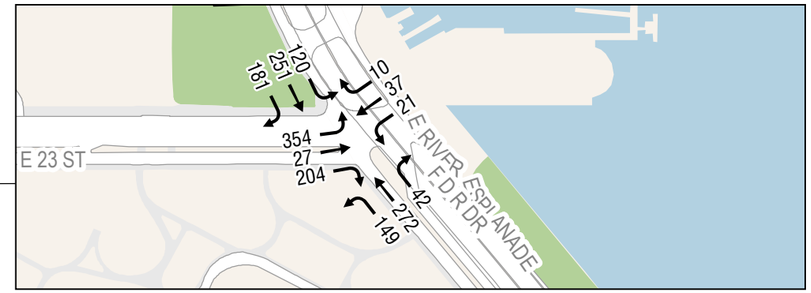
Preferred Alternative Total Construction Traffic Increments
3-4 PM Peak Hour

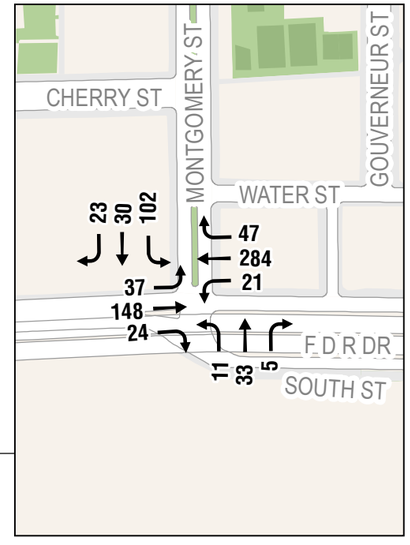
Figure 6.9-11

3/21/2019









Project Area One

Project Area Two

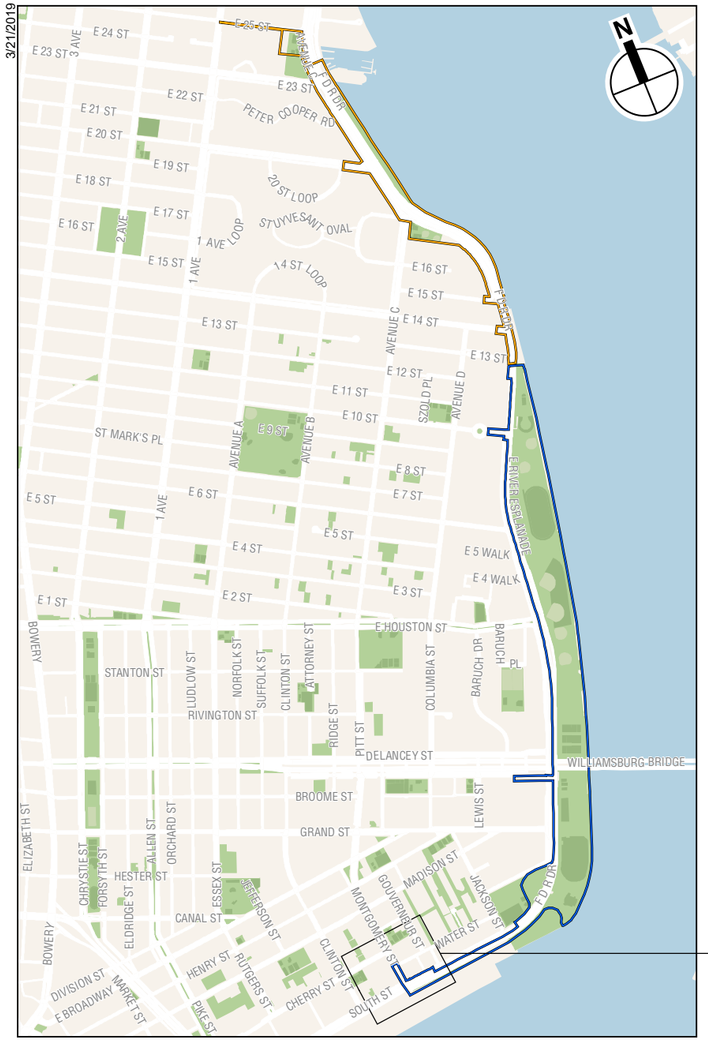
NYC DDC Capital Project: SANDRESM1

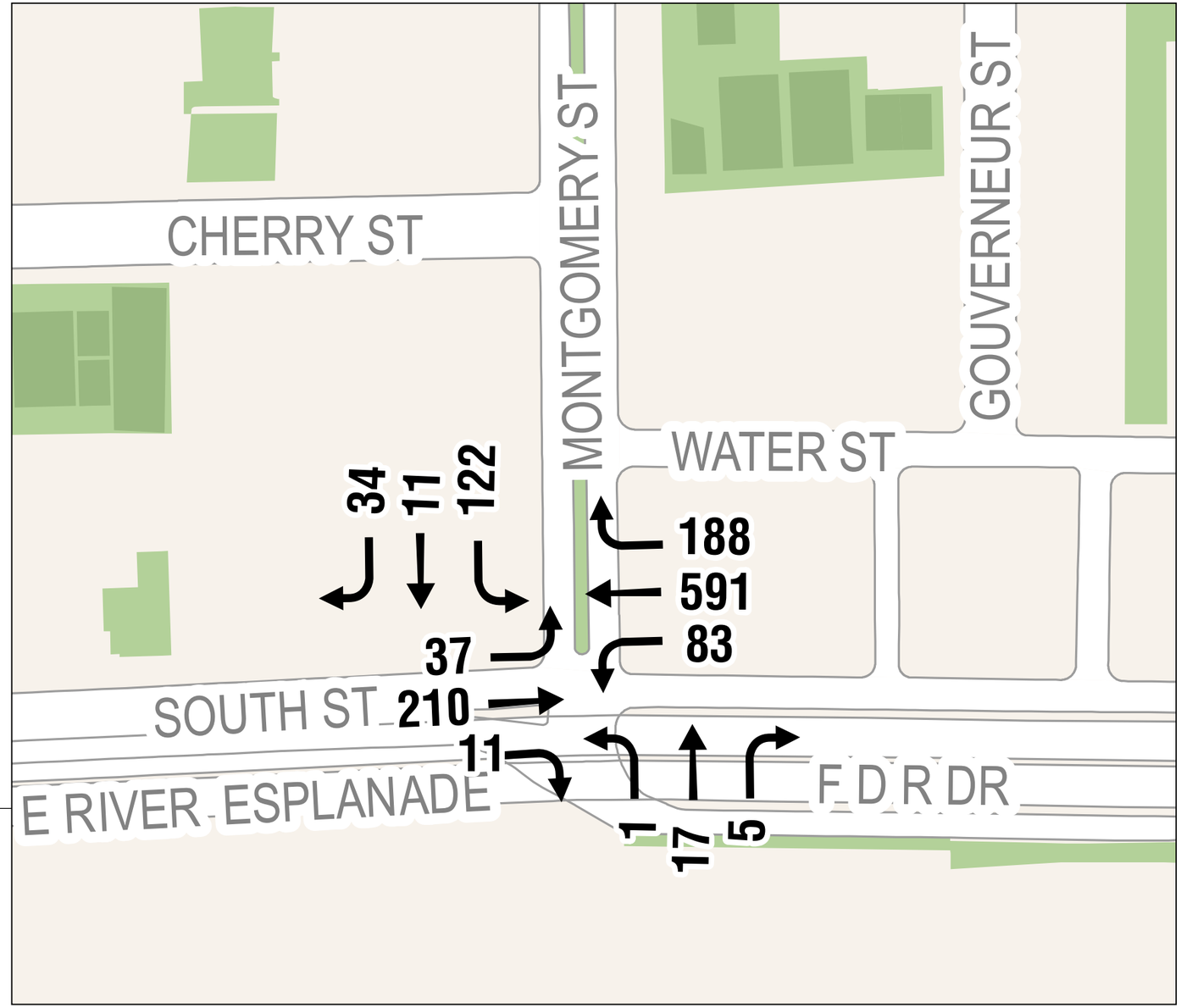
EAST SIDE COASTAL RESILIENCY

Preferred Alternative 2022 With Action Traffic Volumes
6-7 AM Peak Hour

Figure 6.9-12

3/21/2019





Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Preferred Alternative 2022 With Action Traffic Volumes
3-4 PM Peak Hour

Figure 6.9-13

Significant Adverse Effects

Details on LOS, v/c ratios, and average delays are presented in **Table 6.9-15**. Significant adverse traffic effects were identified at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the weekday 6:00 AM to 7:00 AM peak hour for the Preferred Alternative. Potential measures that can be implemented to mitigate these significant adverse traffic effects are discussed in Section F below. In addition, with the full reconstruction of East River Park, this alternative is likely to involve barging of fill materials to East River Park, thereby reducing the volume of truck trips from what would otherwise be needed to reconstruct and raise the park.

- Westbound right-turn at the East 23rd Street and First Avenue intersection would deteriorate within LOS F (from a v/c ratio of 0.93 and 90.8 spv of delay to a v/c ratio of 0.95 and 97.2 spv of delay), an increase of more than three seconds, during the weekday AM peak hour. This projected increase in delay constitutes a significant adverse effect.
- Southbound approach at the East 23rd Street and Avenue C intersection would deteriorate from LOS E (v/c ratio of 1.02 and 77.5 spv of delay) to LOS F (v/c ratio of 1.05 and 86.0 spv of delay), an increase of more than four seconds, during the weekday AM peak hour. This projected increase in delay constitutes a significant adverse effect.

Table 6.9-15
No Action and the Preferred Alternative's Level of Service Analysis

Intersection	AM Peak Hour (6:00 AM to 7:00 AM)								PM Peak Hour (3:00 PM to 4:00 PM)							
	No Action				Preferred Alternative				No Action				Preferred Alternative			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and Second Avenue																
EB	TR	0.66	32.3	C	TR	0.68	33.2	C	Analysis not warranted during PM peak hour.							
WB	LT	0.72	36.3	D	LT	0.83	44.2	D								
SB	L	0.75	47.5	D	L	0.75	47.9	D								
	TR	0.60	12.6	B	TR	0.60	12.7	B								
	Intersection		22.0	C	Intersection		23.6	C								
East 23rd Street and First Avenue																
EB	L	0.64	55.8	E	L	0.64	55.8	E	Analysis not warranted during PM peak hour.							
	T	0.36	16.2	B	T	0.36	16.2	B								
WB	T	0.34	26.4	C	T	0.37	26.9	C								
	R	0.93	90.8	F	R	0.95	97.2	F+								
NB	L	0.80	71.4	E	L	0.82	74.9	E								
	TR	0.70	28.0	C	TR	0.70	28.2	C								
	Intersection		33.3	C	Intersection		33.8	C								
East 23rd Street and Avenue C																
EB (Mainline)	LTR	0.88	47.1	D	LTR	0.89	49.1	D	Analysis not warranted during PM peak hour.							
WB	LTR	0.08	14.1	B	LTR	0.10	14.2	B								
NB	LTR	0.43	18.9	B	LTR	0.43	18.9	B								
SB	LTR	1.02	77.5	E	LTR	1.05	86.0	F+								
EB (Service Road)	R	0.23	38.0	D	R	0.23	38.0	D								
	Intersection		47.8	D	Intersection		51.3	D								
East Broadway and Allen Street/Pike Street																
EB	LT	0.54	29.7	C	LT	0.55	29.9	C	Analysis not warranted during PM peak hour.							
	R	0.11	21.5	C	R	0.11	21.5	C								
WB	LTR	0.50	28.7	C	LTR	0.53	29.7	C								
NB	L	0.42	46.3	D	L	0.42	46.3	D								
	TR	0.26	18.2	B	TR	0.27	18.3	B								
SB	L	0.19	41.9	D	L	0.19	41.9	D								
	T	0.29	19.7	B	T	0.30	19.9	B								
	Intersection		25.0	C	Intersection		25.2	C								
South Street and Allen Street/Pike Street																
EB	L	0.32	11.1	B	L	0.32	11.2	B	Analysis not warranted during PM peak hour.							
	T	0.37	21.3	C	T	0.38	21.4	C								
WB	TR	0.57	25.8	C	TR	0.59	26.4	C								
SB	L	0.33	32.9	C	L	0.38	34.0	C								
	R	0.33	33.0	C	R	0.33	33.0	C								
	Intersection		23.6	C	Intersection		24.2	C								
South Street and Montgomery Street																
EB	LTR	0.19	10.9	B	LTR	0.22	11.1	B	LTR	0.27	11.6	B	LTR	0.28	11.6	B
WB	LTR	0.35	12.4	B	LTR	0.35	12.4	B	LTR	0.89	28.9	C	LTR	0.94	35.4	D
NB	LTR	0.06	20.0	B	LTR	0.10	20.6	C	LTR	0.04	19.8	B	LTR	0.05	19.8	B
SB	LTR	0.31	23.4	C	LTR	0.35	23.9	C	LTR	0.37	24.5	C	LTR	0.40	25.2	C
	Intersection		14.8	B	Intersection		15.5	B	Intersection		24.6	C	Intersection		29.3	C

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection
+ Denotes a significant adverse traffic effect.

PARKING

An inventory of on- and off-street parking within a ¼-mile radius of the project area was conducted in June 2015. The on-street survey involved recording curbside regulations and performing general observations of daytime utilization. The off-street survey provided an inventory of the area's public parking facilities and their legal capacities and daytime utilization.

In terms of on-street parking, there are approximately 70 available on-street parking spaces available near Project Area One and 30 on-street parking spaces available near Project Area Two.

There are a total of 9 public parking facilities within ¼-mile of the project area (1 in Project Area One and 8 in Project Area Two). The combined capacity of these facilities is 400 parking spaces in Project Area One and 3,652 parking spaces in Project Area Two for a total of 4,052 parking spaces. Overall, the facilities were approximately 85 percent utilized and 75 percent utilized, with 60 and 915 off-street parking spaces available within Project Area One and Project Area Two, respectively.

As shown in **Tables 6.9-16 and 6.9-17**, the peak number of workers during the construction of the proposed project would be approximately 250 per day for Project Area One and 140 per day for Project Area Two. Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is expected that 48 percent of construction workers commute to the project area by private autos at an average occupancy of approximately 1.30 persons per vehicle.

The expected construction activities are therefore projected to generate a maximum parking demand of 92 spaces for Project Area One and 52 spaces for Project Area Two. The parking demand for Project Area Two could be fully accommodated by the available on-street parking spaces and off-street parking facilities within a ¼-mile. The Project Area One demand would not be fully accommodated within ¼-mile and could result in a parking shortfall of up to approximately 35 spaces. It is expected that excess parking demand within Project Area One would need to be accommodated by on-street parking or off-street parking beyond a ¼-mile walk from the project area. Alternatively, motorists could choose other modes of transportation. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, construction of the Preferred Alternative would not result in any significant adverse parking effects.

TRANSIT

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is expected that approximately 46 percent of construction workers would commute to the project area via transit. The study area is well served by mass transit, including 6 subway lines (No. 6, and F, J, M, Z, and L) and numerous local and express bus routes. During the peak-construction worker shift (a maximum of 250 average daily construction workers for Project Area One and a maximum of 140 average daily construction workers in Project Area Two, as shown in **Tables 6.9-7 and 6.9-8**), this would correspond to approximately 115 and 64 workers traveling by transit for Project Area One and Project Area Two, respectively. With 80 percent of these workers arriving or departing during the construction peak hours, the estimated number of peak-hour transit trips would be 92 and 52 for Project Area One and Project Area Two, respectively. Since these incremental construction transit trips are well below the *CEQR Technical Manual* 200-transit-trip analysis threshold, no further quantified analysis is warranted. Therefore, construction of the proposed project under the Preferred Alternative would not result in any significant adverse transit effects.

PEDESTRIANS

As summarized above, up to 250 average daily construction workers for Project Area One and 140 average daily construction workers for Project Area Two are projected during peak construction for the proposed project. With 80 percent of these workers arriving or departing during the construction peak hours (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM), the corresponding numbers of peak-hour pedestrian trips traversing the area's sidewalks, corners,

and crosswalks would be approximately 200 and 112 for Project Area One and Project Area Two, respectively. Given the number of available pedestrian routes to/from area parking facilities and transit services and the various access/egress points to the project area, no pedestrian element is expected to experience 200 or more pedestrian trips during an hour, the *CEQR Technical Manual* analysis threshold. Therefore, construction of the proposed project under the Preferred Alternative would not result in any significant adverse pedestrian effects.

However, because pedestrian and bicyclist circulation through East River Park and Stuyvesant Cove Park would be temporarily closed throughout the construction period, it is concluded that construction under the Preferred Alternative would result in temporary significant adverse effects for users of the East River bikeway/walkway. A preliminary rerouting plan would be developed by NYCDOT for implementation during construction of the Preferred Alternative.

SHARED-USE FLYOVER BRIDGE

As currently contemplated, the proposed flyover bridge would be a steel thru-truss superstructure supported on footings placed adjacent to the eastern edge of the northbound FDR Drive lanes, within the limits of the existing East River Bikeway. The proposed flyover bridge would be cantilevered over the northbound FDR Drive. The thru truss bridge would be approximately 1,000 feet long and 15 feet wide and approximately 19 feet tall from the surface of the bridge deck to the top of the truss. The bridge would have a 16-foot minimum clearance above the elevated roadway between East 13th and East 15th Streets adjacent to the Con Edison pier. The total height of the flyover bridge would be approximately 40 feet above grade. The flyover bridge would slope down to connect to East River Park on the south and to Captain Patrick J. Brown Walk around East 16th Street on the north. As discussed in Chapter 6.0, "Construction Overview," construction of the flyover bridge would require drilled shafts and the placement of concrete to provide foundation for the structure, installation of piers, and the installation of the prefabricated bridge span. This work would require cranes, excavators, and loaders. Construction associated with the shared-use flyover bridge would require work near the FDR Drive that would necessitate temporary FDR Drive closures, which could only occur at nighttime as currently permitted by NYCDOT. Since all FDR Drive lane closures during construction of the flyover bridge would be temporary in nature and conform to the lane closure schedule currently permitted by NYCDOT's OCMC during off-peak hours, no significant adverse effects on transportation systems are anticipated.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

The Flood Protection System on the West Side of East River Park Baseline Alternative (Alternative 2) would provide flood protection in Project Areas One and Two using a combination of floodwalls, levees, and closure structures (i.e., deployable gates) from Montgomery Street to East 25th Street.

The flood protection alignment proposed in Alternative 2 would require that the majority of flood protection construction in Project Area One be performed during night-time single-lane closures of the FDR Drive, thus the flood protection system and associated components under this alternative are assumed to be constructed in 5 years and completed in 2025.

Alternative 2, which is expected to yield comparable construction activities as the Preferred Alternative, would have the potential to result in significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the

6:00 to 7:00 AM construction peak hour. However, these significant adverse effects could be fully mitigated with the implementation of signal timing changes. This alternative would not have any significant adverse transit, pedestrian, or parking effects.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Alternative 3 provides flood protection using a combination of floodwalls, levees, and closures structures in Project Areas One and Two. In addition, the existing pedestrian bridges and bridge landings at Delancey and East 10th Streets would be completely reconstructed to provide American Disability Act (ADA)-compliant access, and a new raised and landscaped park-side plaza landing would be created at the entrance to the park from the East Houston Street overpass. In Project Area Two, the flood protection alignment would be similar to that proposed in the Preferred Alternative 2.

As proposed in the Preferred Alternative, this alternative would include the shared-use flyover bridge to address the Con Edison pinch point. Similarly, the north and south interceptor gates would also be included in this alternative.

Construction of the flood protection system alignment along the FDR Drive is anticipated to be the critical path component and assumes a 5-year construction duration to be completed in 2025.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 6.9-16 shows the estimated average daily numbers of workers and deliveries to Project Area One by calendar quarter for the duration of the construction period for the proposed project under Alternative 3. The average number of workers throughout the entire period would be approximately 114 per day and the peak number of workers would reach 150 per day during the peak construction period from the third quarter of 2020 to the first quarter of 2023 and from the fourth quarter of 2022 to the first quarter of 2023. The average number of trucks throughout the entire construction period would be 53 per day, and the peak would occur from the fourth quarter of 2022 to the first quarter of 2023, with 73 trucks per day.

Table 6.9-16
Average Number of Daily Workers and Trucks by Year and Quarter
Project Area One – Alternative 3

Year	2020				2021				2022				2023			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers/Worker Autos	-	100/37	**150/55**	**150/55**	**150/55**	**150/55**	**150/55**	**150/55**	**150/55**	125/46	125/46	**150/55**	**150/55**	125/46	75/28	75/28
Trucks	-	43	65	65	65	65	65	65	65	55	61	**73**	**73**	61	37	37

Year	2024				2025				Average	Peak
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
Workers/Worker Autos	75/28	75/28	75/28	75/28	75/28	50/18	-	-	114/42	150/55
Trucks	37	37	37	37	37	25	-	-	53	73

Source: AKRF/KSE Joint Venture (JV), February 2018

Table 6.9-17 shows the estimated average daily numbers of workers and deliveries to Project Area Two by calendar quarter for the duration of the construction period for the proposed project under Alternative 3. The average number of workers throughout the entire period would be approximately 55 per day and the peak number of workers would reach 85 per day in the second quarter of 2023. The average number of trucks throughout the entire construction period would be 4 per day, and the peak would occur from the third quarter of 2021 to the second quarter of 2023, with 7 trucks per day.

Table 6.9-17
Average Number of Daily Workers and Trucks by Year and Quarter
Project Area Two – Alternative 3

Year	2020				2021				2022				2023			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers/Worker Autos	-	20/7	30/11	30/11	30/11	30/11	75/28	75/28	75/28	75/28	75/28	75/28	75/28	**85/31**	75/28	75/28
Trucks	-	1	2	2	2	2	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	6	6

Year	2024				2025				Average	Peak
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th		
Workers/Worker Autos	75/28	60/22	30/11	30/11	30/11	20/7	-	-	55/20	85/31
Trucks	6	4	4	4	4	4	-	-	4	7

Source: AKRF/KSE Joint Venture (JV), February 2018

TRANSPORTATION SCREENING ASSESSMENT

Level 1 Screening Analysis

Table 6.9-18 presents the hourly-trip projections for the peak construction quarter (first quarter of 2023) for Project Area One when activities are anticipated to occur at Segments 1 and 2. As shown, the maximum construction-related traffic increments would be approximately 120 PCEs between 6:00 AM and 7:00 AM and 60 PCEs between 3:00 PM and 4:00 PM. **Table 6.9-19** presents the hourly-trip projections for the peak construction quarter (second quarter of 2023) for Project Area Two when activities are anticipated to occur at Segments 4 and 5. As shown, the maximum construction-related traffic increments would be approximately 33 PCEs between 6:00 AM and 7:00 AM and 25 PCEs between 3:00 PM and 4:00 PM.

Table 6.9-18
Peak Construction Vehicle Trip Projections
Project Area One – Alternative 3

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	**44**	**0**	**44**	**19**	**19**	**38**	**63**	**19**	**82**	**82**	**38**	**120**
7 AM–8 AM	11	0	11	7	7	14	18	7	25	25	14	39
8 AM–9 AM	0	0	0	7	7	14	7	7	14	14	14	28
9 AM–10 AM	0	0	0	7	7	14	7	7	14	14	14	28
10 AM–11 AM	0	0	0	7	7	14	7	7	14	14	14	28
11 AM–12 PM	0	0	0	7	7	14	7	7	14	14	14	28
12 PM–1 PM	0	0	0	7	7	14	7	7	14	14	14	28
1 PM–2 PM	0	0	0	4	4	8	4	4	8	8	8	16
2 PM–3 PM	0	4	4	4	4	8	4	8	12	8	12	20
3 PM–4 PM	0	44	44	4	4	8	4	48	52	8	52	60
4 PM–5 PM	0	7	7	0	0	0	0	7	7	0	7	7
10 PM–11 PM	18	0	18	3	3	6	21	3	24	24	6	30
11 PM–12 AM	4	0	4	1	1	2	5	1	6	6	2	8
12 AM–1 AM	0	0	0	1	1	2	1	1	2	2	2	4
1 AM–2 AM	0	0	0	1	1	2	1	1	2	2	2	4
2 AM–3 AM	0	0	0	1	1	2	1	1	2	2	2	4
3 AM–4 AM	0	1	1	1	1	2	1	2	3	2	3	5
4 AM–5 AM	0	18	18	1	1	2	1	19	20	2	20	22
5 AM–6 AM	0	3	3	0	0	0	0	3	3	0	3	3
Daily Total	77	77	154	82	82	164	159	159	318	241	241	482

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

Table 6.9-19
Peak Construction Vehicle Trip Projections
Project Area Two – Alternative 3

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	25	0	25	2	2	4	27	2	29	29	4	33
7 AM–8 AM	6	0	6	1	1	2	7	1	8	8	2	10
8 AM–9 AM	0	0	0	1	1	2	1	1	2	2	2	4
9 AM–10 AM	0	0	0	1	1	2	1	1	2	2	2	4
10 AM–11 AM	0	0	0	1	1	2	1	1	2	2	2	4
11 AM–12 PM	0	0	0	1	1	2	1	1	2	2	2	4
12 PM–1 PM	0	0	0	0	0	0	0	0	0	0	0	0
1 PM–2 PM	0	0	0	0	0	0	0	0	0	0	0	0
2 PM–3 PM	0	2	2	0	0	0	0	2	2	0	2	2
3 PM–4 PM	0	25	25	0	0	0	0	25	25	0	25	25
4 PM–5 PM	0	4	4	0	0	0	0	4	4	0	4	4
10 PM–11 PM	10	0	10	1	1	2	11	1	12	12	2	14
11 PM–12 AM	3	0	3	1	1	2	4	1	5	5	2	7
12 AM–1 AM	0	0	0	0	0	0	0	0	0	0	0	0
1 AM–2 AM	0	0	0	0	0	0	0	0	0	0	0	0
2 AM–3 AM	0	0	0	0	0	0	0	0	0	0	0	0
3 AM–4 AM	0	1	1	0	0	0	0	1	1	0	1	1
4 AM–5 AM	0	10	10	0	0	0	0	10	10	0	10	10
5 AM–6 AM	0	2	2	0	0	0	0	2	2	0	2	2
Daily Total	44	44	88	9	9	18	53	53	106	62	62	124

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

The cumulative construction trips in PCEs for Project Areas One and Two are presented in **Table 6.9-20**. The peak quarter construction-related traffic increments would be approximately 153 PCEs between 6:00 AM and 7:00 AM and 85 PCEs between 3:00 PM and 4:00 PM. Since the incremental construction PCEs exceed the *CEQR Technical Manual* 50 vehicle-trip analysis threshold during these peak hours, a Level 2 screening assessment was conducted to determine the need for additional quantified traffic analyses, as discussed below.

Table 6.9-20
Total Peak Construction Vehicle Trip Projections—Alternative 3

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	**69**	**0**	**69**	**21**	**21**	**42**	**90**	**21**	**111**	**111**	**42**	**153**
7 AM–8 AM	17	0	17	8	8	16	25	8	33	33	16	49
8 AM–9 AM	0	0	0	8	8	16	8	8	16	16	16	32
9 AM–10 AM	0	0	0	8	8	16	8	8	16	16	16	32
10 AM–11 AM	0	0	0	8	8	16	8	8	16	16	16	32
11 AM–12 PM	0	0	0	8	8	16	8	8	16	16	16	32
12 PM–1 PM	0	0	0	7	7	14	7	7	14	14	14	28
1 PM–2 PM	0	0	0	4	4	8	4	4	8	8	8	16
2 PM–3 PM	0	6	6	4	4	8	4	10	14	8	14	22
3 PM–4 PM	0	69	69	4	4	8	4	73	77	8	77	85
4 PM–5 PM	0	11	11	0	0	0	0	11	11	0	11	11
10 PM–11 PM	28	0	28	4	4	8	32	4	36	36	8	44
11 PM–12 AM	7	0	7	2	2	4	9	2	11	11	4	15
12 AM–1 AM	0	0	0	1	1	2	1	1	2	2	2	4
1 AM–2 AM	0	0	0	1	1	2	1	1	2	2	2	4
2 AM–3 AM	0	0	0	1	1	2	1	1	2	2	2	4
3 AM–4 AM	0	2	2	1	1	2	1	3	4	2	4	6
4 AM–5 AM	0	28	28	1	1	2	1	29	30	2	30	32
5 AM–6 AM	0	5	5	0	0	0	0	5	5	0	5	5
Daily Total	121	121	242	91	91	182	212	212	424	303	303	606

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

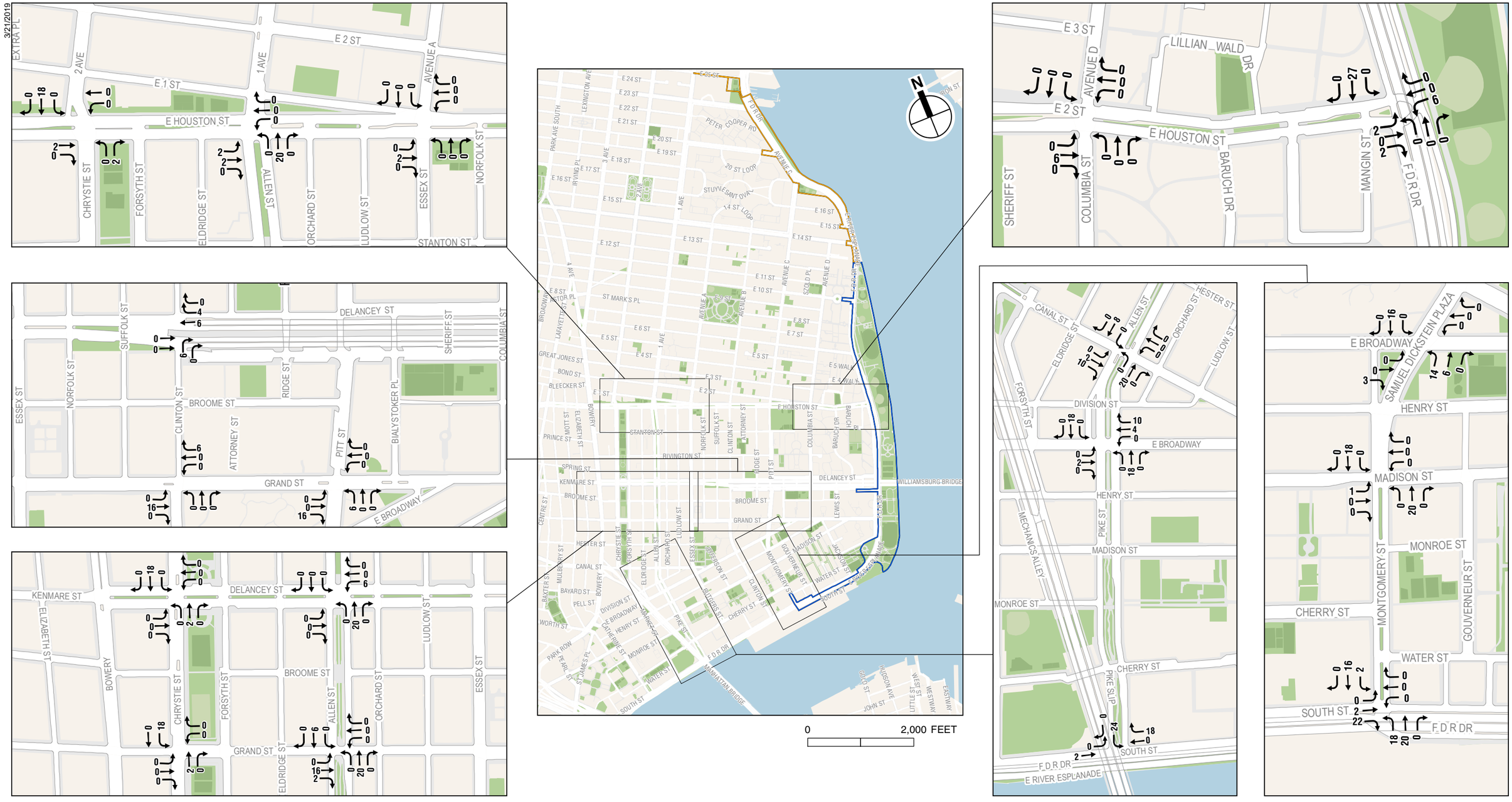
LEVEL 2 SCREENING ANALYSIS

As shown in **Table 6.9-20**, incremental construction trips in PCEs would exceed the *CEQR* Level-1 screening threshold during the 6:00 AM to 7:00 AM peak hour. Therefore, a Level 2 screening analysis for traffic was prepared and is presented below.

Summary

According to the *CEQR Technical Manual*, intersections expected to incur 50 or more incremental construction trips in PCEs may have to be assessed in a quantified traffic analysis to identify the potential for significant adverse traffic effects. The assignments of the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hour incremental construction trips in PCEs described above are shown in **Figures 6.9-14a and 6.9-14b, Figures 6.9-15a and 6.9-15b**, and **Table 6.9-21**. As presented in **Table 6.9-21**, only two intersections for the 6:00 AM to 7:00 AM peak hour (East Broadway and Allen Street/Pike Street and South Street and Montgomery Street) and one intersection for the 3:00 PM to 4:00 PM peak hour (South Street and Montgomery Street) would exceed the analysis threshold of 50 PCEs. However, in order to present analysis encompassing roadways within both Project Areas, six intersections for the 6:00 AM to 7:00

3/21/2019



Project Area One

Project Area Two

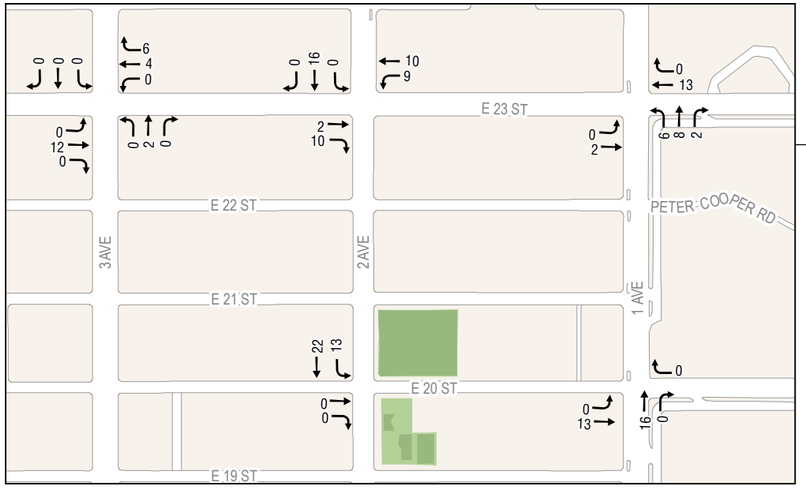
NYC DDC Capital Project: SANDRESM1

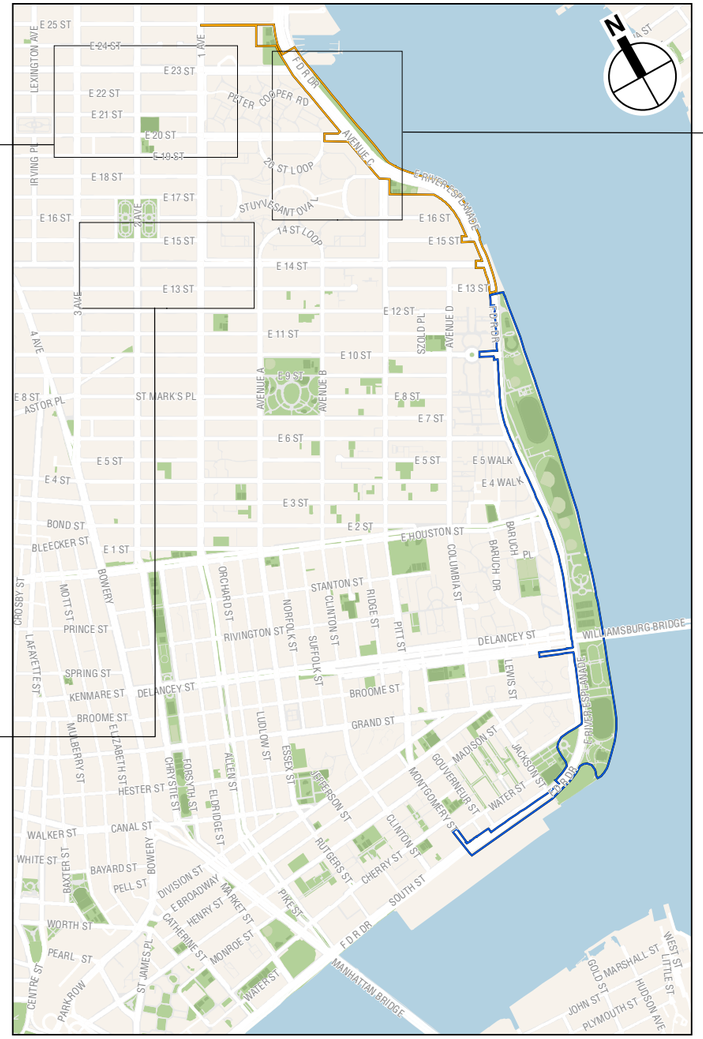
EAST SIDE COASTAL RESILIENCY

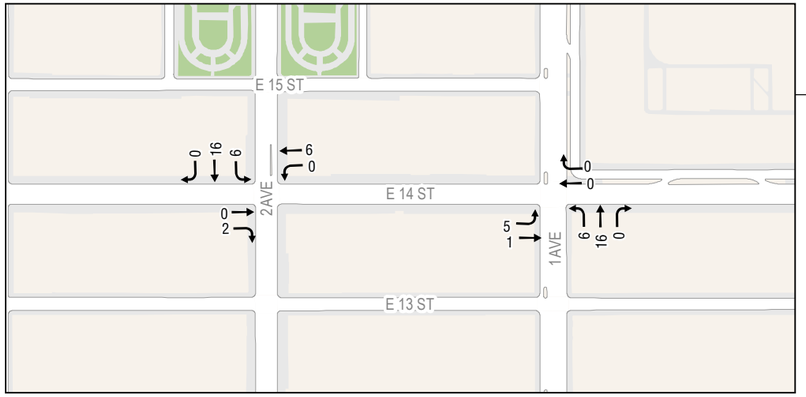
Alternative 3 Total Construction PCE Trips: Project Area One Study Area
6-7 AM Peak Hour

Figure 6.9-14a

3/21/2019







Project Area One

Project Area Two

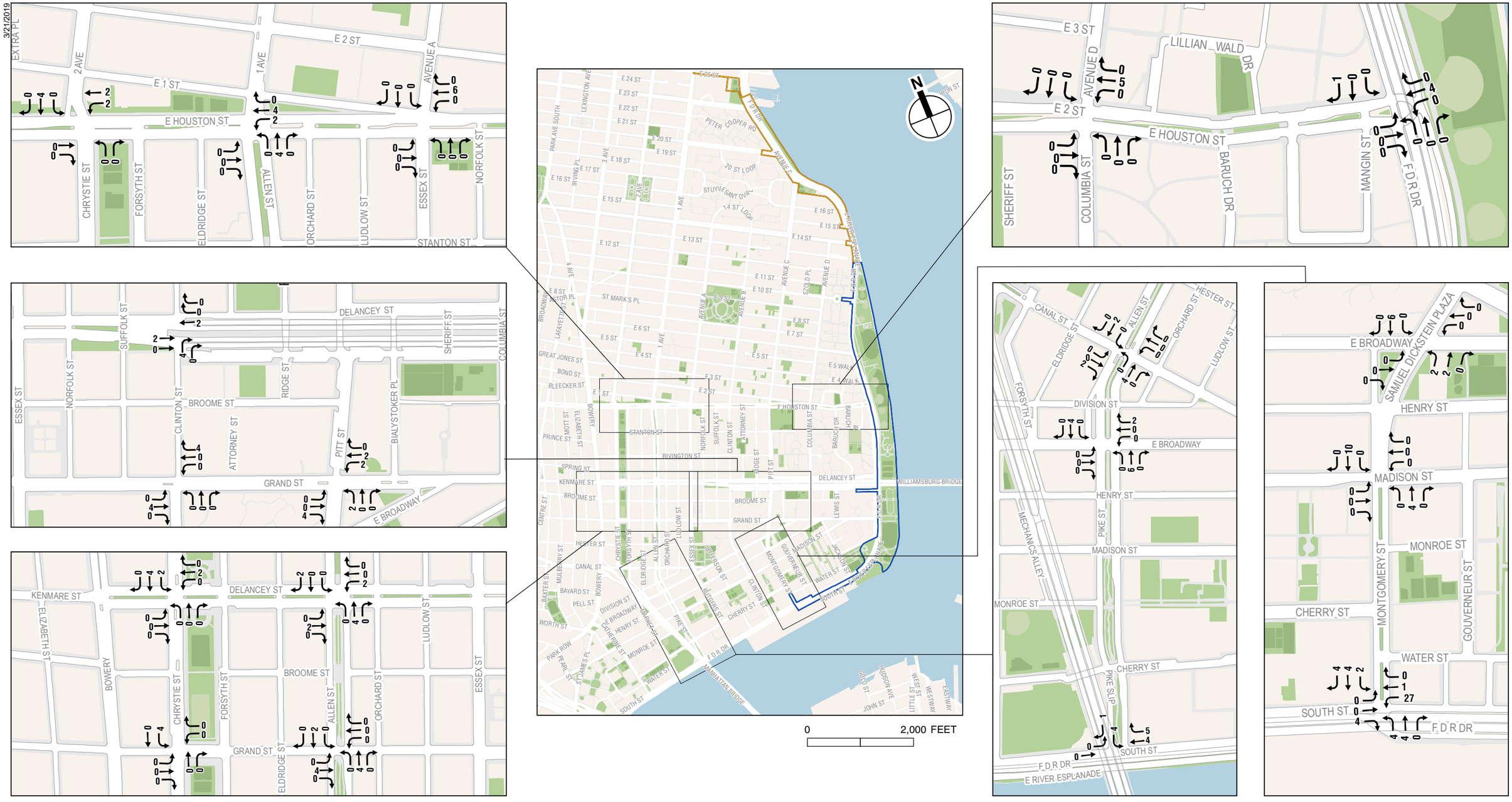
NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Alternative 3 Total Construction PCE Trips: Project Area Two Study Area
6-7 AM Peak Hour

Figure 6.9-14b

3/21/2019



Project Area One

Project Area Two

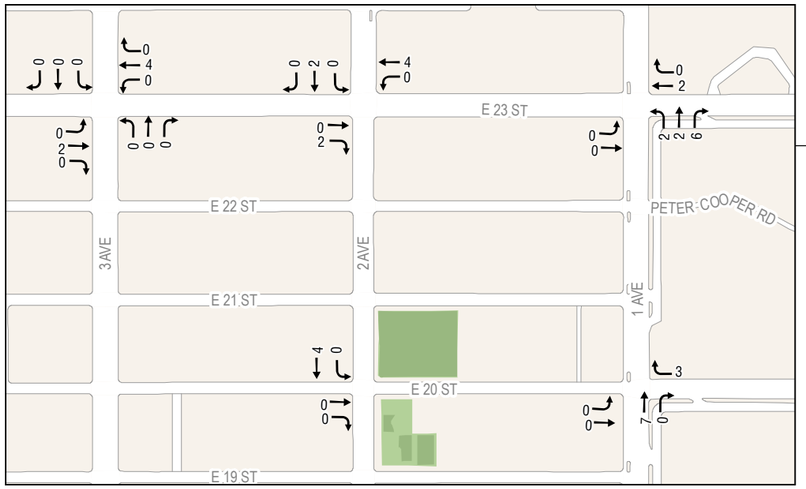
NYC DDC Capital Project: SANDRESM1

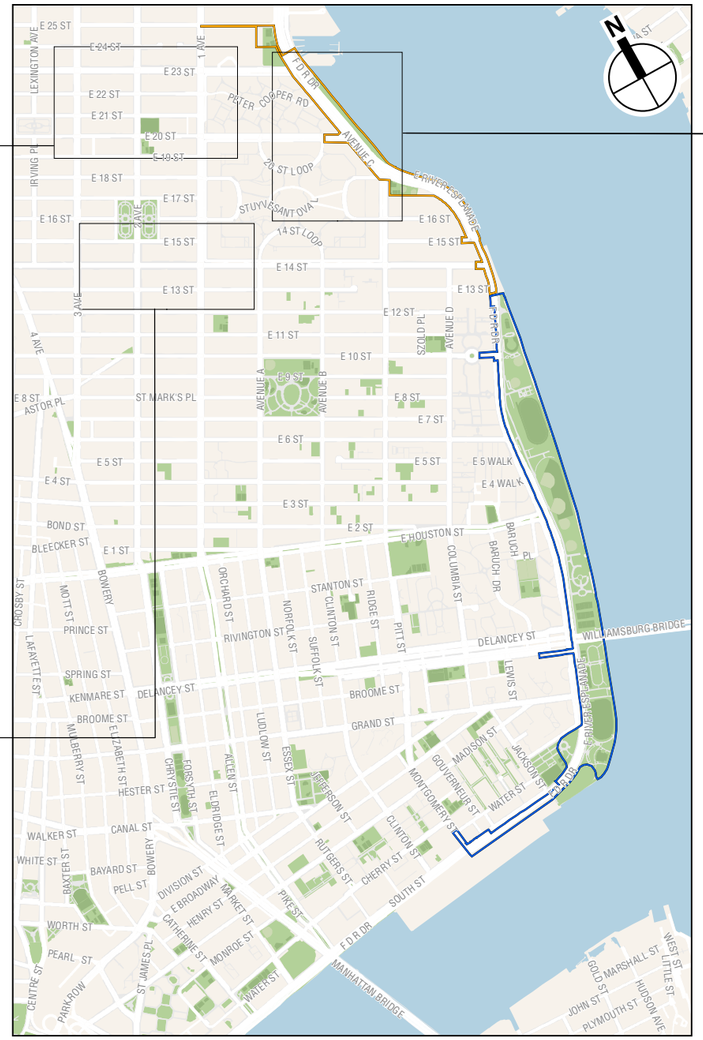
EAST SIDE COASTAL RESILIENCY

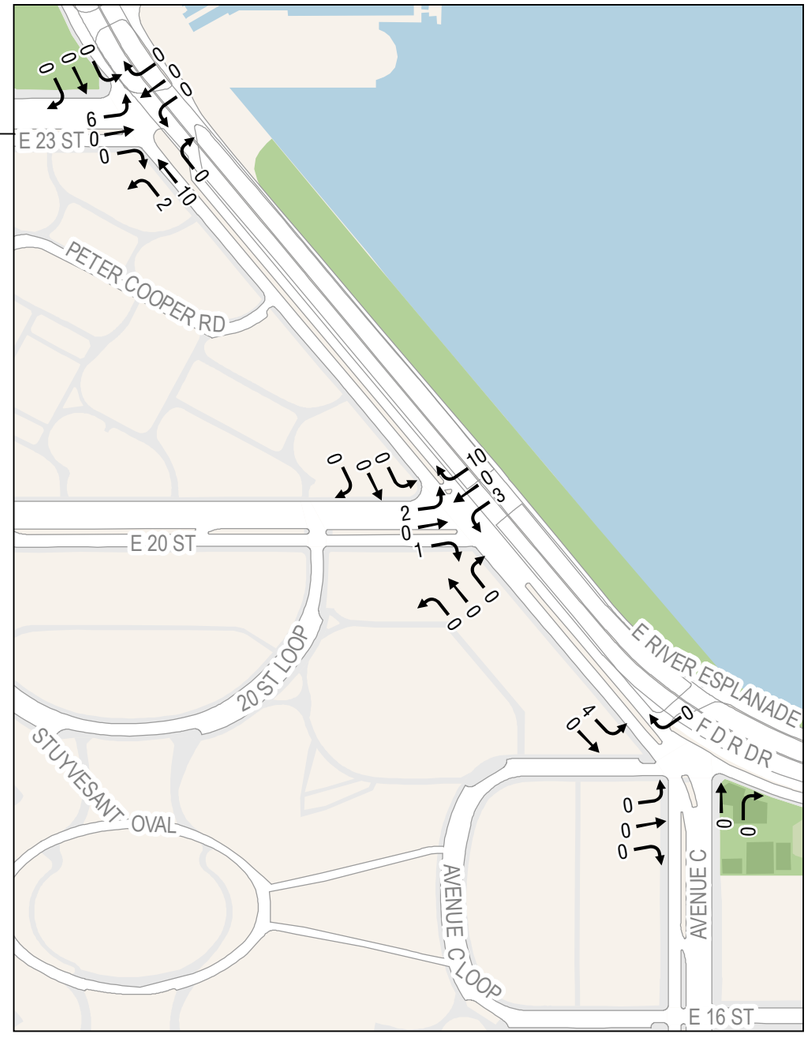
Alternative 3 Total Construction PCE Trips: Project Area One Study Area
3-4 PM Peak Hour

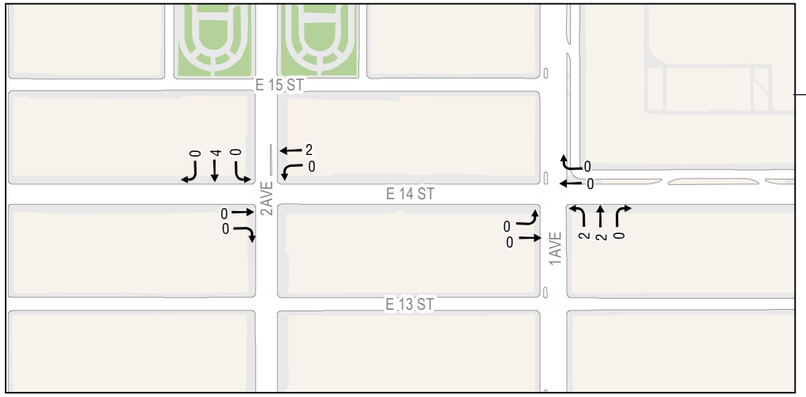
Figure 6.9-15a

3/21/2019









0 2,000 FEET

Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Alternative 3 Total Construction PCE Trips: Project Area Two Study Area
3-4 PM Peak Hour

Figure 6.9-15b

AM peak hour and one intersection for the 3:00 PM to 4:00 PM peak hour, were selected for analysis.

Table 6.9-21

Traffic Level 2 Screening Analysis Results—Selected Analysis Locations (Alternative 3)

Intersection	Weekday		Selected Analysis Locations
	6:00 AM–7:00 AM	3:00 AM–4:00 PM	
23rd Street and Third Avenue	24	6	
23rd Street and Second Avenue	47	8	✓
23rd Street and First Avenue	31	12	✓
23rd Street and Avenue C	17	18	✓
20th Street and Second Avenue	35	4	
20th Street and First Avenue	29	10	
20th Street and Avenue C	16	16	
18th Street and Avenue C	6	4	
14th Street and Second Avenue	30	6	
14th Street and First Avenue	28	4	
Houston Street and Chrystie Street/Second Avenue	22	8	
Houston Street and Allen Street/First Avenue	24	10	
Houston Street and Essex Street/ Avenue A	2	6	
Houston Street and Columbia Street/ Avenue D	6	5	
Houston Street and FDR Drive	37	5	
Delancey Street and Chrystie Street/Second Avenue	20	8	
Delancey Street and Allen Street/First Avenue	26	10	
Delancey Street and Clinton Street/Avenue B	16	8	
Grand Street and Chrystie Street/Second Avenue	20	4	
Grand Street and Allen Street/First Avenue	44	10	
Grand Street and Clinton Street/Avenue B	22	8	
Grand Street and Pitt Street/Montgomery Street	22	10	
Canal Street and Allen Street/First Avenue	40	8	
East Broadway and Allen Street/Pike Street	**52**	12	✓
East Broadway and Montgomery Street	39	10	
Madison Street and Montgomery Street	39	14	
South Street and Allen Street/Pike Street	44	14	✓
South Street and Montgomery Street	**80**	**50**	✓

Notes: ✓ denotes intersections selected for the detailed traffic analysis. South Street and Montgomery Street were selected for analysis for both peak hours and the remaining locations were selected only for the 6:00–7:00 AM peak hour.

As described above and shown in **Table 6.9-21**, six traffic analysis locations have been selected for detailed analysis for the 6:00 AM to 7:00 AM peak hour and one traffic analysis location has been selected for detailed analysis for the 3:00 PM to 4:00 PM peak hour under Alternative 3. All of the selected analysis intersections are signalized.

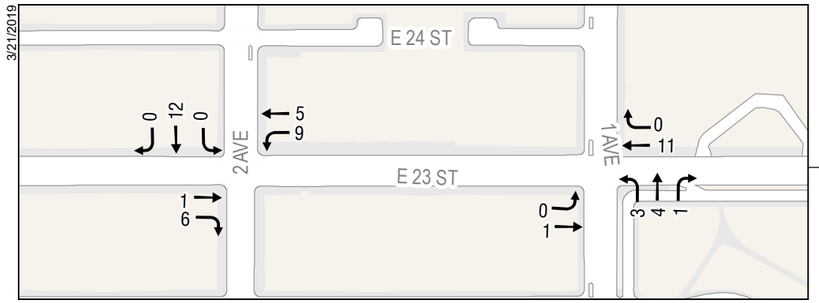
Detailed Traffic Analysis

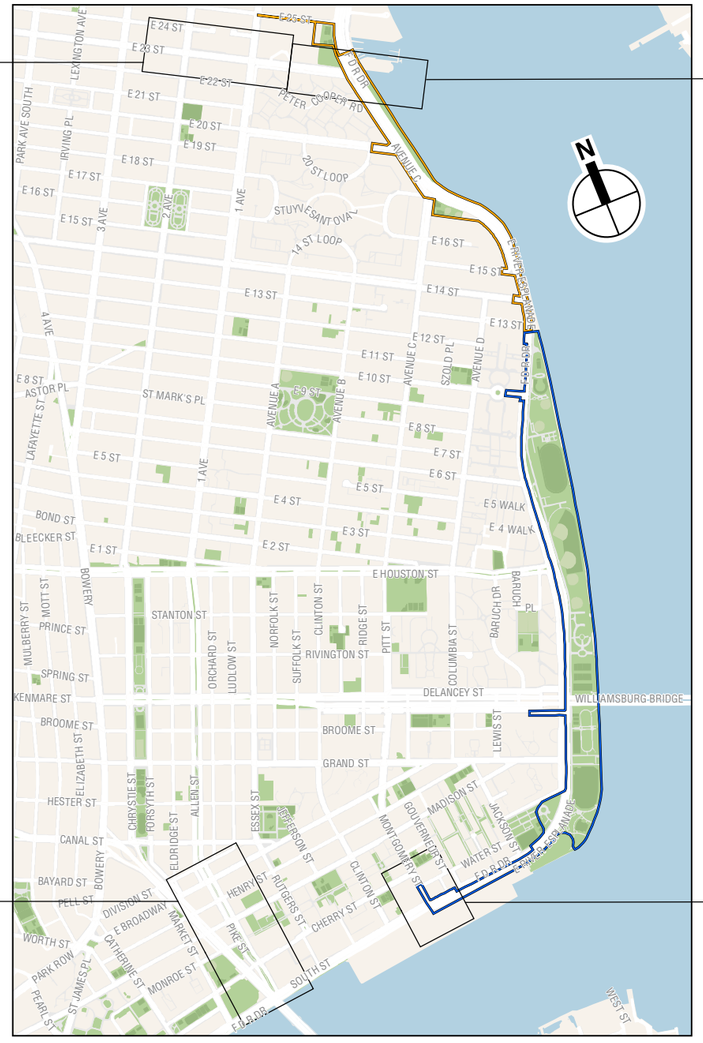
Overall, the proposed project would result in approximately 111 and 77 construction-related traffic increments between 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM, respectively. The incremental construction worker auto trips were assigned to the nearby available on-street parking spaces and off-street parking facilities available within a ½-mile radius of the East River. All delivery trips were assigned to the project area via NYCDOT designated truck routes. The incremental construction-related vehicle trips are shown in **Figures 6.9-16 and 6.9-17** for the weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours.

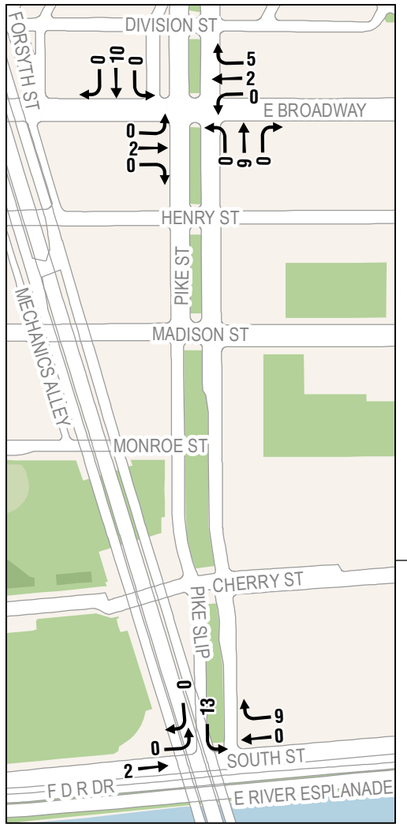
Traffic Operations

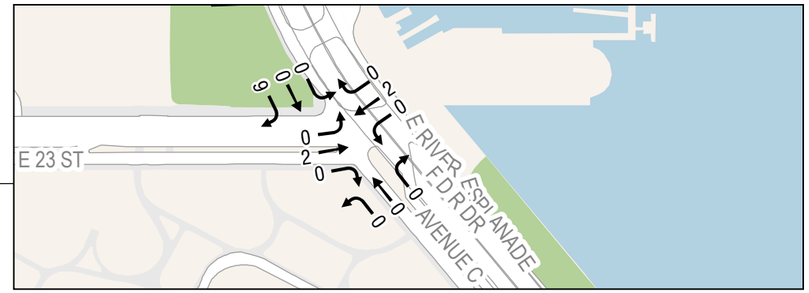
Alternative 3's traffic volumes are shown in **Figures 6.9-18 and 6.9-19** for the weekday 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours. Alternative 3's traffic volumes were

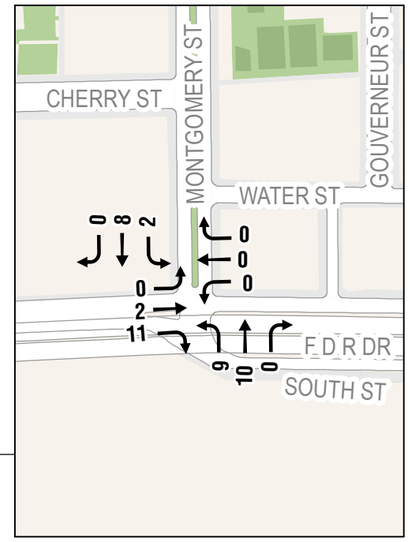
3/21/2019











0 2,000 FEET

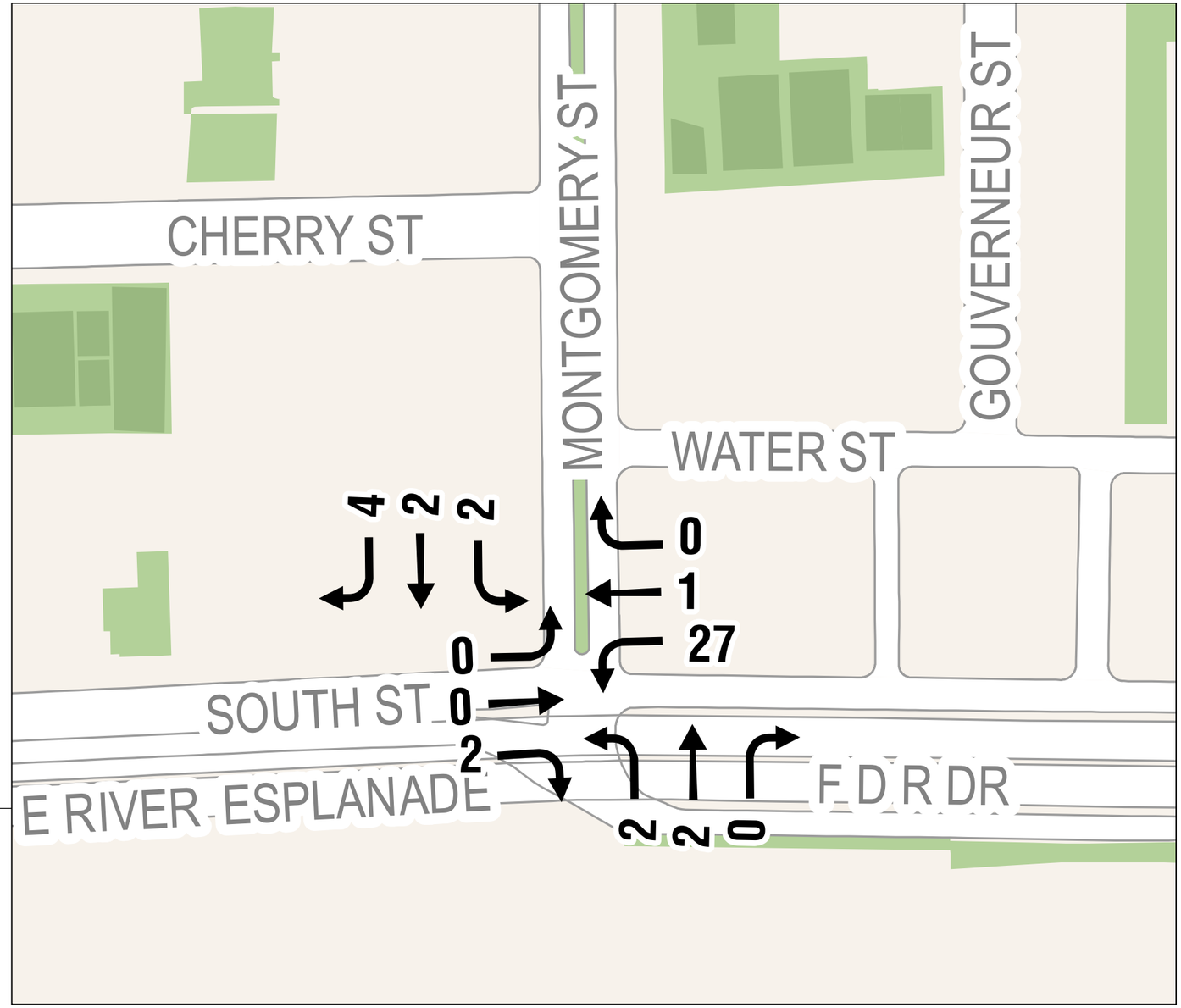
Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1
EAST SIDE COASTAL RESILIENCY

Alternative 3 Total Construction Traffic Increments
6-7 AM Peak Hour
Figure 6.9-16

3/21/2019



Project Area One

Project Area Two

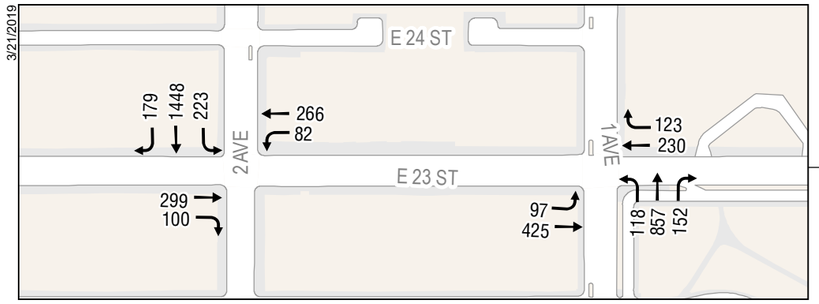
NYC DDC Capital Project: SANDRESM1

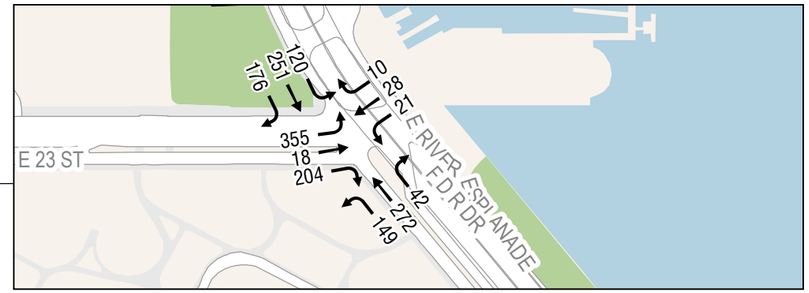
EAST SIDE COASTAL RESILIENCY

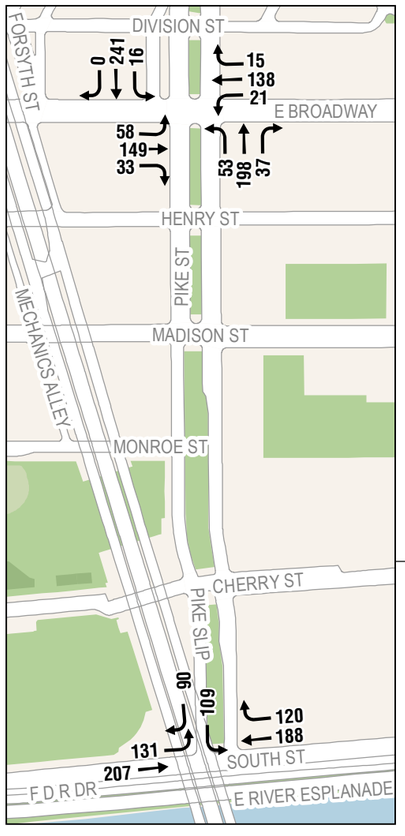
Alternative 3 Total Construction Traffic Increments
3-4 PM Peak Hour

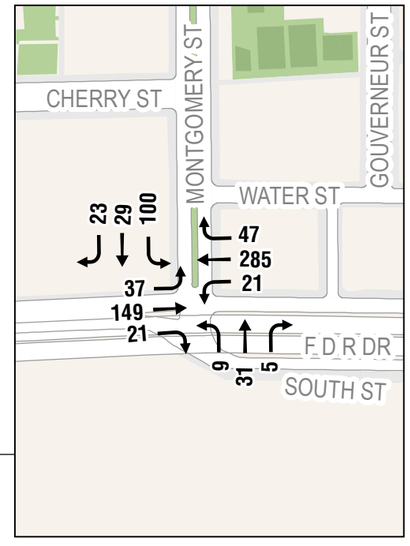
Figure 6.9-17

3/21/2019









Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Alternative 3 2023 With Action Traffic Volumes
6-7 AM Peak Hour

Figure 6.9-18

3/21/2019

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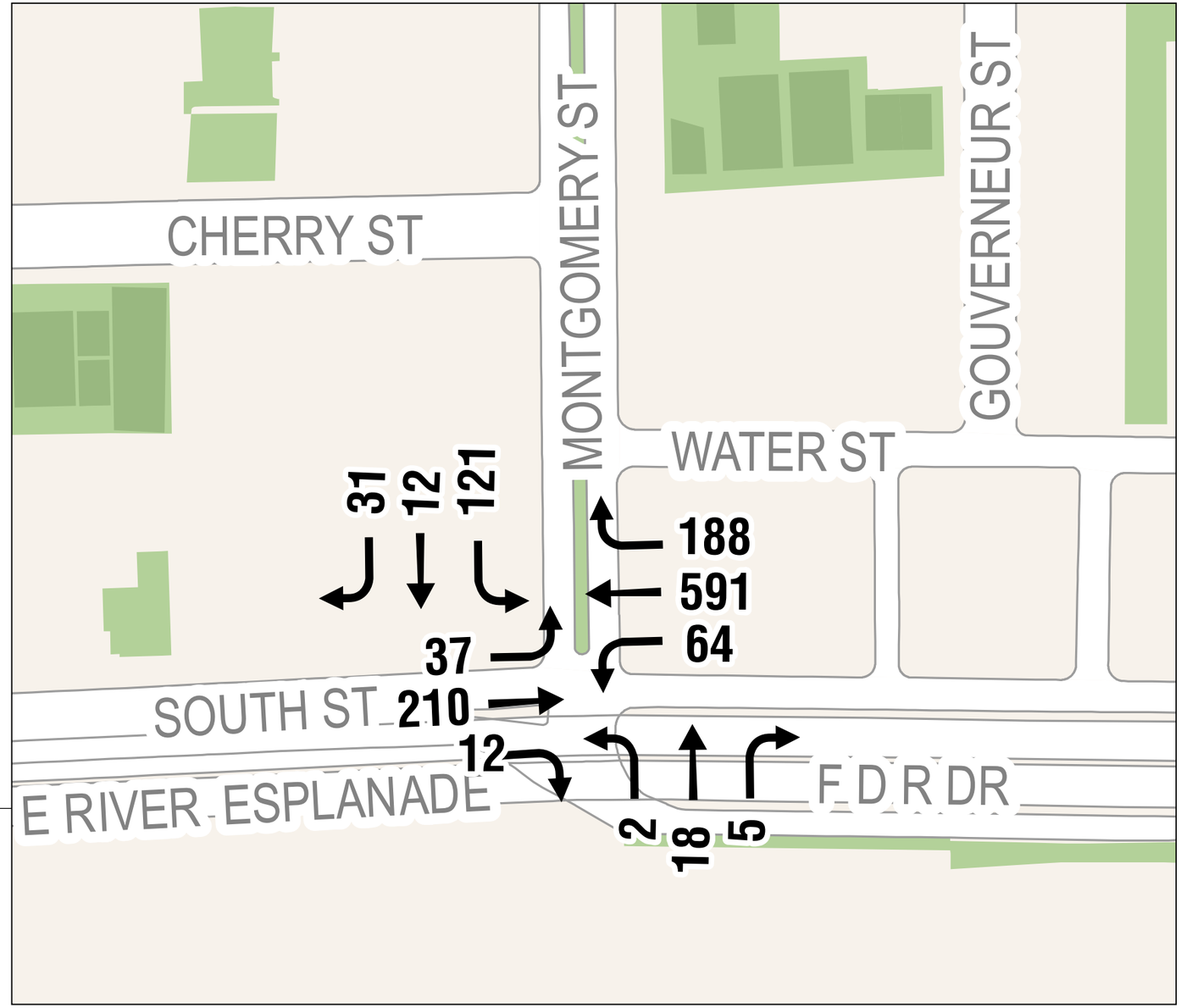

Project Area One

Project Area Two

NYC DDC Capital Project: SANDRESM1

EAST SIDE COASTAL RESILIENCY

Alternative 3 2023 With Action Traffic Volumes
3-4 PM Peak Hour

Figure 6.9-19

constructed by layering on top of the No Action Alternative traffic volumes the incremental vehicle trips shown in **Figures 6.9-16 and 6.9-17**. A summary of the Alternative 3's traffic analysis results is presented in **Table 6.9-22**.

Table 6.9-22
Summary of Alternative 3's Traffic Analysis Results

Level of Service	Analysis Peak Hours	
	Weekday AM (6:00 AM to 7:00 AM)	Weekday PM (3:00 PM to 4:00 PM)
Lane Groups at LOS A/B/C	21	4
Lane Groups at LOS D	6	0
Lane Groups at LOS E	2	0
Lane Groups at LOS F	2	0
Total	31	4
Lane Groups with v/c ≥ 0.90	2	1

Notes: LOS = Level-of-Service; v/c = volume-to-capacity ratio

Significant Adverse Effects

Details on LOS, v/c ratios, and average delays are presented in **Table 6.9-23**. As discussed below, significant adverse traffic effects were identified at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the weekday 6:00 AM to 7:00 AM peak hour for Alternative 3.

Potential measures that can be implemented to mitigate these significant adverse traffic effects are discussed in Section F below.

- Westbound right-turn at the East 23rd Street and First Avenue intersection would deteriorate within LOS F (from a v/c ratio of 0.93 and 90.8 spv of delay to a v/c ratio of 0.94 and 94.1 spv of delay), an increase of more than three seconds, during the weekday AM peak hour. This projected increase in delay constitutes a significant adverse effect.
- Southbound approach at the East 23rd Street and Avenue C intersection would deteriorate from LOS E (v/c ratio of 1.02 and 77.5 spv of delay) to LOS F (v/c ratio of 1.03 and 82.3 spv of delay), an increase of more than four seconds, during the weekday AM peak hour. This projected increase in delay constitutes a significant adverse effect.

Table 6.9-23
No Action and Alternative 3's Level of Service Analysis

Intersection	AM Peak Hour (6:00 AM to 7:00 AM)								PM Peak Hour (3:00 PM to 4:00 PM)							
	No Action				Alternative 3				No Action				Alternative 3			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and Second Avenue																
EB	TR	0.66	32.3	C	TR	0.67	33.0	C	Analysis not warranted during PM peak hour.							
WB	LT	0.72	36.3	D	LT	0.78	40.3	D								
SB	L	0.75	47.7	D	L	0.75	47.7	D								
	TR	0.60	12.6	B	TR	0.60	12.7	B								
	Intersection		22.1	C	Intersection		22.8	C								
East 23rd Street and First Avenue																
EB	L	0.64	55.8	E	L	0.64	55.8	E	Analysis not warranted during PM peak hour.							
	T	0.36	16.2	B	T	0.36	16.2	B								
WB	T	0.34	26.4	C	T	0.35	26.6	C								
	R	0.93	90.8	F	R	0.94	94.1	F+								
NB	L	0.80	71.4	E	L	0.82	74.9	E								
	TR	0.70	28.0	C	TR	0.70	28.1	C								
	Intersection		33.3	C	Intersection		33.8	C								
East 23rd Street and Avenue C																
EB (Mainline)	LTR	0.88	47.3	D	LTR	0.88	47.6	D	Analysis not warranted during PM peak hour.							
WB	LTR	0.08	14.1	B	LTR	0.09	14.1	B								
NB	LTR	0.43	18.9	B	LTR	0.43	18.9	B								
SB	LTR	1.02	77.5	E	LTR	1.03	82.3	F+								
EB (Service Road)	R	0.23	38.0	D	R	0.23	38.0	D								
	Intersection		47.9	D	Intersection		49.7	D								
East Broadway and Allen Street/Pike Street																
EB	LT	0.54	29.7	C	LT	0.55	29.8	C	Analysis not warranted during PM peak hour.							
	R	0.11	21.5	C	R	0.11	21.5	C								
WB	LTR	0.50	28.7	C	LTR	0.53	29.5	C								
NB	L	0.42	46.3	D	L	0.42	46.3	D								
	TR	0.26	18.2	B	TR	0.27	18.3	B								
SB	L	0.19	41.9	D	L	0.19	41.9	D								
	T	0.29	19.7	B	T	0.30	19.9	B								
	Intersection		25.0	C	Intersection		25.2	C								
South Street and Allen Street/Pike Street																
EB	L	0.32	11.1	B	L	0.32	11.2	B	Analysis not warranted during PM peak hour.							
	T	0.37	21.3	C	T	0.38	21.4	C								
WB	TR	0.57	25.8	C	TR	0.59	26.3	C								
SB	L	0.33	32.9	C	L	0.37	33.8	C								
	R	0.33	33.0	C	R	0.33	33.0	C								
	Intersection		23.6	C	Intersection		24.1	C								
South Street and Montgomery Street																
EB	LTR	0.20	10.9	B	LTR	0.21	11.1	B	LTR	0.27	11.6	B	LTR	0.28	11.6	B
WB	LTR	0.35	12.4	B	LTR	0.35	12.4	B	LTR	0.89	29.0	C	LTR	0.92	32.4	C
NB	LTR	0.06	20.0	B	LTR	0.10	20.5	C	LTR	0.04	19.8	B	LTR	0.05	19.9	B
SB	LTR	0.32	23.4	C	LTR	0.35	23.8	C	LTR	0.37	24.5	C	LTR	0.40	25.1	C
	Intersection		14.8	B	Intersection		15.3	B	Intersection		24.7	C	Intersection		27.2	C

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection
+ Denotes a significant adverse traffic effect.

PARKING

As shown in **Tables 6.9-16 and 6.9-17**, the peak number of workers during the construction of the proposed project would be approximately 150 per day for Project Area One and 85 per day for Project Area Two. Based on 2000 U.S. Census data on workers in the construction and excavation industry, the expected construction activities are therefore projected to generate a maximum parking demand of 55 spaces for Project Area One and 31 spaces for Project Area Two. Similar to the Preferred Alternative, the Project Area Two demand would be fully accommodated by the large inventory of available on- and off-street parking spaces near the project area and the Project Area One demand could result in a parking shortfall within ¼-mile.

As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation. Therefore, construction of Alternative 3 would not result in any significant adverse parking effects.

TRANSIT

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is expected that approximately 46 percent of construction workers would commute to the project area via transit. During the peak-construction worker shift (a maximum of 150 average daily construction workers for Project Area One and a maximum of 85 average daily construction workers in Project Area Two, as shown in **Tables 6.9-16 and 6.9-17**), this would correspond to approximately 69 and 39 workers traveling by transit for Project Area One and Project Area Two, respectively. With 80 percent of these workers arriving or departing during the construction peak hours, the estimated number of peak-hour transit trips would be 55 and 31 for Project Area One and Project Area Two, respectively. Since these incremental construction transit trips are well below the *CEQR Technical Manual* 200-transit-trip analysis threshold, no further quantified analysis is warranted. Therefore, construction of the proposed project under Alternative 3would not result in any significant adverse transit effects.

PEDESTRIANS

As summarized above, up to 150 average daily construction workers for Project Area One and 85 average daily construction workers for Project Area Two are projected during peak construction for the proposed project. With 80 percent of these workers arriving or departing during the construction peak hours (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM), the corresponding numbers of peak-hour pedestrian trips traversing the area's sidewalks, corners, and crosswalks would be approximately 120 and 68 for Project Area One and Project Area Two, respectively. Since these incremental construction pedestrian trips are below the *CEQR Technical Manual* 200-pedestrian-trip analysis threshold, no further quantified analysis is warranted.

Under Alternative 3, pedestrian and bicyclist circulation through East River Park and Stuyvesant Cove Park may be temporarily closed for a portion of the construction period. Therefore, similar to the Preferred Alternative, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway and would require the development and implementation of a rerouting plan.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

The Flood Protection System East of FDR Drive (Alternative 5) proposes a flood protection alignment similar to the Preferred Alternative, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property, and Murphy Brothers Playground.

This alternative would include drainage components to reduce the risk of interior flooding, carbon fiber wrapping of Con Edison transmission lines, and construction of the shared-use flyover bridge to address the Con Edison pinch point. Similarly, the north and south interceptor gates would also be included in this Alternative.

Anticipated project completion under this alternative is driven by construction of the raised northbound lanes of the FDR Drive and the adjacent shared-use flyover bridge in this same footprint, therefore Alternative 5 is anticipated to be constructed in 5 years and completed in 2025.

Construction activities in Project Area One are the same between the Preferred Alternative and Alternative 5. In addition, although the activities are different in nature, the peak number of daily workers and trucks during the construction of the raised FDR Drive platform and the pedestrian flyover bridge under Alternative 5 are estimated to be similar to those projected for the flood protection system installation activities on the west side of the FDR Drive under the Preferred Alternative that the platform and flyover bridge would replace. Therefore, the magnitude of daily workers and trucks during the peak quarter of construction under Alternative 5 would be comparable to those presented under the Preferred Alternative. For Project Area One, similar to the Preferred Alternative, the maximum construction-related traffic increments for Alternative 5 would be approximately 166 PCEs between 6:00 AM and 7:00 AM and 82 PCEs between 3:00 PM and 4:00 PM during the first quarter of 2022; for Project Area Two, the maximum construction-related traffic increments would be approximately 85 PCEs between 6:00 AM and 7:00 AM and 49 PCEs between 3:00 PM and 4:00 PM during the second quarter of 2022.

There is a possibility, however, that the FDR Drive would temporarily require a full closure (24 hours a day) in the northbound direction and one lane closure in the southbound direction for two months during construction activities under Alternative 5 (Scenario 1). If these full closures are required, they would most likely occur during the summer months when traffic volumes along the FDR Drive are lower than the rest of the year. Under Scenario 2, there is also a possibility that a full closure in the northbound direction would not be required and that two lanes in the northbound and southbound directions could remain open along the FDR Drive between East 13th Street and East 18th Street during construction. Depending on the type of closure and the duration, vehicular traffic from the FDR Drive would need to be diverted to the local roadways in the study area, which would most likely result in additional significant adverse traffic effects at intersections other than those identified under Alternative 3. The 2010 Best Practices Model (BPM) was utilized to identify the potential traffic diversions (for both closure scenarios described above) resulting from the construction of Alternative 5. Based on a review of the BPM results, the daily and peak period percent change in traffic along parallel corridors and East River crossings were calculated. The BPM results showed that Scenario 1 would result in much greater traffic diversions on parallel routes within the study area as compared to Scenario 2. The BPM results showed that under Scenario 1, daily traffic would increase by 10 percent or more along major corridors including, Route 9A, Avenue C, Houston Street, 14th Street, First Avenue, Second Avenue, Third Avenue, Lexington Avenue, Park Avenue, Sixth Avenue, Eighth Avenue, and Tenth Avenue.

The potential FDR Drive closure would require the use of TEAs to regulate traffic and pedestrian circulation within the study area. The use of TEAs would help mitigate any additional significant adverse traffic effects that could occur due to the closure of the FDR Drive. Given the large volumes of diverted traffic, the implementation of Alternative 5 would require detailed

traffic management plans and detour plans that would include identifying mitigation measures where the management of traffic may be beyond that of TEAs. Additionally, intercepting vehicles on a regional level via variable message signs and public outreach could be additional mitigation to assist TEAs in managing the locally diverted traffic. If full closures along the FDR Drive are not required under this Alternative, any potential significant adverse traffic, parking, transit, and pedestrian effects identified under Alternative 5 would be within the envelope of significant adverse traffic, parking, transit, and pedestrian effects identified under Alternatives 3 and 4.

G. SWING GATE CONSTRUCTION ACROSS THE FDR DRIVE

During the installation of closure structures (including gates and associated foundations) across the FDR Drive near East 13th Street, lane closures on the FDR Drive would be required for the Preferred Alternative and Alternatives 2 and 3 during construction. To minimize disruptions to traffic flow on the FDR Drive, any FDR Drive lane closures will be required to follow the lane closure schedule currently permitted by NYCDOT's OCMC (see **Table 6.9-9**). Construction of the raised FDR Drive platform and flyover bridge under Alternative 5 would require more extensive work within the FDR Drive.

The proposed swing gates across the FDR Drive where Project Area Two begins near the Con Edison facility are comprised of the following key elements:

- Median Center Structure – A floodwall with a foundation, and gate columns that are proposed to be constructed in the center median of the FDR Drive;
- Cut-off Walls and Gate Tracks – Cut-off walls, foundation slabs, and approach slabs for the proposed gates that would be installed within the north and southbound lanes of the highway;
- Anchor Structure (West) – A gate column structure west of the FDR Drive southbound lanes of the highway right-of-way that would be installed in the area between the existing highway barrier and the sidewalk;
- Anchor Structure (East) – A gate column structure east of the FDR Drive northbound lanes of the highway right-of-way that would be installed in East River Park;
- Gate Installation;
- Final finishes; and
- Testing

The construction activities and the duration of these elements would be as follows:

- Median center structure: (1) establish safe and secure work zone in highway; (2) remove segment of median and establish work zone; (3) drill and install a foundation pile; (4) create the pile cap foundation (5) install the gate stanchion and mechanical equipment. This stage would involve the use of backhoes, cranes, drilling equipment, concrete and flatbed trucks to form and pour concrete foundations and deliver and install the steel gate elements.
- Cut-off walls and gate tracks: (1) score the roadbed; (2) excavate and install steel sheet piles for the cut-off wall install foundation slab and approach slabs; (3) jet grouting repair and finalize road surface. This stage would involve the use of backhoes, cranes, cutting equipment, jackhammers, jet grouting trucks, concrete and flatbed trucks to cut the roadbed, excavate a track alignment, form and pour a concrete foundation, repair and finalize the road surface.

- Gate columns (east and west of highway): (1) clear and secure work area; (2) drill and install a foundation pile; (3) install the gate foundation and gate stanchion and mechanical equipment. This stage would involve the use of cranes, drilling equipment, flatbed and concrete trucks to form and pour concrete and deliver and install the steel gate elements.
- Gate installation: (1) establish work areas; (2) delivery of gate sections; and (3) installation too hang and secure gates. This stage would involve the use of cranes and flatbed trucks to deliver and install the steel gate elements.
- Final finishes: (1) complete installation of mechanical fixtures; and (2) finishing elements such as landscaping, lighting, or signage (as necessary). This stage would involve primarily hand-held and light duty equipment.
- Test deployment. This stage would involve primarily hand-held equipment.

The estimated duration of each stage of this construction is provided in **Table 6.9-24.**

Table 6.9-24
Estimated Construction Duration for Gate Closure Structure

Construction Element	Estimated Total Duration (workdays)	Estimated Workdays in FDR Drive
Median Center Structure	20 to 30	20 to 30
Cut-off Wall and Gate track (southbound lanes)	20 to 40	20 to 40
Cut-Off Wall and Gate track (northbound lanes)	20 to 40	20 to 40
East/West Anchor Structures	20	0
Gate installation	10 to 20	5 to 10
Final finishes	10 to 20	5 to 10
Testing	5 to 10	5 to 10

While some of the work could be staged and performed immediately adjacent to the FDR Drive, certain activities such as gate foundations and cut-off walls crossing the FDR Drive, and work in the median (not applicable for Alternative 5) would require excavation and pile installation in the roadway which would require FDR Drive lane closures.

It will be an objective of the proposed project to limit construction activities in the highway and the disruptions to traffic. To that end, weekend and off-peak work hours (as well as July/August work periods) could be used to minimize effects on traffic flow along the highway. Additionally, at the end of each work shift full use of the highway would be restored. However, it is anticipated that at least one travel lane in either a northbound or southbound direction would need to be closed during certain phases of gate closure construction (e.g., installation of the median structure) as detailed above in **Table 6.9-24**.

To minimize disruptions to traffic flow on the FDR Drive, any FDR Drive lane closures will be required to follow the lane closure schedule currently permitted by NYCDOT's OCMC (see **Table 6.9-9**). In addition, Maintenance and Protection of Traffic Plans would be developed for any temporary lane closures and approval of these plans and implementation of the closures would be coordinated with OCMC. Since all FDR Drive lane closures during the swing gate construction would be temporary in nature and conform to the lane closure schedule currently permitted by NYCDOT's OCMC during off-peak hours, no significant adverse effects on transportation systems are anticipated.

H. POTENTIAL BARGING OPERATIONS

As discussed in detail in Chapter 6.0, "Construction Overview," the Preferred Alternative and Alternative 5 are expected to use both barges and truck deliveries for material transport while Alternatives 2 and 3 may also employ barges for material deliveries. Although truck activity between potential barge loading/unloading locations and construction staging/work areas within East River Park would increase, a combination of truck and barge deliveries compared to truck deliveries only would decrease daily truck activity that would traverse the external roadways near the project area during construction.

Approximately 600,000 cubic yards of fill is estimated to be required for the construction under the Preferred Alternative, and an average of 3 barge trips per day are anticipated throughout the 3.5-year construction period. East River is a busy maritime port with tour boats, tugs, barges, and recreational vessels traversing the waters 24 hours a day. USCG operates a harbor surveillance system to help provide separation between large vessels. The maritime trips generated by construction of the proposed project are expected to be limited to tug-assisted barges for equipment and materials. All of these vessels are operated by captains licensed by USCG. The number of daily trips to project area for construction is expected to be minimal compared with the existing trips and would not add significantly to the waterborne traffic in the East River

I. MITIGATION

TRAFFIC

As discussed above, traffic conditions were evaluated at six intersections for the weekday 6:00 AM to 7:00 AM peak hour and one intersection for the 3:00 PM to 4:00 PM peak hour under the Preferred Alternative and Alternative 3, for which the analyses identified the potential for significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the weekday 6:00 AM to 7:00 AM peak hour. As discussed below, implementation of proposed mitigation measures could fully mitigate the potential for significant adverse traffic effects at these intersections for both alternatives.

As discussed above, traffic LOS at signalized and unsignalized intersections are evaluated using average stop control delay, in seconds per vehicle, for individual lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersection. According to the criteria presented in the *CEQR Technical Manual*, effects are considered significant and require examination of mitigation if they result in an increase under conditions with the proposed project of five or more seconds of delay in a lane group over conditions with the No Action Alternative levels beyond mid-LOS D. For LOS E in conditions with the No Action Alternative, a four-second increase in delay is considered significant. For LOS F in conditions with the No Action Alternative, a three-second increase in delay is considered significant. In addition, effects are considered significant if levels of service deteriorate from acceptable A, B, or C under conditions with the No Action Alternative to marginally unacceptable LOS D (a delay in excess of 45 seconds, the midpoint of LOS D), or unacceptable LOS E or F in the condition with the proposed project. A traffic effect is considered fully mitigated when the resulting degradation in the average control delay per vehicle under the proposed project with Mitigation condition compared with the condition with the No Action Alternative is no longer deemed significant following the criteria described above.

MITIGATION MEASURES

Table 6.9-25 itemizes the recommended mitigation measures that address the identified effects under the construction of the proposed project. With the implementation of these standard traffic mitigation measures (signal timing changes), which are subject to review and approval by the NYCDOT, the significant adverse traffic effects identified above could be fully mitigated.

Table 6.9-25
Recommended Mitigation Measures: Proposed Project
Weekday AM Peak Hour

Intersection	No Action Signal Timing	Recommended Mitigation Measures	Recommended Signal Timing
East 23rd Street and First Avenue	EB-T/WB-T: Green = 7 s EB-T/WB-T/WB-R: Green = 19 s EB-L/EB-T: Green = 11 s NB-T/NB-R: Green = 15 s NB-L/NB-T/NB-R: Green = 11 s	Shift 1 second of green time from the NB TR phase to the EB T/WB TR phase	EB-T/WB-T: Green = 7 s EB-T/WB-T/WB-R: Green = 20 s EB-L/EB-T: Green = 11 s NB-T/NB-R: Green = 14 s NB-L/NB-T/NB-R: Green = 11 s
East 23rd Street and Avenue C	EB-R (SR)/WB: Green = 13 s EB-LTR (ML)/WB: Green = 23 s NB/SB: Green = 19 s NB: Green = 6 s NB /WB: Green = 9 s	Shift 1 second of green time from the EB-R (SR)/WB phase to the NB/SB phase	EB-R (SR)/WB: Green = 12 s EB-LTR (ML)/WB: Green = 23 s NB/SB: Green = 20 s NB: Green = 6 s NB /WB: Green = 9 s

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left; T = Through; R = Right.

A discussion of the recommended mitigation measures is provided below. **Tables 6.9-26a and 6.9-26b** compare the LOS and lane group delays for the affected intersections under the 2022 No Action Alternative, the proposed project, and mitigation conditions for the 6:00 AM to 7:00 AM peak hour for Alternative 3 and the Preferred Alternative, respectively.

Table 6.9-26a
Level of Service Analysis
Weekday AM Peak Hour – Alternative 3

	Weekday 6:00 AM to 7:00 AM											
	No Action Alternative				Alternative 3				Mitigation			
Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and First Avenue												
EB	L	0.64	55.8	E	L	0.64	55.8	E	L	0.64	55.8	E
	T	0.36	16.2	B	T	0.36	16.2	B	T	0.35	15.5	B
WB	T	0.34	26.4	C	T	0.35	26.6	C	T	0.34	25.7	C
	R	0.93	90.8	F	R	0.94	94.1	F+	R	0.88	79.1	E
NB	L	0.80	71.4	E	L	0.82	74.9	E	L	0.82	74.9	E
	TR	0.70	28.0	C	TR	0.70	28.1	C	TR	0.73	29.4	C
	Intersection		33.3	C	Intersection		33.8	C	Intersection		33.3	C
East 23rd Street and Avenue C												
EB (Mainline)	LTR	0.88	47.3	D	LTR	0.88	47.6	D	LTR	0.88	47.6	D
WB	LTR	0.08	14.1	B	LTR	0.09	14.1	B	LTR	0.09	14.7	B
NB	LTR	0.43	18.9	B	LTR	0.43	18.9	B	LTR	0.42	18.2	B
SB	LTR	1.02	77.5	E	LTR	1.03	82.3	F+	LTR	0.98	67.2	E
EB (Service Road)	R	0.23	38.0	D	R	0.23	38.0	D	R	0.25	39.7	D
	Intersection		47.9	D	Intersection		49.7	D	Intersection		44.5	D

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection.
+ Denotes a significant adverse traffic effect.

Table 6.9-26b
Level of Service Analysis
Weekday AM Peak Hour – Preferred Alternative

	Weekday 6:00 AM to 7:00 AM											
	No Action Alternative				Preferred Alternative				Mitigation			
Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
East 23rd Street and First Avenue												
EB	L	0.64	55.8	E	L	0.64	55.8	E	L	0.64	55.8	E
	T	0.36	16.2	B	T	0.36	16.2	B	T	0.35	15.5	B
WB	T	0.34	26.4	C	T	0.37	26.9	C	T	0.36	26.0	C
	R	0.93	90.8	F	R	0.95	97.2	F+	R	0.89	81.5	F
NB	L	0.80	71.4	E	L	0.82	74.9	E	L	0.82	74.9	E
	TR	0.70	28.0	C	TR	0.70	28.2	C	TR	0.73	29.5	C
	Intersection		33.3	C	Intersection		33.8	C	Intersection		33.5	C
East 23rd Street and Avenue C												
EB (Mainline)	LTR	0.88	47.1	D	LTR	0.89	49.1	D	LTR	0.89	49.1	D
WB	LTR	0.08	14.1	B	LTR	0.10	14.2	B	LTR	0.10	14.8	B
NB	LTR	0.43	18.9	B	LTR	0.43	18.9	B	LTR	0.42	18.2	B
SB	LTR	1.02	77.5	E	LTR	1.05	86.0	F+	LTR	0.99	70.0	E
EB (Service Road)	R	0.23	38.0	D	R	0.23	38.0	D	R	0.25	39.7	D
	Intersection		47.8	D	Intersection		51.3	D	Intersection		45.9	D

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection.
+ Denotes a significant adverse traffic effect.

East 23rd Street and First Avenue

The significant adverse effect at the westbound right-turn of this intersection during the weekday AM peak hour could be fully mitigated by shifting 1 second of green time from the northbound through/right-turn phase to the eastbound through/westbound through/westbound right-turn phase.

East 23rd Street and Avenue C

The significant adverse effect at the southbound approach of this intersection during the weekday AM peak hour could be fully mitigated by shifting 1 second of green time from the eastbound right-turn (service road)/westbound phase to the northbound/southbound phase.

CONCLUSIONS

Traffic conditions were evaluated at six intersections for the weekday 6:00 AM to 7:00 AM peak hour and one intersection for the 3:00 PM to 4:00 PM peak hour under the Preferred Alternative and Alternative 3. In 2022 with the proposed project, there would be the potential for significant adverse traffic effects at the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C during the weekday 6:00 AM to 7:00 AM peak hour for both Alternatives.

At the intersections of East 23rd Street and First Avenue and East 23rd Street and Avenue C where significant adverse traffic effects are predicted to occur could be fully mitigated with the implementation of standard traffic mitigation measures (e.g., signal timing), which are described above.

The magnitude of construction activities during the peak construction period of Alternative 2 would be comparable to the Preferred Alternative and any transportation effects identified under Alternative 2 would be similar to those identified under the Preferred Alternative.

PEDESTRIANS

Because the proposed project may require a rerouting of the bikeway/walkway along the proposed project area to inland routes, it is concluded to have the potential to result in temporary significant adverse effects for users of the East River bikeway/walkway. Thus, the proposed project would require the development and implementation of a rerouting plan. Additionally, mitigation measures being explored for the Preferred Alternative by NYCDOT include the following:

- Rerouting greenway users to the most direct alternate route within the existing bicycle network, primarily along the protected bike lanes on First Avenue and Second Avenue; bicycles looking to access Stuyvesant Cove Park ferry landing would have access via the existing protected bike lanes onto East 20th Street; and
- Investigating supporting bicycle infrastructure upgrades along the alternate route, including new markings and signage.

RAISED FDR DRIVE

Under Alternative 5, there is a possibility that the FDR Drive would temporarily require a full closure in the northbound direction and one-lane closure in the southbound direction for two months to accommodate construction activities for the raised FDR Drive. If a full closure in any direction is required, it would most likely occur during the summer months when the magnitudes of traffic volumes along the FDR Drive are lower than the rest of the year. Depending on the type of closure and the duration, vehicular traffic from the FDR Drive would need to be diverted to the local roadways in the study area, likely resulting in significant adverse traffic effects beyond those identified for the Preferred Alternative. The potential FDR Drive closure would require the use of TEAs to regulate traffic and pedestrian circulation within the study area. The use of TEAs would help mitigate any additional significant adverse traffic effects that could occur due to the closure of the FDR Drive; however, as a result of the closure, some effects could remain unmitigatable. ✷

A. INTRODUCTION

The potential for air quality effects during construction from the proposed project is examined in this chapter. Construction of the proposed project requires the use of both nonroad construction equipment and on-road vehicles. Nonroad construction equipment includes equipment operating on-site such as pile drivers, excavators, and loaders. On-road vehicles include construction trucks arriving to and departing from the project area as well as operating on-site. Emissions from nonroad construction equipment and on-road vehicles, as well as dust-generating construction activities such as truck loading and unloading operations, have the potential to affect air quality.

In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM) (both PM_{10} and $PM_{2.5}$) emissions. Dust generated by construction activities is also a source of PM emissions. Gasoline engines produce relatively high levels of carbon monoxide (CO). Since the United States Environmental Protection Agency (USEPA) mandates the use of ultra-low-sulfur diesel (ULSD) fuel[1] for all highway vehicles and nonroad equipment, and New York City Local Law 77 of 2003 mandates the use of ULSD fuel for nonroad equipment used on City construction projects, sulfur oxides (SO_x) emitted from the proposed project's construction activities would be negligible. Therefore, the pollutants analyzed for the construction period included NO_2, the component of NO_x that is a regulated component, PM_{10}, $PM_{2.5}$, and CO.

This chapter contains a review of these pollutants; applicable regulations, standards, and benchmarks; and general methodology for the construction air quality analyses, which included both local (microscale) and regional (mesoscale) analyses.

B. PRINCIPAL CONCLUSIONS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, this alternative is not evaluated further as there will be no new construction associated with the proposed project.

[1] USEPA required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and nonroad engines and equipment, including construction equipment. As of 2015, the diesel fuel produced by all large refiners, small refiners, and importers must be ULSD fuel, with sulfur levels in nonroad diesel fuel limited to a maximum of 15 parts per million.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes as well as New York City Local Law 77. These include dust suppression measures, idling restriction, and the use of ULSD fuel and best available tailpipe reduction technologies. With the implementation of these emission reduction measures, construction of the Preferred Alternative would not result in any predicted concentrations above the National Ambient Air Quality Standards (NAAQS) for NO_2, CO, and PM_{10} or the *de minimis* thresholds for $PM_{2.5}$ from nonroad and on-road sources. Therefore, no significant adverse air quality impacts are predicted from the construction of the Preferred Alternative.

Annual emissions from nonroad and on-road sources over the scheduled construction duration would not exceed any of the *de minimis* criteria defined in the general conformity regulations. Therefore, construction of the Preferred Alternative would conform to the relevant State Implementation Plan (SIP) and does not require a general conformity determination.

OTHER ALTERNATIVES

The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2), The Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3), and The Flood Protection System East of FDR Drive (Alternative 5) would implement measures to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes as well as New York City Local Law 77. With the implementation of these emission reduction measures, construction would not result in significant adverse effects with respect to air quality. As with the Preferred Alternative, construction under these alternatives would conform to the relevant SIP and does not require a general conformity determination.

The magnitude of construction activities during the peak construction period of Alternative 2 would be the same or lower than the Preferred Alternative and any air quality effects identified under Alternative 3 would be similar to those identified under the Preferred Alternative. Alternative 5 would require extensive work within and adjacent to the FDR Drive and could require full closure of the FDR Drive northbound lanes for a period of two months. Therefore, construction activities under Alternative 5 may have the potential for short-term effects on local air quality due to changes in traffic patterns and diversions.

C. REGULATORY CONTEXT

POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources including nonroad equipment. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities (e.g., power plants, industrial facilities, etc.), including emissions from construction equipment, such as excavators, and bulldozers, marine engines, etc., are referred to as stationary source emissions. Ambient concentrations of CO are predominantly influenced by mobile source emissions. PM, volatile organic compounds (VOCs), and NO_x are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, SO_x, ammonia, organic compounds, and other gases react or condense

in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources and sources utilizing nonroad diesel fuel, such as large international marine engines. However, diesel vehicles (both nonroad and on-road) currently contribute very little to SO_2 emissions since the sulfur content of diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by USEPA under the Clean Air Act (CAA), and are referred to as 'criteria pollutants'; emissions of precursors to criteria pollutants, including VOCs, NO_x, and SO_2, are also regulated by EPA.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can diminish rapidly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be analyzed on a local, or microscale, basis.

Construction of the proposed project would result in a temporary increase in traffic volumes in the areas surrounding the project areas. However, the temporary increase in traffic volumes would not exceed the screening threshold of 170 vehicles at intersections in the project area. Therefore, a quantified assessment of mobile source emissions of CO is not warranted. CO concentrations were determined for construction activities within the two project areas, and where applicable, cumulative effects from on-site and on-road sources were assessed. In addition, regional (mesoscale) CO emissions were evaluated.

NITROGEN OXIDES, VOCS, AND OZONE

NOx contaminants are of principal concern because of their adverse effects on the respiratory system, and increased respiratory symptoms in people with asthma (from short-term NO_2 exposure), along with their role, together with VOCs, as precursors in the formation of ground-level ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The cumulative effects of NOx and VOC emission sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a criteria pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source), prior to the promulgation of the EPA's 2010 1-hour average standard, it was primarily of concern further downwind from large stationary point sources, and not a local concern from mobile sources. With the promulgation of the 2010 1-hour average standard for NO_2, local ground-level sources, such as vehicular and nonroad construction sources, may also be of greater concern for this pollutant in the future. However, for vehicular sources, any increase in NO_2 associated with the proposed project would be relatively small, as demonstrated below for CO and PM, due to the small increases in the number of vehicles. This increase would not be expected to significantly affect levels of NO_2 experienced near roadways. For nonroad construction sources, the monthly/annual variation in the types of equipment

needed on the construction site and the utilization of the equipment would fluctuate on an hourly basis. In addition, the statistical basis of the 1-hour NO_2 standard (a three-year statistical average of modeled concentrations), unlike the other pollutants and the corresponding averaging periods modeled in the construction analysis, such as $PM_{2.5}$ 24-hour and NO_2 annual averaging periods, make it difficult to accurately model construction sources which would move throughout the project area over the entire construction period as opposed to sources that operate on a regular basis in a defined location such as an exhaust stack on a building.

USEPA guidance on modeling 1-hour NO_2 discusses intermittent emissions.[2] USEPA states that "the intermittent nature of the actual emissions…in many cases, when coupled with the probabilistic form of the standard, could result in modeled impacts being significantly higher than actual impacts would realistically be expected to be for these emission scenarios." Furthermore, USEPA "recommends that compliance demonstrations for the 1-hour NO_2 NAAQS be based on emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations."

When construction of the proposed project commences, there would be a greater percentage of nonroad diesel engines on-site that conform to the newer USEPA emissions standards, resulting in reduced NO_x emissions during construction activities. Given the level of existing data and models, there are no clear methods to predict the rate of transformation of NO to NO_2 at ground-level for construction sources that would not be anticipated to operate within the immediate vicinity of a single receptor location for an extended period of time. Further, substantial uncertainty still exists as to 1-hour NO_2 background concentrations at ground level, especially near roadways, since these concentrations have not been adequately measured and no attainment determinations have been made by the EPA. For these reasons, a 1-hour NO_2 analysis was not conducted for construction sources.

Potential effects on annual local NO_2 concentrations from fuel combustion for on-site construction activities were determined. In addition, the change in regional NO_x and VOC emissions was analyzed.

LEAD

Current airborne lead emissions are principally associated with industrial sources. Lead in gasoline was banned under the CAA in 1996 and would not be emitted from any other component of the proposed project. Therefore, an analysis of this pollutant is not warranted. In addition, as discussed in Chapter 6.6, "Construction—Hazardous Materials," any demolition activities with the potential to disturb positively identified or suspected lead-based paint or lead-containing paint would be performed in accordance with the applicable Occupational Safety and Health Administration regulation (OSHA 29 CFR 1926.62—Lead Exposure).

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles in a wide range of sizes and chemical compositions, either as liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a

[2] USEPA Memorandum, "Additional Clarification Regarding Application of Appendix W, Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard," March 1, 2011.

wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions, and forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction and agricultural activities, and wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: $PM_{2.5}$ and PM_{10}, which includes $PM_{2.5}$. $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

All gasoline-powered and diesel-powered nonroad construction sources and vehicles, especially heavy-duty trucks, are significant sources of respirable PM, most of which is $PM_{2.5}$. PM concentrations may consequently be locally elevated near roadways. An analysis was conducted to assess the reasonable worst-case PM effects due to the increased construction-related traffic and on-site construction sources associated with the construction under the proposed project. In addition, regional PM emissions were evaluated.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as a $PM_{2.5}$ precursor under EPA's New Source Review permitting program for large sources. Due to the federal restrictions on the sulfur content in diesel fuel for on-road and nonroad vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant; therefore, an analysis of SO_2 from mobile sources and/or nonroad sources was not warranted.

AIR QUALITY STANDARDS, REGULATIONS, AND BENCHMARKS

The regulatory context for the proposed project includes the following standards, requirements, and policies for which each of the alternatives have been analyzed to result in a determination of environmental effects during project construction.

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary NAAQS have been established[3] for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other

[3] EPA. National Ambient Air Quality Standards. 40 CFR part 50.

aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 6.10-1**. The NAAQS for CO, annual NO_2, and three-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

Effective December 2015, USEPA reduced the 2008 ozone NAAQS, lowering the primary and secondary NAAQS from the current 0.075 ppm to 0.070. USEPA issued final area designations for the revised standard on April 30, 2018.

Table 6.10-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
8-Hour Average	9(1)	10,000	None	
1-Hour Average	35(1)	40,000		
Lead				
Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average(2)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average(3,4)	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average(1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean(5)	NA	12	NA	15
24-Hour Average(76)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
1-Hour Average(7)	0.075	196	NA	NA
Maximum 3-Hour Average(1)	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m³ are presented.
[1] Not to be exceeded more than once a year.
[2] 3-year average of the annual 98th percentile daily maximum 1-hr average concentration.
[3] 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
[4] USEPA has lowered the NAAQS down from 0.075 ppm, effective December 2015.
[5] 3-year average of annual mean.
[6] Not to be exceeded by the annual 98th percentile when averaged over 3 years.
[7] 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.
Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a SIP, which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA, followed by a plan for maintaining attainment status once the area is in attainment.

In 2002, USEPA re-designated New York City as in attainment for CO. Under the resulting maintenance plans, New York City is committed to implementing site-specific control measures throughout the City to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period. The second CO maintenance plan for the region was approved by USEPA on May 30, 2014.

Manhattan, which had been designated as a moderate NAA for $PM_{10,}$ was reclassified by USEPA as in attainment on July 29, 2015.

The five New York City counties, Nassau, Suffolk, Rockland, Westchester, and Orange Counties has been designated as a $PM_{2.5}$ NAA (New York Portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT NAA) non-attainment area since 2004 under the CAA due to exceedance of the 1997 annual average standard, and were also nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009. The area was redesignated as in attainment for that standard on April 18, 2014, and is now under a maintenance plan. USEPA lowered the annual average primary $PM_{2.5}$ standard to 12 $\mu g/m^3$, effective March 2013. USEPA designated the area as in attainment for the new 12 $\mu g/m^3$ NAAQS, effective April 15, 2015.

On April 18, 2014, USEPA redesignated the New York City Metropolitan Area as in attainment. Previously, it had been nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009. The area, now under a maintenance plan for this standard, includes the same ten-county area as the maintenance area for the 1997 annual $PM_{2.5}$ NAAQS.

Effective June 15, 2004, USEPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City counties (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT, NAA) as a "moderate" non-attainment area for the 1997 8-hour average ozone standard. USEPA designated the New York–Northern New Jersey–Long Island, NY-NJ-CT NAA as a "marginal" NAA for the 2008 ozone NAAQS, effective July 20, 2012. On April 11, 2016, as requested by New York State, USEPA reclassified the area as a "moderate" NAA. New York State has begun submitting SIP documents in December 2014. The state is expected to be able to meet its SIP obligations for both the 1997 and 2008 standards by satisfying the requirements for a moderate area attainment plan for the 2008 ozone NAAQS.

New York City is currently in attainment of the annual average NO_2 standard. USEPA has designated the entire state of New York as "unclassifiable/attainment" of the 1-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available.

USEPA has established a new 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. In December 2017, USEPA designated most of the State of New York, including New York City, as in attainment for this standard.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY EFFECTS

The New York State Environmental Quality Review Act (SEQRA) regulations and the 2014 *City Environmental Quality Review (CEQR) Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[4] In terms of the magnitude of air quality effects, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 6.10-1**) would be deemed to have a potential significant adverse effect.

In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, *de minimis* threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse effect, even in cases where violations of the NAAQS are not predicted.

Carbon Monoxide (CO) De Minimis Criteria

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the effect of proposed projects or actions on mobile sources, as set forth in the *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant environmental effect. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No Action) concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm.

$PM_{2.5}$ de Minimis Criteria

The New York State Department of Environmental Conservation (NYSDEC) has published a policy to provide interim direction for evaluating $PM_{2.5}$ effects.[5] This policy applies only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be deemed to have a potentially significant adverse effect if the project's maximum effects are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the effects, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ effects of the source to the maximum extent practicable.

In addition, New York City uses *de minimis* criteria to determine the potential for significant adverse $PM_{2.5}$ effects under CEQR are as follows:

[4] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014; and New York State Environmental Quality Review Regulations, 6 NYCRR § 617.7

[5] NYSDEC. CP33: Assessing and Mitigating Impacts of Fine Particulate Emissions. December 29, 2003.

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level effect is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions requiring review under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the above-mentioned *de minimis* criteria will be considered to have a potential significant adverse effect.

The above-mentioned *de minimis* criteria were used to evaluate the significance of predicted effects on $PM_{2.5}$ concentrations for the construction activities associated with the proposed project.

CONFORMITY WITH STATE IMPLEMENTATION PLANS

The conformity requirements of the CAA and regulations promulgated thereunder limit the ability of federal agencies to assist, fund, permit, and approve projects that do not conform to the applicable SIP. To implement the proposed project, the City is proposing to enter into a grant agreement with the U.S. Department of Housing and Urban Development (HUD). Therefore, general conformity regulations would apply to the proposed project.

The pollutants of concern on a regional basis are CO, PM_{10}, $PM_{2.5}$, NO_x, and VOC. Emissions from on-road trucks and worker vehicles and from nonroad construction equipment were calculated on an annual basis based on the emissions modeling procedures described above for the microscale analysis.

Under the general conformity regulations, a general conformity determination for federal actions is required for each criteria pollutant or precursor in non-attainment or maintenance areas where the action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the prescribed *de minimis* rates for that pollutant. In the case of this project, the prescribed annual rates are 50 tons of VOCs, 100 tons of NO_x, CO $PM_{2.5}$, or SO_2.

D. METHODOLOGY

ANALYSIS PERIOD

As discussed in detail in Chapter 6.0, "Construction Overview," construction of the proposed project is anticipated to begin in 2020. Note that although the superstructure of the shared-use flyover bridge for the proposed project would be completed in 2025, the flood protection and enhanced park and access features under the Preferred Alternative would be completed in 2023. Construction activities in Project Area One and Project Area Two are each anticipated to be divided into three primary segments (see Figure 6.0-1 for the locations of the construction segments). Due to the complexity of the proposed project and the variable construction options

considered, a preliminary construction schedule has been developed to provide for a reasonable and conservative analysis of the range of environmental effects associated with construction activities for the proposed project.

Because the level of construction activities would vary over the construction period, a reasonable worst-case analysis period was selected based on the estimated monthly construction work schedule, equipment to be employed and their usage factors, and equipment emission rates. The periods of highest emissions nearest to sensitive receptor locations are expected to be the periods of greatest effects. Construction-related emissions were calculated throughout the duration of construction on a rolling annual and peak day basis for $PM_{2.5}$. $PM_{2.5}$ was selected for determining the worst-case periods for all pollutants analyzed because the ratio of predicted $PM_{2.5}$ incremental concentrations is anticipated to be higher than for other pollutants, based on previous analyses of construction air emissions. Therefore, estimates of $PM_{2.5}$ emissions throughout construction were used to determine the reasonable worst-case scenario for all pollutants. Generally, emission patterns of PM_{10} and NO_2 would follow $PM_{2.5}$ emissions, since they are correlated with horsepower (hp) for diesel engines. CO emissions may have a somewhat different pattern but would also be anticipated to be highest during periods when the most activity would occur.

The dispersion modeling analysis was performed for the reasonable worst-case annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods for Alternative 3 and 4. The potential for significant adverse effects was determined by comparing modeled NO_2, CO, and PM_{10} concentrations to the NAAQS, and modeled $PM_{2.5}$ and CO increments to applicable *de minimis* thresholds in the context of magnitude, duration, and locations and the size of the area affected by the air emissions sources.

Other less intensive construction periods are discussed qualitatively, based on the reasonable worst-case analysis period results.

CONSTRUCTION EMISSION SOURCES

Construction emissions sources include nonroad construction equipment, on-road vehicles and dust-generating construction activities. A list of the nonroad construction equipment and on-road vehicles that would likely be operated during the modeled reasonable worse-case analysis period was developed to be used to calculate the emissions generated from the likely construction activities during the reasonable worse-case analysis period.

NONROAD CONSTRUCTION EQUIPMENT

Nonroad construction equipment includes equipment operating on-site, such as pile drivers, excavators, and loaders. See **Appendix K1** for a preliminary list of construction equipment for the proposed project. Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from nonroad construction engines were developed using the latest USEPA NONROAD Emission Model (NONROAD).[6]

On-Road Vehicles

On-road vehicles include construction worker vehicles and construction trucks arriving to and from the construction sites, as well as operating on-site. Traffic data for the construction air

[6] NONROAD Model (Nonroad Engines, Equipment, and Vehicles) User Guide, EPA420-R-05-013, December 2005.

quality analysis was provided from projected future growth in traffic and other information developed as part of the construction traffic analysis presented in Chapter 6.9, "Construction—Transportation." Since emissions from nonroad construction equipment and on-road vehicles may contribute to concentration increments concurrently, both nonroad construction equipment and on-road vehicles were modeled together, where applicable, to address local project-related construction emissions.

Vehicular engine emission factors were computed using the USEPA Motor Vehicle Emission Simulator (MOVES2014a) emission model.[7] For analysis purposes, it was assumed that the concrete trucks would operate for 60 minutes per hour and heavy trucks, such as dump trucks and tractors, would have a maximum three-minute idle time.

Both barges and trucks are expected to be used for material transport during construction of the Preferred Alternative. Therefore, the analysis for the Preferred Alternative included the use of both barges and trucks for material deliveries. For Alternative 3, material deliveries may occur partially by barges or by trucks only. Therefore, an analysis was performed to estimate the increase in annual pollutant emissions for these two delivery options. For the consideration of construction barges to supplement truck deliveries, tugboat emissions were estimated according to the latest emission factors and methodologies delineated by EPA.[8]

Dust Generating Activities

In addition to engine emissions, fugitive dust emissions are generated from operations (e.g., transferring excavated materials into dump trucks), and vehicle travel on-site. Fugitive dust emissions from operations were calculated using USEPA procedures provided in AP-42 Table 13.2.3-1.[9] Road dust emissions from vehicle travel on-site were calculated using equations from EPA's AP-42, Section 13.2.1 for paved roads.

As discussed below under "Emissions Reduction Measures," the construction of the proposed project is required to follow the New York City Department of Environmental Protection (DEP) *Construction Dust Rules* regarding construction-related dust emissions.[10] Therefore, a 50 percent reduction in particulate emissions from fugitive dust was conservatively assumed in the calculations to account for required dust control measures that would be employed, such as wet suppression.

EMISSION REDUCTION MEASURES

Construction activity has the potential to adversely affect air quality as a result of diesel emissions and fugitive dust. Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include use of clean fuel, the idling restriction for on-road vehicles, and dust suppression measures:

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[7] USEPA, Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2014a, EPA-420-B-15-095, November 2015

[8] USEPA, Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, April 2009.

[9] USEPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Chapter 13: Miscellaneous Sources.

[10] http://www.nyc.gov/html/dep/html/air/construction_dust_debris.shtml

- *Clean Fuel.* ULSD[11] fuel will be used exclusively for all diesel engines throughout the construction site.
- *Dust Control Measures.* To minimize dust emissions from construction activities, a dust control plan including a robust watering program would be required as part of contract specifications. For example, all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the project area; water sprays would be used for all excavation and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air. Loose materials (e.g., on-site material storage piles) would be watered or covered. All construction-related dust reduction measures required by DEP's *Construction Dust Rules*[12] would be implemented.
- *Idling Restriction.* In accordance with Title 24, Chapter 1, Subchapter 7, Section 24-163 of the NYC Administrative Code, the local law restricting unnecessary idling on roadways, truck idle time would be restricted to three minutes except for those vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.

Additional emissions controls are required for New York City agency projects by New York City Local Law 77 of 2003, including the use of ULSD and best available technology (BAT) as outlined below:

- *Best Available Tailpipe Reduction Technologies.* Nonroad diesel engines with a power rating of 50 hp or greater, and controlled truck fleets (i.e., truck fleets under long-term contract with the proposed project), including, but not limited to concrete mixing and pumping trucks, would utilize BAT for reducing diesel particulate matter emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest emissions reduction capability. Construction contracts would specify that all nonroad diesel engines rated at 50 hp or greater would utilize DPFs, either installed by the original equipment manufacturer or retrofitted. Retrofitted DPFs must be verified by the USEPA or the California Air Resources Board. Other technologies proven to achieve an equivalent emissions reduction may also be used.

The analysis took into account the emissions reduction measures listed above that would be implemented during construction of the proposed project. In addition, the proposed project may also consider implementing the following emissions reduction measures to further reduce the effects of construction activities on air quality:

- *Utilization of Newer Equipment.* EPA's Tier 1 through 4 standards for nonroad diesel engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC). All nonroad construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3[13] emissions standard.

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[11] USEPA required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and nonroad engines and equipment, including construction equipment. As of 2015, the diesel fuel produced by all large refiners, small refiners, and importers must be ULSD fuel sulfur levels in nonroad diesel fuel are limited to a maximum of 15 parts per million.

[12] http://www.nyc.gov/html/dep/html/air/construction_dust_debris.shtml

[13] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by USEPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3

- *Diesel Equipment Reduction.* Construction would minimize the use of diesel engines and utilize electric engines to the extent practicable. Equipment that could use electric engines in lieu of diesel engines includes, but may not be limited to, welders and rebar benders.

DISPERSION MODELING

Potential effects from the proposed project's nonroad construction equipment, on-road vehicles, and dust generating activities were evaluated using the USEPA/AMS AERMOD model (version 18081), a refined dispersion model. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources), and the preferred model of both USEPA and NYSDEC. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of the interactions.

SOURCE SIMULATION

During construction, various types of construction equipment would be used at different locations throughout the project area. Some of the equipment would be mobile and operate throughout specified areas, while some would remain fixed at distinct locations for short-term periods. For short-term model scenarios (predicting concentration averages for periods of 24 hours or less), nonroad construction sources such as pile drivers, compressors, or generators, which would likely remain at a single location at a given day, were simulated as point sources in the model. Other nonroad construction sources, engines such as excavators or loaders, which would move around the site on any given day, as well as on-road vehicles, were simulated as area sources in the model. All sources are anticipated to move around the site throughout the year and were therefore simulated as area sources in the annual analyses.

RECEPTOR LOCATIONS

Receptors (locations in the model where concentrations are predicted) were placed at residential, and other sensitive uses (i.e., schools, community facilities) at both ground-level and elevated locations (e.g., residential windows), and at publicly accessible open spaces that would have continuous public access during the modeled periods of construction including portions of the Corlears Hook Park that would remain publicly accessible during construction as well as the ferry landings at East River Park and Stuyvesant Cove Park. In addition, a ground-level receptor grid was placed to enable extrapolation of concentrations at locations more distant from the project area.

METEOROLOGICAL DATA

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at LaGuardia Airport in Queens, New York (2013–2017) and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year

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standards for equipment manufactured in 2000 through 2008. In 2004, USEPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the USEPA criteria pollutants, including PM, HC, NO_x and CO. Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

period. These data were processed using the USEPA AERMET (version 18081) program to develop data in a format, which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

E. AFFECTED ENVIRONMENT

To estimate the maximum expected total pollutant concentrations, the calculated effects from the emission sources must be added to a background value that accounts for existing pollutant concentrations from other sources. The background levels are based on concentrations monitored at the nearest NYSDEC ambient air monitoring stations. These represent the most recent 3-year average for 24-hour average $PM_{2.5}$, the highest value from the three most recent years of available data for PM_{10}, and the highest value from the five most recent years of data available for all other pollutants and averaging period combinations. The background concentrations are presented in **Table 6.10-2**.

Table 6.10-2
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration	NAAQS
NO_2	Annual	IS 52, Bronx	38.9 µg/m^3	100 µg/m^3
CO	1-hour	City College of New York, Manhattan	2.3 ppm	35 ppm
CO	8-hour	City College of New York, Manhattan	1.5 ppm	9 ppm
PM_{10}	24-hour	Division Street, Manhattan	44 µg/m^3	150 µg/m^3
$PM_{2.5}$	24-hour	Division Street, Manhattan	20.7 µg/m^3	35 µg/m^3
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2013–2017.				

F. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative is the future condition without the proposed project and assumes that no new comprehensive coastal protection system is installed in the proposed project area. Therefore, this alternative is not evaluated further as there will no new construction associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Based on the anticipated construction schedule for the Preferred Alternative, equipment to be employed and their usage factors, and equipment emission rates, the periods of highest emissions nearest to sensitive receptor locations were identified for the following periods and were selected for analysis (see **Appendix K1**):

- Project Area One, Short-Term Analysis Period: February 2022;
- Project Area One, Annual Analysis Period: March 2021 to February 2022;
- Project Area Two, Short-Term Analysis Period: September 2021; and

- Project Area Two, Annual Analysis Period: June 2021 to May 2022.

As discussed above, the dispersion modeling analysis was performed for the reasonable worst-case annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. The potential for significant adverse effects was determined by comparing modeled NO_2, CO, and PM_{10} concentrations to the NAAQS, and modeled $PM_{2.5}$ and CO increments to applicable *de minimis* thresholds in the context of magnitude, duration, and locations and the size of the area affected by the concentration increment. Other less intensive construction periods are discussed qualitatively, based on the reasonable worst-case analysis period results. The analysis of the Preferred Alternative assumed the use of both barges and trucks for material deliveries.

PROBABLE EFFECTS OF CONSTRUCTION

Maximum predicted concentration increments and overall concentrations including background concentrations from construction activity under the Preferred Alternative are presented in **Table 6-10-3**. Concentrations are presented for receptors near both Project Areas One and Two.

As shown in **Table 6.10-3**, the maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are below the applicable NAAQS under the Preferred Alternative during construction activities at Project Areas One and Two. In addition, the maximum predicted $PM_{2.5}$ incremental concentrations would not exceed the applicable CEQR *de minimis* criteria of 7.2 $\mu g/m^3$ in the 24-hour average period or 0.3 $\mu g/m^3$ in the annual average period.

Table 6.10-3
Pollutant Concentrations from Construction Site Sources ($\mu g/m^3$)
Preferred Alternative

Pollutant	Averaging Period	Maximum Predicted Increment	Background Concentration	Maximum Predicted Total Concentration	*De Minimis* Criteria[(1)]	NAAQS
Project Area One						
$PM_{2.5}$	24-hour	1.47	20.7	-	7.2	35
	Annual	0.17	-	-	0.3	15
PM_{10}	24-hour	4.18	44	48.2	-	150
NO_2	Annual	6.2	38.9	45.1	-	100
CO	1-hour	0.4	2.3	2.7	-	35 ppm
	8-hour	0.1	1.5	1.6	-	9 ppm
Project Area Two						
$PM_{2.5}$	24-hour	2.9	20.7	-	7.2	35
	Annual	0.29	-	-	0.3	15
PM_{10}	24-hour	8.0	44	52.0	-	150
NO_2	Annual	15.0	38.9	53.9	-	100
CO	1-hour	1.4	2.3	3.7	-	35 ppm
	8-hour	0.2	1.5	1.7	-	9 ppm

Notes:
$PM_{2.5}$ concentration increments are compared to the *de minimis* criteria. Increments of all other pollutants are compared with the NAAQS to evaluate the magnitude of the increments. Comparison to the NAAQS is based on total concentrations.
(1) $PM_{2.5}$ *de minimis* criteria is defined as 24-hour average not to exceed more than half the difference between the background concentration and the 24-hour NAAQS; annual average not to exceed more than 0.3 $\mu g/m^3$ at discrete receptor locations.

Conformity with State Implementation Plans

Annual on-site and off-site construction-related emissions over the scheduled construction duration (2020 through 2023) are presented in **Table 6.10-4**. The pollutant emissions associated with construction of the proposed project would be well below any of the *de minimis* criteria. Therefore, the proposed project would conform to the SIP and does not require a full conformity determination.

Table 6.10-4
Emissions from Construction Activities (ton/yr)
Preferred Alternative

	$PM_{2.5}$	PM_{10}	NO_x	VOC	CO
De Minimis Criteria	100	100	100	50	100
2020	0.99	1.07	18.0	1.05	e
2021	**1.72**	**1.85**	**31.1**	**1.82**	**10.9**
2022	1.69	1.83	30.0	1.72	10.7
2023	0.79	0.86	13.9	0.78	5.0
Note: Emissions presented in **bold** represent the highest annual emissions.					

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

The magnitude of construction activities during the peak construction period of Alternative 2 would be the same or lower than the Preferred Alternative. As a result, the construction effects under Alternative 2 would be equal or lesser magnitude than the effects identified under the Preferred Alternative as described above.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

The dispersion modeling analysis was performed for the reasonable worst-case annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. The potential for significant adverse effects was determined by comparing modeled NO_2, CO, and PM_{10} concentrations to the NAAQS, and modeled $PM_{2.5}$ and CO increments to applicable *de minimis* thresholds in the context of magnitude, duration, and locations and the size of the area affected by the concentration increment. Other less intensive construction periods are discussed qualitatively, based on the reasonable worst-case analysis period results.

Under Alternative 3, the periods of highest emissions nearest to sensitive receptor locations would occur during the following periods:

- Project Area One, Short-Term Analysis Period: May 2022 (Activities at Segments 2 and 3);
- Project Area One, Annual Analysis Period: June 2021 to May 2022 (Activities at Segments 2 and 3);
- Project Area Two, Short-Term Analysis Period: May 2023 (Activities at Segments 4, 5, and 6); and
- Project Area Two, Annual Analysis Period: October 2021 to September 2022 (Activities at Segments 4 and 5).

PROBABLE EFFECTS OF CONSTRUCTION

Maximum predicted concentration increments and overall concentrations including background concentrations from construction activity under Alternative 3 are presented in **Table 6.10-5**. Concentrations are presented for receptors near both Project Areas One and Two.

Table 6.10-5
Pollutant Concentrations from Construction Site Sources (µg/m³)
Alternative 3

Pollutant	Averaging Period	Maximum Predicted Increment	Background Concentration	Maximum Predicted Total Concentration	*De Minimis* Criteria[(1)]	NAAQS
Project Area One						
$PM_{2.5}$	24-hour	1.5	20.7	-	7.2	35
	Annual	0.22	-	-	0.3	15
PM_{10}	24-hour	3.9	44	47.9	-	150
NO_2	Annual	10.8	38.9	49.7	-	100
CO	1-hour	0.8	2.3	1.6	-	35 ppm
	8-hour	0.1	1.5	1.6	-	9 ppm
Project Area Two						
$PM_{2.5}$	24-hour	3.0	20.7	-	7.2	35
	Annual	0.28	-	-	0.3	15
PM_{10}	24-hour	7.2	44	51.2	-	150
NO_2	Annual	17.9	38.9	56.8	-	100
CO	1-hour	1.5	2.3	3.8	-	35 ppm
	8-hour	0.1	1.5	1.6	-	9 ppm

Notes:
$PM_{2.5}$ concentration increments are compared to the *de minimis* criteria. Increments of all other pollutants are compared with the NAAQS to evaluate the magnitude of the increments. Comparison to the NAAQS is based on total concentrations.
(1) $PM_{2.5}$ *de minimis* criteria is defined as 24-hour average not to exceed more than half the difference between the background concentration and the 24-hour NAAQS; annual average not to exceed more than 0.3 µg/m³ at discrete receptor locations.

As discussed above, based on the $PM_{2.5}$ construction emissions profiles for Project Area One, the highest project-wide emissions were predicted when construction activities at Segments 2 and 3 would occur simultaneously under the assumed schedule and sequence. In Project Area Two, the highest project-wide emissions were when construction activities at Segments 4, 5, and 6 are anticipated to overlap. These periods were selected for detail analyses.

As shown in **Table 6.10-5**, the maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are below the applicable NAAQS under Alternative 3 during construction activities at Project Areas One and Two. In addition, the maximum predicted $PM_{2.5}$ incremental concentrations would not exceed the applicable CEQR *de minimis* criteria of 6.7 µg/m³ in the 24-hour average period or 0.3 µg/m³ in the annual average period.

Conformity with State Implementation Plans

As discussed above, both barges and trucks are expected to be used for material transport during construction of the Preferred Alternative and therefore, the analysis for the Preferred Alternative presented above included the use of both barges and trucks for material deliveries. However, for Alternative 3, material deliveries may occur partially by barges or by trucks only. Therefore, an

analysis was performed to estimate the increase in annual pollutant emissions for these two delivery options.

Annual on-site and off-site construction-related emissions over the scheduled 5-year construction duration for trucking only option are presented in **Table 6.10-6**. As presented in **Table 6.10-6**, the pollutant emissions would be well below any of the *de minimis* criteria. Therefore, the Alternative 3 would conform to the SIP and does not require a full conformity determination under this delivery option.

Table 6.10-6
Emissions from Construction Activities (ton/yr)
Material Deliveries by Trucks Only

	$PM_{2.5}$	PM_{10}	NO_x	VOC	CO
De Minimis Criteria	100	100	100	50	100
2020	0.47	0.50	8.58	0.52	3.49
2021	**0.84**	**0.91**	**15.50**	**0.95**	**6.24**
2022	0.83	0.90	15.20	0.94	6.23
2023	0.74	0.80	13.31	0.82	5.45
2024	0.51	0.55	9.09	0.55	3.72
2025	0.19	0.21	3.33	0.20	1.36

Note: Emissions presented in **bold** represent the highest annual emissions.
The analysis of Alternative 3 was performed assuming a preliminary construction schedule with construction starting approximately a year earlier than the final construction schedule. Emissions under the final construction schedule would be similar to or marginally less than those included in the dispersion modeling.

The use of tug boats for the movement of the barges would increase annual pollutant emissions when compared with the pollutant emissions under the trucks only option. While this would represent an increase in the pollutant emissions, the tug boats would transverse in the navigation channel within the East River, some distance away from East River Park and the inland neighborhoods. In addition, with the use of barges, construction truck activity on nearby roadways would be reduced. Further, the use of tug boats and barges would be temporary and only limited to the construction period.

Emissions associated with the total annual construction activity under Alternative 3 utilizing a combination of barges and trucks are presented in **Table 6.10-7**. As presented in **Table 6.10-7**, the pollutant emissions would not exceed any of the *de minimis* criteria. Therefore, the proposed project would also conform to the SIP and does not require a full conformity determination under this delivery option.

Table 6.10-7
Emissions from Construction Activities (ton/yr)
Material Deliveries by Trucks and Barges

	$PM_{2.5}$	PM_{10}	NO_x	VOC	CO
De Minimis Criteria	100	100	100	50	100
2020	0.82	0.89	22.21	1.00	4.39
2021	**1.44**	**1.57**	**38.81**	**1.77**	**7.77**
2022	1.26	1.36	31.63	1.52	7.31
2023	0.83	0.90	17.13	0.96	5.70
2024	0.51	0.55	9.09	0.55	3.72
2025	0.19	0.21	3.33	0.20	1.36

Note: Emissions presented in **bold** represent the highest annual emissions.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 proposes a flood protection alignment similar to Alternative 4, except for the approach in Project Area Two between East 13th Street and Avenue C. This alternative would raise the northbound lanes of the FDR Drive in this area by approximately six feet to meet the design flood elevation then connect to closure structures at the south end of Stuyvesant Cove Park. Maintaining the flood protection alignment along the east side of the FDR Drive would eliminate the need to cross the FDR Drive near East 13th Street as well as the need to install floodwalls adjacent to NYCHA Jacob Riis Houses, Con Edison property, and Murphy Brothers Playground.

Similarly, the activities included under Alternative 5 could result in a minor increase of pollutant emissions regionally when compared with the emissions under the Preferred Alternative. Therefore, as the annual regional emissions under the Preferred Alternative are well below the applicable *de minimis* thresholds, the increased emissions under Alternative 5 would not result in an exceedance of the thresholds.

However, Alternative 5 would require extensive work within the FDR Drive and could require full closure of the FDR Drive northbound lanes for a period of two months. Therefore, the raising of the FDR Drive platform under Alternative 5 may have the potential for short-term effects on local air quality due to changes in traffic patterns and diversions. ✷

Chapter 6.11: Construction—Greenhouse Gas Emissions

A. INTRODUCTION

This chapter evaluates the greenhouse gas (GHG) emissions that would be generated by the construction of the proposed project and its consistency with the citywide GHG reduction goals. Note that there would be no substantial energy use associated with operations post construction, and, therefore, the construction emissions represent the total lifetime emissions associated with the proposed project.

As discussed in the Federal National Climate Assessment,[1] the New York State Department of Environmental Conservation (NYSDEC) policy,[2] and the 2014 *City Environmental Quality Review* (*CEQR) Technical Manual*,[3] climate change is projected to have wide-ranging effects on the environment, including rising sea levels, increases in temperature, and changes in precipitation levels. Although this is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level. The United States, New York State, and New York City have all established sustainability initiatives and goals for greatly reducing GHG emissions and for adapting to climate change.

Per the three guidance documents cited above, the citywide GHG reduction goal is currently the most appropriate standard by which to analyze a project under CEQR. Accordingly, a GHG consistency assessment is provided, assessing the projected emissions consistent with the requirements of CEQR, State Environmental Quality Review Act (SEQRA), and National Environmental Policy Act (NEPA).

B. PRINCIPAL CONCLUSIONS

The proposed project would not introduce any substantial new buildings or other uses which would require electricity use, fuel consumption, or generate transportation needs. Therefore, consistency with the efficient buildings goal, clean power goal, and transit-oriented development and sustainable transportation goal defined in CEQR as part of the City's GHG reduction goal would not be relevant for the proposed project. Since the proposed project would not result in substantial carbon dioxide equivalent (CO_2e) emissions once in operation, the quantified analysis of CO_2e emissions focuses on construction of the proposed project.

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[1] U.S. Global Change Research Program. Climate Science Special Report: Fourth National Climate Assessment. Volume I. 2017.

[2] NYSDEC. "NYSDEC Policy: Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements." July 15, 2009.

[3] New York City Mayor's Office of Environmental Coordination. *CEQR Technical Manual.* March 2014.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, this alternative is not evaluated further as there will no new construction associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

The total fossil fuel use in all forms associated with construction under the Preferred Alternative would result in up to approximately 48,889 metric tons of CO_2e emissions. Potential measures for further reductions of emissions from construction of the Preferred Alternative are under consideration and may include the use of biodiesel, expanded use of recycled steel and aluminum, as well as expanded construction waste reduction.

OTHER ALTERNATIVES

The magnitude of construction activities for The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2) would be substantially lower than the Preferred Alternative, resulting in fewer on-road trips and on-site use of nonroad engines, requiring less materials, and resulting in the removal of fewer trees. Overall, less GHG would be emitted under Alternative 2 as compared to the Preferred Alternative.

The total fossil fuel use in all forms associated with construction under Alternative 3 would result in up to approximately 48,652 metric tons of CO_2e emissions for the Flood Protection System on the West Side of East River Park – Enhanced Park and Access Alternative (Alternative 3). This estimate is similar to the total fossil fuel use projected for the Preferred Alternative.

The Flood Protection System East of FDR Drive (Alternative 5) aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Avenue C to the north as opposed to the west side of the FDR Drive for the Preferred Alternative and is expected to result in similar GHG emissions as the Preferred Alternative. However, Alternative 5 would require extensive work within the FDR Drive and could require full closure of the FDR Drive northbound lanes for a period of two months, which could result in increased congestion and ensuing GHG emissions as compared to the Preferred Alternative.

C. REGULATORY CONTEXT

POLLUTANTS OF CONCERN

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This phenomenon causes the general warming of the Earth's atmosphere, or the "greenhouse effect." Water vapor, carbon dioxide (CO_2), nitrous oxide (N_2O), methane, and ozone are the primary greenhouse gases in the Earth's atmosphere.

There are also a number of entirely anthropogenic greenhouse gases in the atmosphere, such as halocarbons and other chlorine- and bromine-containing substances, which also damage the stratospheric ozone layer (and contribute to the "ozone hole"). Since these compounds are being replaced and phased out due to the 1987 Montreal Protocol, there is no need to address them in GHG assessments for most projects. Although ozone itself is also a major greenhouse gas, it

does not need to be assessed as such at the project level since it is a rapidly reacting chemical and efforts are ongoing to reduce ozone concentrations as a criteria pollutant (see Chapter 6.10, "Construction—Air Quality"). Similarly, water vapor is of great importance to global climate change, but is not directly of concern as an emitted pollutant since the negligible quantities emitted from anthropogenic sources are inconsequential.

CO_2 is the primary pollutant of concern from anthropogenic sources. Although not the GHG with the strongest effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG. CO_2 is emitted from any combustion process (both natural and anthropogenic); from some industrial processes such as the manufacturing of cement, mineral production, metal production, and the use of petroleum-based products; from volcanic eruptions; and from the decay of organic matter. CO_2 is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake by the oceans. CO_2 is included in any analysis of GHG emissions.

Methane and N_2O also play an important role since the removal processes for these compounds are limited and because they have a relatively high impact on global climate change as compared with an equal quantity of CO_2. Emissions of these compounds, therefore, are included in GHG emissions analyses when the potential for substantial emission of these gases exists.

The *CEQR Technical Manual* lists six GHGs that could potentially be included in the scope of a GHG analysis: CO_2, N_2O, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). This analysis focuses mostly on CO_2, N_2O, and methane. There are no significant direct or indirect sources of HFCs, PFCs, or SF_6 associated with the proposed project.

To present a complete inventory of all GHGs, component emissions are added together and presented as CO_2e emissions—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing of each chemical over a period of 100 years (e.g., CO_2 has a much shorter atmospheric lifetime than SF_6, and therefore has a much lower GWP). The GWPs for the main GHGs discussed here are presented in **Table 6.11-1**.

Table 6.11-1
Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	100-year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous Oxide (N_2O)	310
Hydrofluorocarbons (HFCs)	140 to 11,700
Perfluorocarbons (PFCs)	6,500 to 9,200
Sulfur Hexafluoride (SF_6)	23,900

Note:
The GWPs presented above are based on the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report (SAR) to maintain consistency in GHG reporting. The IPCC has since published updated GWP values that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2. In some instances, if combined emission factors were used from updated modeling tools, some slightly different GWP may have been used for this study. Since the emissions of GHGs other than CO_2 represent a very minor component of the emissions, these differences are negligible.
Source: 2014 *CEQR Technical Manual.*

POLICY, REGULATIONS, STANDARDS, AND BENCHMARKS FOR REDUCING GHG EMISSIONS

The regulatory context for the proposed project includes the following requirements and policies for which each of the alternatives have been analyzed to result in a determination of environmental effects with project implementation.

FEDERAL

As a result of the growing consensus that human activity resulting in GHG emissions has the potential to profoundly impact the Earth's climate, countries around the world have undertaken efforts to reduce emissions by implementing both global and local measures addressing energy consumption in production, land use, and other sectors. In December 2015, the U.S. signed the international Paris Agreement[4] that pledges deep cuts in emissions, with a stated goal of reducing emissions to between 26 and 28 percent lower than 2005 levels by 2025[5]. On June 1, 2017, the President announced that "the United States will withdraw from the Paris Climate Accord."[6]

Regardless of the Paris Agreement, the U.S. Environmental Protection Agency (USEPA) is required to regulate greenhouse gases under the Clean Air Act (CAA), and has begun preparing and implementing regulations aimed at limiting emissions from vehicles and stationary sources. In addition, there are various federal policies aimed at reducing GHG emissions. For example, Executive Order 13693 of March 19, 2015 maintains the existing policy of the United States that

[4] Conference of the Parties, 21st Session. *Adoption of The Paris Agreement, decision -/CP.21*. Paris, December 12, 2015.

[5] United States of America. Intended Nationally Determined Contributions (INDCs), as submitted. March 31, 2015.

[6] Under the Agreement, countries are allowed to withdraw four years from the date the agreement entered into force—meaning the United States can officially withdraw on November 4, 2020. However, given the voluntary nature of the agreement, any action in the U.S. may or may not occur regardless of this status.

federal agencies increase energy efficiency; measure, report, and reduce their GHG emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which Federal facilities are located; and prioritize actions based on a full accounting of both economic and social benefits and costs.

NEW YORK STATE

There are also regional and local efforts to reduce GHG emissions. In 2009, Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York State by 80 percent, compared with 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining the policies required to attain the GHG reduction goal of which an interim draft plan has been published.[7] The State is now seeking to achieve some of the emission reduction goals via local and regional planning and projects through its Cleaner Greener Communities and Climate Smart Communities programs. The State has also adopted California's GHG vehicle standards (which are at least as strict as the federal standards).

The New York State Energy Plan outlines the State's energy goals and provides strategies and recommendations for meeting those goals. The latest version of the plan was published in June 2015. The 2015 plan also establishes new targets of reducing GHG emissions in New York State by 40 percent, compared with 1990 levels, by 2030, providing 50 percent of electricity generation in the state from renewable sources by 2030 and increasing building energy efficiency gains by 600 trillion British thermal units (Btu) by 2030.

New York State has also developed regulations to cap and reduce CO_2 emissions from power plants to meet its commitment to the Regional Greenhouse Gas Initiative (RGGI). Under the RGGI agreement, the governors of nine northeastern and Mid-Atlantic states have committed to regulate the amount of CO_2 that power plants are allowed to emit, gradually reducing annual emissions to half the 2009 levels by 2020, and reducing an additional 30 percent from 2020 to 2030. The RGGI states and Pennsylvania have also announced plans to reduce GHG emissions from transportation through the use of biofuel, alternative fuel, and efficient vehicles.

NEW YORK CITY

Many local governments worldwide, including New York City, are participating in the Cities for Climate Protection™ (CCP) campaign and have committed to adopting policies and implementing quantifiable measures to reduce local GHG emissions, improve air quality, and enhance urban livability and sustainability. New York City's long-term comprehensive plan for a sustainable and resilient New York City, which began as PlaNYC 2030 in 2007 and continues to evolve today as OneNYC, includes GHG emissions reduction goals, many specific initiatives that can result in emission reductions, and initiatives aimed at adapting to future climate change impacts. The goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 ("30 by 30") was codified by Local Law 22 of 2008, known as the New York City Climate

[7] New York State Climate Action Council. *New York State Climate Action Plan Interim Report*. November 2010.

Protection Act (the "GHG reduction goal").[8] The City has also announced a longer-term goal of reducing emissions to 80 percent below 2005 levels by 2050 ("80 by 50"), which was codified by Local Law 66 of 2014, and has published a study evaluating the potential for achieving that goal. More recently, as part of OneNYC, the City has announced a more aggressive goal for reducing emissions from building energy down to 30 percent below 2005 levels by 2025.

In December 2009, the New York City Council enacted four laws addressing energy efficiency in large new and existing buildings, in accordance with PlaNYC. To achieve the 80 by 50 goals, the City is convening technical working groups to develop action plans to analyze the GHG reduction pathways from the building, power, transportation, and solid waste. The building sector work is currently in progress.

For certain projects subject to CEQR, an analysis of the project's contributions to GHG emissions is required to determine their consistency with the City's reduction goal, which is currently the most appropriate standard by which to analyze a project under CEQR, and is therefore applied in this chapter.

D. METHODOLOGY

Although the contribution of any single project's emissions to climate change is generally infinitesimal, the combined GHG emissions from all human activity have been found to significantly impact global climate. While the increments of criteria pollutants and toxic air emissions are assessed in the context of health-based standards and local impacts, there are no established thresholds for assessing the significance of a project's contribution to climate change. Nonetheless, prudent planning dictates that all sectors address GHG emissions by identifying GHG sources and practicable means to reduce them. Therefore, this chapter presents the total GHG emissions potentially associated with the proposed project and identifies measures that would be implemented and measures that are still under consideration to limit emissions. Note that there would be no substantial energy use associated with operations post construction, and, therefore, the construction emissions represent the total lifetime emissions associated with the proposed project.

The analysis of GHG emissions that would be associated with the proposed project is based on the methodology presented in the *CEQR Technical Manual*. Estimates of emissions of GHGs from the construction activity and materials have been quantified, including on-site emissions from engines, emissions from vehicle use, and emissions associated with materials extraction, production, and transport. Emissions and reduction in carbon sequestration associated with tree removal were evaluated qualitatively. Note that while removal of trees would occur, replacement planting would take place in the process of constructing the proposed project and potentially at other locations throughout the city.

A description of construction activities is provided in Chapter 6.0, "Construction Overview." The analysis is based on the projected activity and materials developed for Alternatives 3 and 4. Under Alternative 3, two options are considered, demonstrating the consequences of optional delivery modes: the delivery of fill and other materials via a combination of trucks and barges, using tugboats, versus all deliveries of such fill via truck. The ultimate mode of transport is not yet decided, and may include a combination of both modes. Under Alternative 4, due to the amount of fill that is required to raise East River Park by approximately eight feet to meet the

[8] Administrative Code of the City of New York, §24-803.

design flood protection criteria, it is anticipated that barges would be the primary mode of delivery of fill and other materials.

CO_2 is the primary pollutant of concern from anthropogenic emission sources and is accounted for in the analysis of emissions from all development projects. GHG emissions for gases other than CO_2 are included where practicable or in cases where they comprise a substantial portion of overall emissions. The various GHG emissions are added together and presented as metric tons of CO_2e emissions per year (see "Pollutants of Concern," above).

The magnitude of construction activities for Alternative 2 would be lower than Alternatives 3 through 5 since Alternatives 3 through 5 would include higher levels of construction activity and a larger construction workforce, require more materials and deliveries, result in the removal of more trees, and Alternative 2 would therefore result in lower GHG emissions. Alternative 5 aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Captain Patrick J. Brown Walk to the north as opposed to the west side of the FDR Drive for Alternative 4 and is expected to result in similar GHG emissions as Alternative 4. Therefore, the following methodology for quantified analysis is focused on Alternatives 3 and 4.

ON-ROAD EMISSIONS

The total number of construction worker trips was estimated using the construction schedule. The total number of worker-days was multiplied by the vehicle mode share of 48 percent, divided by an average vehicle occupancy of 1.30 (per the project's transportation study), and multiplied by an average round-trip distance of 25.3 miles (based on the average trip to work distance for the NYMTC area)[9] to obtain a total personal vehicle miles traveled (VMT) of 3.039 million and 2.826 million under Alternatives 3 and 4, respectively. An average combined emission factor of 701 grams CO_2e per mile was applied; this was derived from the "mobile GHG emissions calculator" provided in the *CEQR Technical Manual*[10] for 2020, while applying the distribution by roadway type for Manhattan—22 percent local, 48 percent arterial, and 30 percent freeway.

General deliveries (fuel, potable water, and other miscellaneous materials) were assumed to travel 36 miles round-trip. Concrete was assumed to be delivered from nearby concrete batch plants at a distance of approximately 7.5 miles in each direction (ready-mix concrete needs to be delivered within a short time, and other materials are available locally). It is expected that large volumes of soil (over 100,000 cubic yards) may be required for construction. Imported materials to be used either below or as (a part of) the clean cover layer is conservatively assumed to be delivered from outside the city. Exported debris would travel anywhere from 30 to 200 miles, depending on type of contamination or intended reuse/disposal. An average round-trip distance of 62 miles was estimated for both exported debris and imported soil. The trips, distances, and resulting total VMT for Alternatives 3 and 4 are summarized in **Table 6.11-2**. An average combined emission factor of 1,800 grams CO_2e per mile was applied, derived as described above for personal vehicles but applying a distribution of 10 percent on local roads, 10 percent on arterials, and the remainder on interstate or expressways.

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[9] NYSDOT. *2009 NHTS, New York State Add-On*. Key Tables. "Table 3: Average Travel Day Person-Trip Length By Mode and Purpose," trip-to work distance for SOV in NYMTC 10-county area. 2011.

[10] The *mobile GHG emissions calculator*, provided in the *CEQR Technical Manual*, is based on emission factors modeled using the EPA's MOVES model—EPA's latest approved model for mobile source emissions and the only model capable of providing GHG emissions by speed.

EPA estimates that the well-to-pump GHG emissions of gasoline and diesel are more than 20 percent of the tailpipe emissions.[11] Although upstream emissions (emissions associated with production, processing, and transportation) of all fuels can be substantial and are important to consider when comparing the emissions associated with the consumption of different fuels, fuel alternatives are not being considered for the proposed development, and as per the *CEQR Technical Manual* guidance, the well-to-pump emissions are not considered in the analysis. The assessment of tailpipe emissions only is in accordance with the *CEQR Technical Manual* guidance on assessing GHG emissions and the methodology used in developing the New York City GHG inventory, which is the basis of the GHG reduction goal.

Table 6.11-2
Total Construction Truck Trips and Distances

Type	Trips	Distance (round-trip miles)	Vehicle Miles Traveled
Alternative 3			
Dump truck delivery and removal	40,814	62	2,530,486
General and material delivery	33,168	36	1,194,043
Concrete and pump trucks	13,393	15	200,893
Sub-Total without Fill (Barge and Truck Option)			**3,925,421**
Additional Dump Truck (Truck Only Option)			
Dump truck delivery and removal	10,263	62	636,297
Total (Truck Only Option)			**4,561,719**
Alternative 4			
Dump truck delivery and removal	90,763	62	5,627,297
General and material delivery	35,057	36	1,262,057
Concrete and pump trucks	1,243	15	18,647
Total			**6,908,001**

NON-ROAD EMISSIONS

A detailed schedule for the use of non-road construction engines and, optionally, tug boats to support a partial barging of materials, was developed, as described in Section 6.0, "Construction Overview." The detailed data, including the number, type, power rating, and hours of operation for all construction engines was coupled with fuel consumption rate data from EPA's NONROAD model to estimate total fuel consumption throughout the duration of the construction activities.

Under Alternative 3, non-road construction engines are estimated to require approximately 1.4 million gallons of diesel equivalent throughout the duration of construction, and approximately an additional 0.31 million gallons of diesel would be required for tug boats under the barge option. In addition, on-site idling of ready-mix concrete trucks and other necessary idling is estimated to consume 69.5 thousand gallons of diesel.

Similarly, under Alternative 4, non-road construction engines are estimated to require approximately 1.6 million gallons of diesel equivalent throughout the duration of construction, and approximately an additional 0.14 million gallons of diesel would be required for tug boats under the barge option. In addition, on-site idling of ready-mix concrete trucks and other necessary idling is estimated to consume 20.5 thousand gallons of diesel.

[11] EPA. *MOVES2004 Energy and Emission Inputs*. Draft Report, EPA420-P-05-003. March 2005.

The quantity of fuel was then multiplied by an emission factor of 10.30 and 10.35 kilograms CO_2e per gallon of diesel for trucks and tug boats, respectively.[12]

MATERIAL EMISSIONS

Upstream emissions related to the production of construction materials were estimated based on the expected quantity of iron or steel and cement. Although other materials will be used, cement and metals have the largest embodied energy and direct GHG emissions associated with their production, and substantial quantities would be used for the proposed project.

The construction is estimated to require 17,646 metric tons of cement under Alternative 3. Alternative 4 is estimated to require 13,235 metric tons of cement, three quarters of the amount as required under Alterative 3. An emission factor of 0.928 metric tons of CO_2e per metric ton of cement produced was applied to estimate emissions associated with energy consumption and process emissions for cement production.[13] The precise origin of cement for this project is unknown at this time.

The construction is estimated to require 3,430 metric tons of steel under Alternatives 3 and 4. An emission factor of 0.6 metric tons of CO_2e per metric ton of steel product produced was applied to estimate emissions associated with production energy consumption,[14] and 0.65 metric tons of CO_2e per metric ton of steel product produced for process emissions associated with iron and steel production were applied.[15]

TREE REMOVAL

Tree removal estimates are presented in **Table 6.11-3**. As discussed further in Chapter 5.6, "Natural Resources," the proposed project would require a New York City Department of Parks and Recreation (NYC Parks)-approved tree replacement plan to address the tree clearing that is proposed. These trees would be replanted or replaced in accordance with the pre-approved tree mitigation plan. The newly constructed and planted raised landscapes would be passive structures that are integrated components of East River Park and Stuyvesant Cove Park.

Table 6.11-3
Trees Removed Due to Design

Alternative	Total Trees Removed Due to Design	Total Trees Removed Due to Conditions
Alternative 2	265	62
Alternative 3	776	62
Alternative 4	981	62
Alternative 5	981	62

Since the details of reuse or disposal of the removed trees and the tree replacement plan are not known at this time, the carbon content of the trees to be removed was not estimated, but net emissions associated with tree removal is discussed qualitatively.

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[12] EPA. Emission Factors for Greenhouse Gas Inventories. 19 November 2015.

[13] The Portland Cement Association, Life Cycle Inventory of Portland Cement Manufacture, 2006

[14] Arpad Horvath et al., Pavement Life-cycle Assessment Tool for Environmental and Economic Effects, Consortium on Green Design and Manufacturing, UC Berkeley, 2007.

[15] Based on 42.3 teragrams of CO_2e emitted and 65,460 thousand tons produced; EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2009, April 15, 2011.

E. ENVIRONMENTAL EFFECTS

A detailed description of the alternatives analyzed in this chapter is presented in Chapter 2.0, "Project Alternatives."

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, this alternative is not evaluated further as there will no new construction associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

TRANSPORTATION EMISSIONS

The on-road GHG emissions from the construction of the Preferred Alternative are presented in detail in **Table 6.11-4**. Note that some emissions from trucks, associated with increased congestion, are not included due to the limitations of the above methodology; however, these would not be expected to be greater overall than the difference between barge and truck emissions.

Table 6.11-4
Total Transportation Emissions (metric tons CO_2e)

Vehicle Type	Total
Passenger Vehicle	2,129
Truck	7,007
Tug Boat (Delivery by Barge)	1,458
Total	**10,594**

ON-SITE EMISSIONS

The GHG emissions from construction engines associated with the proposed project are presented in detail in **Table 6.11-5**.

Table 6.11-5
Total On-Site Emissions (metric tons CO_2e)

Vehicle Type	Emissions
Non-Road	16,365
On-Site Truck Idling	212
Total	**16,657**

CONSTRUCTION MATERIAL EMISSIONS

The resulting GHG emissions from construction materials extraction, processing, and transport would be 12,279 metric tons CO_2e from cement and 4,273 metric tons CO_2e from steel.

TREE REMOVAL EMISSIONS

As discussed above, 981 trees of varying size and species would be removed due to design and conditions for the Preferred Alternative. This would result in GHG emissions of stock carbon and reduced carbon sequestration in the future. Some carbon would be also be sequestered annually by transfer to soils if left intact.

Under the tree replacement plan, tree restitution is expected to result in the planting of 1,442 new trees. While the new trees are not equivalent to the removed trees, many of which are large established trees, the methodology for determining equivalent restitution accounts for this by increasing the number of trees substantially. While many trees would be planted on-site once construction is concluded, structural and design limitations would likely result in many of the replacement trees being planted elsewhere by the City. Overall, the replacement plan is expected to result in long-term sequestration that equals or exceeds the current level of sequestration by the trees identified for removal.

To the extent that the wood can be used, the release of the carbon stock back to the atmosphere as CO_2 or methane may be delayed or avoided. Chipped wood would release CO_2 and small amounts of methane, while landfilled wood would release larger amounts of methane but the gas is likely to be captured and burned or used (depending on the landfill). Firewood carbon is mostly released as CO_2 but avoids the use of wood which may be otherwise useful as firewood, and other uses (e.g., structural, furniture) generally preserve the wood extending the sequestration for many years. A small amount of the wood would be used to construct play equipment in East River Park, and the exact disposition of the rest of the wood is unknown at this time.

Overall, a net reduction in long-term carbon sequestration and flux is not expected due to the tree removal and replacement associated with the proposed project.

SUMMARY

A summary of GHG emissions by source type for the Preferred Alternative is presented in **Table 6.11-6**. Note that tree removal is not included, given the uncertainty regarding the changes in long-term sequestration, and since replacement details are unknown at this time and therefore not quantified. As described above, it is expected that in the long term, sequestration and flux of carbon would not substantially change due to the project since trees removed would be replaced by new plantings with a larger potential for sequestration, and since removed wood would be recycled and used to the extent practicable.

Table 6.11-6
Summary of GHG Emissions (metric tons CO_2e)

Use	Total
Transportation	15,770
On-Site	16,567
Materials	16,552
Total	**48,889**

Total GHG emissions associated with the construction, including direct emissions and upstream emissions associated with construction materials (excluding fuel), would be approximately 49 thousand metric tons.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK - BASELINE

The magnitude of construction activities for Alternative 2 would be lower than the Preferred Alternative, resulting in fewer on-road trips and on-site use of nonroad engines, requiring less materials, and resulting in the removal of fewer trees. Overall, less GHG would be emitted under this alternative.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

TRANSPORTATION EMISSIONS

The on-road GHG emissions from the proposed project are presented in detail in **Table 6.11-7**. The truck-only option would have some additional emissions from trucking materials, but would not include the tug-boat emissions from barge transport of material (see "Non-Road Emissions," below). Overall, the barge and truck option is projected to result in higher GHG emissions, by over 2,000 metric tons. Note that some emissions from trucks, associated with increased congestion, are not included due to the limitations of the above methodology; however, these would not be expected to be greater overall than the difference between barge and truck emissions.

Table 6.11-7
Total Transportation Emissions (metric tons CO_2e)

Vehicle Type	Barge and Truck Option	Truck Only Option
Passenger Vehicle	2,181	
Truck	7,136	8,292
Tug Boat (Delivery by Barge)	3,190	0
Total	**12,506**	**10,473**

The barge and truck option would have some additional emissions from tug-boats used for barge transport, but would have somewhat lower emissions from trucking (see "On-Road Emissions," above).

ON-SITE EMISSIONS

The GHG emissions from construction engines associated with the proposed project are presented in detail in **Table 6.11-8**.

Table 6.11-8
Total On-Site Emissions (metric tons CO_2e)

Vehicle Type	Emissions
Non-Road	14,867
On-Site Truck Idling	633
Total	**15,500**

CONSTRUCTION MATERIAL EMISSIONS

The resulting GHG emissions from construction materials extraction, processing, and transport would be 16,373 metric tons CO_2e from cement and 4,273 metric tons CO_2e from steel.

TREE REMOVAL EMISSIONS

As discussed above, 776 trees of varying size and species would be removed due to design and conditions for Alternative 3. This would result in GHG emissions of stock carbon and reduced carbon sequestration in the future. Some carbon would be also be sequestered annually by transfer to soils if left intact.

Under the tree replacement plan, tree restitution is expected to result in the planting of 1,180 new trees. While the new trees are not equivalent in size to the removed trees, many of which are large established trees, the methodology for determining equivalent restitution accounts for this by increasing the number of trees substantially. While many trees would be planted on-site once construction is concluded, structural and design limitations would likely result in many of the replacement trees being planted elsewhere by the City. Overall, the replacement plan is expected to result in long-term sequestration that equals or exceeds the current level of sequestration by the trees identified for removal.

To the extent that the wood can be used, the release of the carbon stock back to the atmosphere as CO_2 or methane may be delayed or avoided. Chipped wood would release CO_2 and small amounts of methane, while landfilled wood would release larger amounts of methane but the gas is likely to be captured and burned or used (depending on the landfill). Firewood carbon is mostly released as CO_2 but avoids the use of wood, which may be otherwise useful as firewood, and other uses (e.g., structural, furniture) generally preserve the wood extending the sequestration for many years. A small amount of the wood would be used to construct play equipment in East River Park, and the exact disposition of the rest of the wood is unknown at this time.

Overall, a net reduction in long-term carbon sequestration and flux is not expected due to the tree removal and replacement associated with the proposed project.

SUMMARY

A summary of GHG emissions by source type for Alternative 3 is presented in **Table 6.11-9**. Note that tree removal is not included, given the uncertainty regarding the changes in long term sequestration and since replacement details are unknown at this time and therefore not quantified. As described above, it is expected that in the long term, sequestration and flux of carbon would not substantially change due to the project since trees removed would be replaced by new plantings with a larger potential for sequestration, and since removed wood would be recycled and used to the extent practicable.

Table 6.11-9
Summary of GHG Emissions (metric tons CO_2e)

Use	Total Truck and Barge Option	Total Truck Only Option
Transportation	12,506	10,473
On-Site	15,500	15,500
Materials	20,646	20,646
Total	**48,652**	**46,619**

Total GHG emissions associated with the construction, including direct emissions and upstream emissions associated with construction materials (excluding fuel), would be approximately 49 thousand metric tons with the truck-only option and 47 thousand metric tons with the truck and barge option.

ALTERNATIVE 5 – FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

Alternative 5 aligns the flood protection system on the east side of the FDR Drive between East 13th Street and Avenue C to the north as opposed to the west side of the FDR Drive for the Preferred Alternative and is expected to result in similar GHG emissions as the Preferred Alternative. However, Alternative 5 would require extensive work within the FDR Drive and

could require full closure of the FDR Drive northbound lanes for a period of two months, which could result in increased congestion and ensuing GHG emissions (see Chapter 6.9, "Construction—Transportation") as compared to the Preferred Alternative.

F. EVALUATION OF MEASURES FOR REDUCING GHG EMISSIONS AND CONSISTENCY WITH CITY GHG GOALS

The proposed project would not introduce any substantial new buildings or other uses which would require electricity use, fuel consumption, or generate transportation needs. Therefore, consistency with the efficient buildings goal, clean power goal, and transit-oriented development and sustainable transportation goal defined in the *CEQR Technical Manual* as part of the City's GHG reduction goal would not be relevant for the proposed project.

REDUCE CONSTRUCTION OPERATION EMISSIONS

REDUCING TRANSPORTATION EMISSIONS

On-road and/or tugboat emissions would be reduced by selecting sources of clean fill and other construction materials that are nearer to the project areas, therefore reducing transport emissions, if found to be practicable. Note that this would require identifying sources of clean fill not requiring substantial reprocessing which would result in additional expense and emissions. The reuse of excess fill material from other sites would also reduce emissions associated with the transport and disposal of that fill if it were otherwise used. While similar considerations exist for debris disposal, the location for disposal is dictated by the nature of the material and disposal requirements. Within the limitations of those requirements, efforts would be made to identify nearer destinations for disposal. Since cost for both delivery and disposal are associated with distance, this consideration is included in the decision making as a matter of course.

The analysis results indicate that disposal by truck would be more energy efficient and result in lower emissions than by barge. Nonetheless, there are other considerations, including reducing congestion and expediency for the project, which may result in a decision to use barges for transport.

REDUCE NON-ROAD ENGINE EMISSIONS

To reduce construction operations emissions, construction contracts could include a requirement to use biodiesel blends of 20 percent (B20, ASTM D7467-15ce1) in non-road and marine engine fleets operating on-site. B20 can be used with no considerable adjustments necessary for virtually all diesel construction engines[16] and can also reduce cost since average biodiesel prices in the region have been lower than standard diesel on a per-energy unit basis.

While some operations in the past have stated concerns about biodiesel use in cold weather, these have been resolved in B20 blends meeting ASTM quality standards and BQ-9000 supply chain management, with minimal handling and management requirements. Another concern that has been raised in the past was that engine warranties do not cover the use of biodiesel. It should be noted that warranties do not cover any fuel, standard or alternative, and that a warranty would not be voided by using appropriate fuel. Damage caused by fuel not meeting standards would be covered under the fuel supply warranties. Nonetheless, it is recommended to require that contractors use engines from manufacturers that have explicitly approved B20 use.

[16] USDOE. *Biodiesel Blends*. https://www.afdc.energy.gov/fuels/biodiesel_blends.html. Accessed 2/7/2018.

Based on fuel price data for the two years leading up to October 2017, in the NY region, B20 is cheaper than diesel fuel (both per gallon and on an energy content basis).[17] Recent average relative cost of B20 is presented in **Figure 6.11-1**. Note that these are average prices—shopping for a low price provider during procurement could identify lower costs, and implementing a 'locked-in' contract price can potentially provide cost savings throughout the construction period.

Biodiesel does not entirely eliminate GHG emissions, and B20 is a blend of 20 percent biodiesel and 80 percent standard diesel. Accounting for the overall lifecycle of the fuel, the use of B20 could reduce GHG emissions associated with diesel combustion by at least 13 percent (for standard soybean biodiesel, varies by source with higher reductions available from more advanced biofuels).[18] Therefore, if cost and implementation procedures allow, including a requirement to use B20 for all on-site non-road and marine diesel engines in construction contracts would substantially reduce emissions, and would be practicable and financially beneficial. The use of B20 would be further evaluated through the contract bidding process.

Project specifications and contract requirements would include an extensive diesel emissions reduction program, as described in detail in Chapter 6.10, "Construction—Air Quality," including diesel particle filters for large construction engines and other measures. These measures would reduce particulate matter emissions; while particulate matter is not included in the list of standard GHGs ("Kyoto gases"), recent studies have shown that black carbon—a constituent of particulate matter—may play an important role in climate change.

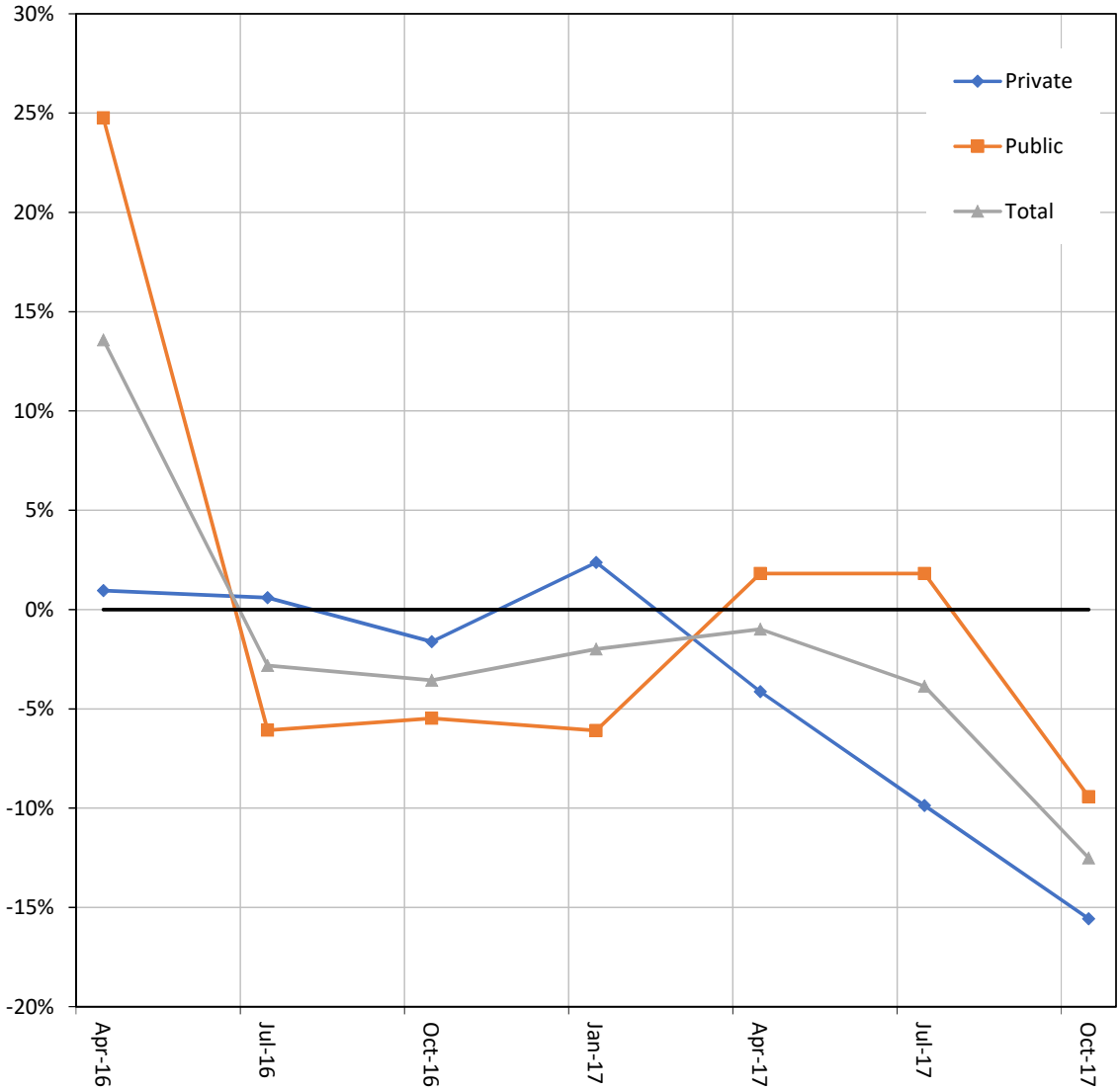
USE BUILDING MATERIALS WITH LOW CARBON INTENSITY

Recycled steel would most likely be used for most structural steel and reinforcing steel (rebar) since the most readily available and specified steel elements required for the project are mostly recycled. Recycled steel reduces most of the emissions associated with extracting materials and processing steel and steel products; and is generally more cost effective than "new" steel. Therefore, including a contract requirement to meet and document a high recycled content target for the total rebar, structural steel, other steel, and aluminum used for the project would likely be practicable, could be easy to implement and achieve, and would ensure that potential reductions are actualized. The specific recycled content target would be evaluated through final design and the contract bidding process.

To reduce the use of high-carbon cement, construction contracts could require the use of supplementary cementitious materials (SCMs) such as fly ash, slag, silica fume, and calcined clay, in addition to up to 5.0 percent interground limestone to the extent practicable, contingent upon meeting the project's concrete performance requirements and specifications. While some SCM content is almost always applied, requiring their use, in addition to interground limestone where practicable, would ensure that benefits are realized, and would reduce costs since the use of SCM and/or interground limestone replaces more expensive cement. The requirements could include cement content optimization, which would identify the appropriate minimum cement content along with SCM and interground limestone so as to meet the structural requirements while minimizing cement content. Note that interground limestone can be used in addition to

[17] Allegheny Science and Technology for U.S. Department of Energy. Personal communication, 12/11/2017.

[18] Argonne National Laboratory. GREET Well-to-Wheels Calculator and Sample Results from GREET 1 2017. December 5, 2017.



Source: AKRF, 2018.
Data: Allegheny Science and Technology for U.S. Department of Energy, personal communication, 12/11/2017.

Price of B20 v. Regular Diesel per Energy Unit, Central Atlantic PADD

SCMs and has been approved for standard use up to 5.0 percent by CalTrans for concrete pavements, structure approach slabs, and bridge decks. Other implementations have been undertaken in Colorado. SCMs and interground limestone replace cement in the mix and reduce GHG emissions associated with extracting and producing cement proportionally, with the potential to reduce those emissions by approximately 15 percent.

Construction waste, especially from the demolition of the existing park lighting fixtures and benches, and pedestrian bridges (under Alternatives 3 through 5), could be diverted from landfills to the extent practicable by separating out materials such as steel for reuse and recycling, with a diversion target of minimum 75 percent. Specifying and implementing a recycling target would ensure that the benefits of recycling materials are realized.

BIOGENIC EMISSIONS

While the new trees to be planted for the proposed project are not equivalent to the removed trees and not all new trees planted survive and thrive, the tree replacement plan is expected to result in long-term sequestration that equals or exceeds the current level of sequestration by the trees identified for removal.

CONCLUSIONS

Based on the above evaluation, the following mitigation is recommended and under consideration in order to achieve practicable and cost effective reduction of GHG emissions from construction of the proposed project:

1. *Use of Biodiesel*: Construction bid documents could require bidders to present an option for the use of biodiesel blends of 20 percent (B20, ASTM D7467-15ce1) in non-road and marine engine fleets operating on-site to the extent practicable. SCDPW will select this option if found to be practicable, including cost and other practical considerations. If B20 is adopted in the construction contracts, the contracts will also specify that contractors shall employ diesel engines from manufacturers that have explicitly approved B20 use.
2. *Recycled Steel and Aluminum*: Construction bid documents could require bidders to estimate the total quantity of recycled content in all structural steel, rebar, and aluminum used for the proposed contract. Construction contracts will specify a target for total recycled content based on this estimate, and require documentation submissions demonstrating that the project meets the target to the extent practicable.
3. *Construction Waste Reduction:* Construction waste could be reduced by diverting recyclable materials from the waste stream to the extent practicable. Construction contracts will require that contractors submit documentation demonstrating a minimum of 75 percent of construction waste diverted for recycling.

The proposed project could also include a number of sustainable design features, which would, among other benefits, result in lower GHG emissions. If these features were specified and required under the construction contracts, the project would be consistent with all City, state, and federal policies regarding GHG emissions. Note that if the proposed project were not pursued or completed, the potential long-term reconstruction of structures and infrastructure due to future design storms would likely result in much higher energy consumption, material use, and GHG emissions that might be largely avoided with the proposed project. Note also that regardless of the GHG emissions, the project, by its nature, is a resiliency project necessary for preparation for the impacts of climate change. ✷

A. INTRODUCTION

This chapter examines the potential noise and vibration effects that could occur during the construction under the proposed project. Effects on community noise levels during construction would include noise from the operation of construction equipment and noise from construction and delivery vehicles traveling to and from the site. Noise and vibration levels at a given location are dependent on the type and quantity of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Noise levels caused by construction activities would vary widely, depending on the stage of construction (i.e., structure rehabilitation, interior fit out, etc.) and the location of the construction activities relative to noise-sensitive receptor locations.

B. PRINCIPAL CONCLUSIONS

A screening level mobile-source analysis indicated that vehicle trips associated with construction of the proposed project would not have the potential to result in significant adverse noise effects at any noise receptor locations.

During, construction of the proposed project, noise control measures would be implemented as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods). Even with these measures, the cumulative analysis of construction vehicle trips and operation of on-site construction equipment indicated the potential for significant adverse noise effects as a result of construction at some receptors under each of the analyzed With Action Alternatives.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, this alternative is not evaluated further as there will no new construction associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water

Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, 520 East 23rd Street, 123 Mangin Street, and the Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of limited duration and would be up to the mid 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to CEQR criteria. The buildings at 621 Water Street, 605 Water Street, 765 FDR Drive, 819 FDR Drive, 132 Avenue D, 465 Avenue D, 123 Mangin Street, and the Asser Levy Recreation Center appear to have monolithic glass (i.e., non-insulating) and would consequently be expected to experience interior $L_{10(1)}$ values up to the high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines (see **Table 6.12-8** for a summary of construction noise analysis results for the Preferred Alternative).

Construction of the Preferred Alternative 4 is expected to occur over a 3.5-year duration as compared to the 5-year duration for Alternatives 2, 3, and 5. This shorter construction duration for the Preferred Alternative 4 primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive. In addition, compared to Alternatives 2 and 3, maximum construction noise levels at receptors nearest floodwall construction within East River Park for the Preferred Alternative would be slightly lower, because pile driving for the Preferred Alternative would occur further from the receptors.

At other receptors near the project area, including open space, residential, school, and hospital receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would generally not exceed typical noise levels in the general area and so would not rise to the level of a significant adverse noise effect.

Vibration resulting from construction of the proposed project would not result in exceedances of the acceptable limit, including for historic structures. However, vibration monitoring would be required for all historic structures within 90 feet of the project work areas according to the project's Construction Protection Plan (CPP) to ensure vibration does not exceed the acceptable limit at any of these historic structures. In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location. While the vibration may be noticeable at times, it would be temporary and would consequently not rise to the level of a significant adverse effect.

OTHER ALTERNATIVES

Construction of Alternative 3 is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street,

601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 132 Avenue D, 465 East 10th Street, 520 East 23rd Street, and the Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of limited duration and would be up to the high 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to City Environmental Quality Review (CEQR) criteria. Under The Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2) and The Flood Protection System East of FDR Drive (Alternative 5), significant adverse construction noise effects are expected to be similar to those under Alternative 2 and the Preferred Alternative, respectively.

Any potential vibration effects for Alternatives 2, 3, and 5 are expected to be similar to those identified for the Preferred Alternative.

MITIGATION

Source or path controls beyond code requirements would be considered and implemented during construction of the proposed project to minimize the effects of noise. To that end, the mitigation measures being explored by the City include:

- Using a hydraulic press-in pile installation method instead of the standard impact pile driving provides a large reduction in noise from pile installation, which would result in a substantial reduction in overall construction noise because pile installation is the dominant source of construction noise at most receptors.
- Hanging noise barriers or curtains made from mass-loaded vinyl around the pile driving head to shield receptors from noise of impact pile driving.
- Enclosing the concrete pump and concrete mixer trucks at any time that the mixer barrels would be spinning in a shed or tunnel including 2 or 3 walls and a roof, with the opening or openings facing away from receptors.
- Using barging for deliveries of construction materials (including concrete) and importing of fill to the project sites, rather than trucks on roadways to from the construction work areas.
- Selecting quieter equipment models for equipment (i.e., cranes, generators, compressors, and lifts).

C. NOISE FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called decibels (dB). The particular character of the sound that we hear (a whistle compared with a French horn, for example) is determined by the speed, or "frequency," at which the air pressure fluctuates, or oscillates. Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz (Hz). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not

perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernable and therefore more intrusive than many of the lower frequencies (e.g., the lower notes on the French horn).

"A"-WEIGHTED SOUND LEVEL (dBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the descriptor of noise levels most often used for community noise. As shown in **Table 6.12-1**, the threshold of human hearing is defined as 0 dBA; quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA.

Table 6.12-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80–90
Busy city street, loud shout	80
Busy traffic intersection	70–80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry	50–60
Background noise in an office	50
Suburban areas with medium-density transportation	40–50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, a change in noise level will be readily noticeable.

EFFECTS OF DISTANCE ON SOUND

Sound varies with distance. For example, highway traffic 50 feet away from a receptor (such as a person listening to the noise) typically produces sound levels of approximately 70 dBA. The same highway noise measures 66 dBA at a distance of 100 feet, assuming soft ground

conditions. This decrease is known as "drop-off." The outdoor drop-off rate for line sources, such as traffic, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 3 dBA for line sources). Assuming soft ground, for point sources, such as amplified rock music, the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 6 dBA for point sources).

SOUND LEVEL DESCRIPTORS

Because the sound pressure level unit of dBA describes a noise level at just one moment and few noises are constant, other ways of describing noise that fluctuates over extended periods have been developed. One way is to describe the fluctuating sound heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted by $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

For purposes of the Phase II operational noise analysis, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. The $L_{eq(1)}$ is the noise descriptor recommended for use in the 2014 *CEQR Technical Manual* for vehicular traffic and construction noise impact evaluation, and is used to provide an indication of highest expected sound levels. The one-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification.

D. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following standards for which each of the alternatives have been analyzed to result in a determination of environmental effects with project construction.

NEW YORK CEQR NOISE STANDARDS

The *CEQR Technical Manual* sets external noise exposure standards; these standards are shown in **Table 6.12-2**. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable.

IMPACT DEFINITION

Chapter 22, Section 100 of the *CEQR Technical Manual* breaks construction duration into "short-term" and "long-term" and states that assessment of construction noise is not likely to result in an effect unless it "affects a sensitive receptor over a long period of time." Consequently, the construction noise analysis considers both the potential for construction of a proposed project to create high noise levels (the "intensity"), and whether construction noise would occur for an extended period of time (the "duration") in evaluating potential construction noise effects.

Table 6.12-2
Noise Exposure Guidelines For Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	Ldn ≤ 60 dBA	NA	NA	NA	(I) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn	NA	Ldn ≤ 75 dBA
Hospital, nursing home		$L_{10} \leq 55$ dBA		55 < $L_{10} \leq 65$ dBA	60 < Ldn ≤ 65 dBA	65 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
Residence, residential hotel, or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		65 < $L_{10} \leq 70$ dBA		70 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		55 < $L_{10} \leq 70$ dBA		70 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public health facility		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)	
Commercial or office		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)	
Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:
(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more;
(II) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L_{dn} (L_{dn} contour) value.

Table Notes:
[1] Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.
[2] Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.
[3] One may use FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
[4] External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).
Source: New York City Department of Environmental Protection (adopted policy 1983).

The noise impact criteria described in Chapter 19, Section 410 of the *CEQR Technical Manual* serve as a screening-level threshold for potential construction noise impacts. If construction of the project would not result in any exceedances of these criteria at a given receptor, then that receptor would not have the potential to experience a construction noise impact. However, if construction of the proposed project would result in exceedances of the noise impact criteria, then further consideration of the intensity and duration of construction noise is warranted at that receptor. The screening level noise impact criteria for mobile and on-site construction activities are as follows:

- If the No Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- If the No Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the *CEQR* criteria as being between 10PM and 7AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.

FEDERAL DEVELOPMENT GUIDELINES

HUD regulates noise for HUD-funded residential housing projects in accordance with 24 CFR Part 51, Subpart B. The intent of HUD's noise rules is to evaluate the noise compatibility of sites where HUD-funded housing developments are proposed. The proposed project is not a housing project. In addition, per 24 CFR § 51.101(a)(3), HUD's noise policy does not apply to actions under disaster assistance provisions or appropriations that are provided to save lives, protect property, and protect public health and safety. Therefore, HUD's noise rules would not apply to the proposed project and *CEQR* guidelines as described above were used.

E. METHODOLOGY

As discussed in Chapter 6.0, "Construction Overview," the proposed project is divided into 2 project areas, 16 reaches for design, and 6 construction segments for analysis purposes (see Figure 6.0-1). Construction activities for the proposed project would have the potential to result in increased noise levels as a result of: (1) the operation of on-site construction equipment; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the internal and surrounding roadways.

Noise from the operation of construction equipment onsite at a specific receptor location near a construction site is calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of the following:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;[1]
- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels due to construction-related traffic are a function of the following:

- The noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Vehicular speed;

[1] Usage factors for each piece of equipment were based on values shown in Section 28-109 of the New York City Department of Environmental Protection's (DEP) "Rules for Citywide Construction Noise Mitigation" document.

- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

CONSTRUCTION NOISE MODELING

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment) and transportation sources (e.g., roads, highways, railroad lines, busways, waterways, airports). The model takes into account the reference sound pressure levels of the noise sources at 50 feet, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. The CadnaA model is a state-of-the-art tool for noise analysis and is approved for construction noise level prediction by the *CEQR Technical Manual*.

Geographic input data to be used with the CadnaA model includes CAD drawings defining likely site work areas, adjacent building footprints and heights, locations of streets, and locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics—including equipment usage rates (percentage of time operating at full power) for each piece of construction equipment operating at the project areas, as well as noise control measures—were input to the model. Reflections and shielding by barriers and project elements erected on the construction site and shielding from adjacent buildings were also accounted for in the model. Furthermore, construction-related vehicles were assigned to the adjacent roadways. The model produces A-weighted $L_{eq(1)}$ noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

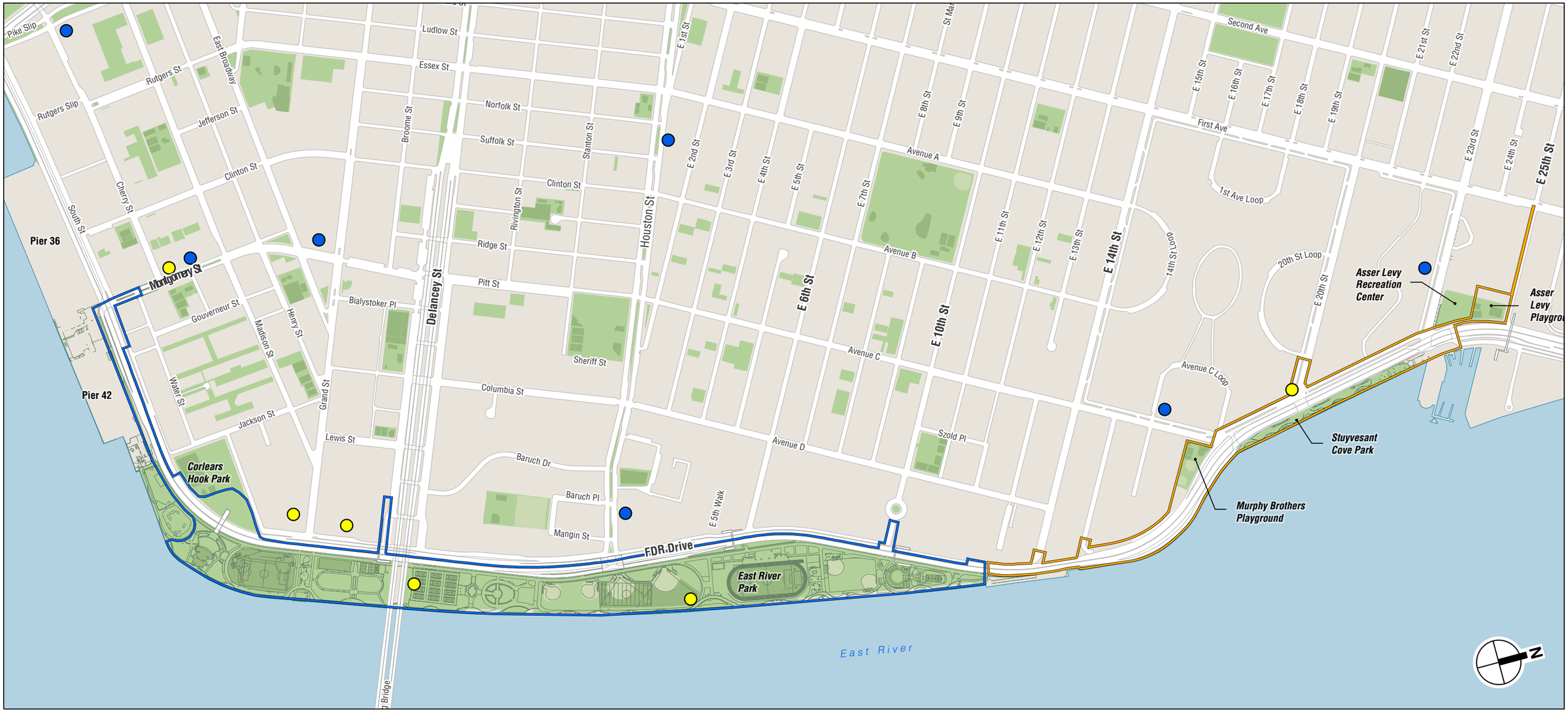
GENERAL NOISE ANALYSIS METHODOLOGY

As discussed in Chapter 6.0, "Construction Overview," due to the complexity of the proposed project and the variable construction options considered for it, a preliminary construction schedule has been developed for Alternatives 3 and 4 to illustrate how the construction could be phased. These preliminary construction schedules provide for a conservative analysis of the range of potential environmental effects that could occur from construction of the proposed project. As described in further detail in Chapter 6.0, "Construction Overview," the construction phasing of Alternatives 2 and 5 are largely expected to be similar to those for Alternatives 3 and 4, respectively. However, under Alternative 5, the northbound lanes of the FDR Drive would be raised approximately 6 feet between East 13th Street and East 18th Street.

The construction noise methodology involved the following process for the proposed project:

1. Complete a mobile-source screening analysis. A screening level proportional model of traffic noise was conducted for the 6 AM hour at each of the at-grade noise measurement locations located adjacent to a roadway (i.e., not in East River Park). The 6 AM hour was selected because it represents the hour that would experience the highest level of truck activity and worker vehicle activity compared with the lowest existing levels of traffic. Any locations predicted to experience less than a doubling of Noise Passenger Car Equivalents (Noise PCEs), which would translate to a 3 dBA increase in noise levels, would not be carried further into the detailed noise analysis.

2. Select analysis hours for cumulative on-site equipment and construction truck noise analysis for daytime and late-night construction activity. The 7 AM hour was selected as the daytime analysis hour upon receipt of a detailed conceptual construction schedule. The 11 PM to 5 AM hours were selected as the late-night time period based on the projected schedule of nighttime work.
3. Select receptor locations for cumulative on-site equipment and construction truck noise analysis. Selected receptors were representative residential or other noise-sensitive uses potentially affected by the proposed project during operation of on-site construction equipment and/or along routes taken to and from the site by construction trucks or routes taken by worker vehicles associated with an individual sub-area.
4. Establish existing noise levels at selected receptors. Noise levels were measured at several at-grade locations, and calculated for the other noise receptor locations included in the analysis. **Figure 6.12-1** shows the construction noise measurement locations. Existing noise levels at noise receptors other than the selected receptor sites or during hours when existing noise levels were not measured were established using the CadnaA model, as described below.
5. Establish worst-case noise analysis periods for detailed analysis. The worst-case noise analysis periods are the periods during the construction schedule that are expected to have the greatest potential to result in construction noise effect. These periods were determined based on number and type of equipment operating on site, and the amount of construction-related vehicular traffic expected to occur according to the conceptual construction schedule and logistics. One analysis period was selected per year.
6. Calculate construction noise levels for each analysis period for both daytime and nighttime construction. Given the on-site equipment, construction trucks, and worker vehicles that are expected during each of the analysis periods, and the location of the equipment, which was based on construction logistics diagrams and construction truck and worker vehicle trip assignments, a CadnaA model file for each analysis period and each analysis hour was created. All model files included each of the construction noise sources operating in the analysis period and hour, calculation points representing multiple locations on various façades and floors of the associated receptors previously identified, as well as the noise control measures that would be used on the site, as described below.
7. Determine total noise levels and noise level increments during construction. For each analysis period, analysis hour, and each noise receptor, the calculated level of construction noise was logarithmically added to the existing noise level to determine the cumulative total noise level. The existing noise level at each receptor was then arithmetically subtracted from the cumulative noise level in each analysis period to determine the noise level increments.
8. Establish construction noise duration. For each receptor, the noise level increments in each analysis period and hour were examined to determine the duration during construction that the receptor would experience substantially elevated noise levels.
9. Compare noise level increments with the *CEQR Technical Manual* noise screening thresholds. At each receptor, based on the magnitude and duration of predicted noise level increases due to construction, a determination of whether the proposed project would have the potential to result in significant adverse construction noise effects was made.



Project Area One

Project Area Two

Collected Noise Level Measurement Locations

Supplemental Noise Monitoring Locations

0 1,000 FEET

Capital Project SANDRESM1

EAST SIDE COASTAL RESILIENCY PROJECT

Construction Noise Analysis Measurement Locations

Figure 6.12-1

DETERMINATION OF NO ACTION AND NON-CONSTRUCTION NOISE LEVELS

Noise generated by construction activities is added to noise generated by non-construction traffic on adjacent roadways in order to determine the total noise levels at each receptor location. Existing noise levels were conservatively used as the baseline noise levels for determining construction-generated noise level increases. Existing noise levels were established according to the following:

- Perform noise measurements at selected noise receptor locations (as described below).
- If the analysis hour was an hour other than the hour of the noise level measurement, adjust the measured levels to the analysis hour based on hour-to-hour noise level profiles from 24-hour noise level measurements or based on differences in traffic between the analysis hour and the measurement hour.
- During the late-night time period (11 PM to 5 AM), the lowest hourly noise level during that time period was selected to represent the existing nighttime noise levels.
- Calculate existing noise levels at the noise measurement locations as well as all other receptor sites using the CadnaA model with existing site geometry and existing traffic on adjacent roadways as inputs.
- Determine adjustment factors based on the difference between the measured and calculated existing noise levels at the measurement locations.
- Apply the adjustment factors to the calculated existing noise levels at the construction noise receptors.

ANALYSIS PERIODS

Construction of the proposed project is anticipated to start in spring 2020 with Alternatives 2, 3, and 5 projected to be completed in 2025 and the Preferred Alternative is anticipated to be completed in 2023. This shorter construction duration for the Preferred Alternative is primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive and this alternative would also result in the full closure of East River Park so it can be reconstructed in a single stage.

A screening analysis was performed to determine the analysis periods with the greatest construction activity resulting in the loudest construction periods. The screening analysis was based on an anticipated construction activity schedule, the equipment logistics, and sensitive noise receptor locations. The number of workers, types and number of pieces of equipment and number of construction vehicles anticipated to be operating during each analysis period was determined. To be conservative, the construction activity screening analysis for each analysis period assumed that both on-site construction activities and off-site construction-related traffic movements including barging deliveries could occur simultaneously.

NOISE REDUCTION MEASURES

Construction associated with the proposed project would be required to follow the requirements of the *NYC Noise Control Code* (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) for construction noise control measures. Specific noise control measures would be described in future noise mitigation plan(s) required under the *NYC Noise Code*. These measures could include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures would be implemented in accordance with the *NYC Noise Code*:

- Equipment that meets the sound level standards specified in Subchapter 5 of the *NYC Noise Control Code* would be utilized from the start of construction. **Table 6.12-3** shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the proposed project. For equipment other than those listed in **Table 6.12-3**, noise emission values for analysis would be determined based on manufacturer's specifications, published noise level data, or field measurements.
- As early in the construction period as logistics would allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification) to the extent feasible and practicable.

Table 6.12-3
Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	NYCDEP Typical Noise Level at 50 feet[1]
Auger Drill Rig	85
Backhoe	80
Bar Bender	80
Compactor (ground)	80
Compressor (air, less than or equal to 350 cfm)	53
Compressor (air, greater than 350 cfm)	80
Concrete Mixer Truck	85
Concrete Pump Truck	82
Concrete Saw	90
Crane	85
Dozer	85
Drill Rig Truck	84
Dump Truck	84
Dumpster/Rubbish Removal	78
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator	82
Generator (< 25 KVA, VMS signs)	70
Gradall	85
Impact Pile Driver	95
Jackhammer	85
Man Lift	85
Paver	85
Pickup Truck	55
Pneumatic Tools	85
Pumps	77
Rock Drill	85
Roller	85
Slurry Plant	78
Soil Mix Drill Rig	80
Tractor	84
Vacuum Street Sweeper	80
Vibratory Pile Driver	95
Welder/Torch	73
Rock Drill	85

Source:
[1] "Rules for Citywide Construction Noise Mitigation," Chapter 28, DEP, 2007.

- Where feasible and practicable, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon Title 24, Chapter 1, Subchapter 7, Section 24-163, of the *NYC Administrative Code*.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.
- A properly secured impact cushion (either a commercially available model or one fabricated from scrap wood, leather, or rubber at the job site) would be installed on top of piles that are being driven by an impact hammer.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction would be implemented to the extent feasible and practicable:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations.
- Noise barriers constructed from plywood or other materials to provide shielding; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) for certain dominant noise equipment to the extent feasible and practical based on the results of the construction noise calculations. The details to construct portable noise barriers, enclosures, tents, etc. are shown in DEP's "Rules for Citywide Construction Noise Mitigation."[2]

NOISE RECEPTOR SITES

Thirteen noise measurement locations (i.e., sites M1a to M11) were selected to determine the baseline existing noise levels, and 70 receptor locations (i.e., sites 1 to 70) representing buildings or noise-sensitive open space locations close to the project areas were selected as discrete noise receptor sites for the construction noise analysis. These receptors were either located directly adjacent to the project areas or streets where construction trucks would pass. Each receptor site was the location of a residence or other noise-sensitive use. At some buildings, multiple building façades were analyzed. At high-rise buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. **Table 6.12-4** lists the noise receptor sites and the associated land use at each site. The receptor sites selected for detailed analysis are representative of other noise receptors in the immediate project area and are the locations where maximum project effects due to construction noise would be expected.

[2] As found at: http://www.nyc.gov/html/dep/pdf/noise_constr_rule.pdf

Table 6.12-4
Noise Receptor Locations

Receptor	Location	Associated Land Use
M1a	East Yard of Residential Building at Grand Street and FDR Drive East Yard	Residential/Open Space
M2	342 First Avenue (Peter Cooper Village) East-Facing Yard	Residential/Open Space
M3	East River Park North of Williamsburg Bridge	Open Space
M4	East River Park East of East 4th Street	Open Space
M5	Montgomery Street at Cherry Street	Residential
M5a	Montgomery Street between Cherry Street and Madison Street	Residential
M6	Pitt Street between East Broadway and Grand Street	Residential/Open Space
M7	Pike Street between Cherry Street and Madison Street	Residential/Open Space
M8	East Houston Street at Baruch Place	Residential/Open Space
M9	East Houston Street between Norfolk and Suffolk Streets	Residential
M10	Avenue C north of East 16th Street	Residential
M11	East 23rd Street at Asser Levy Place	Residential/Hospital
1	FDR Drive/Jackson Street	Open Space (Corlears Hook Park)
2	East River Park Amphitheater	Open Space (East River Park)
3	East River Park by Grand Street	Open Space (East River Park)
4	East River Park near 8th Street	Open Space (East River Park)
5	FDR/Ave C (Murphy Brothers Playground)	Open Space (Murphy Brothers Playground)
6	FDR Drive/East 20th Street	Open Space (East River Colonnade)
7	FDR Drive/East 25th Street	Open-Space (Asser Levy Playground)
8A-8G	570 Grand Street	Residential
9A-9G	455 FDR Drive	Residential
10-A-10D	71 Jackson Street	Residential
11A-11D	367 FDR Drive	Residential
12A-12D	645 Water Street	Residential
13D-13D	322 FDR Drive	Public Facilities (Lower Eastside Service Center)
14A-14D	621 Water Street	Public Facilities (Community Access Housing)
15A-15D	605 Water Street	Residential
16A-16C	309 Avenue C Loop	Residential
17A-17C	315-317-319-321 Avenue C	Residential
18A-18D	620 East 20th Street	Residential
19A-19C	601 East 20th Street	Residential
20A-20C	8 Peter Cooper Road	Residential
21A-21C	7 Peter Cooper Road	Residential
22A-22C	530 East 23rd Street	Residential
23A-23D	392 Asser Levy Place	Open Space (Asser Levy Park)
24A-24E	425 East 25th Street	Public Facilities (CUNY Brookdale Dorm)
25A-25C	10 Waterside Plaza	Residential
26A-26C	24-50 FDR Drive	Public Facilities (UN International School)
27A-27D	525 FDR Drive	Residential
28A-28D	555 FDR Drive	Residential
29A-29-D	571 FDR Drive	Residential
30A-30C	605 FDR Drive	Residential
31A-+31D	500 East Houston Street	Residential
32A-32D	691 FDR Drive	Residential
33A-33D	709 FDR Drive	Residential
34A-34D	725 FDR Drive	Residential

Table 6.12-4 (cont'd)
Noise Receptor Locations

Receptor	Location	Associated Land Use
35A-35D	903 East 6th Street	Residential
36A-36D	749 FDR Drive	Residential
37A-37D	765 FDR Drive	Residential
38A-38D	819 FDR Drive	Residential
39A-39D	911 FDR Drive	Residential
40A-40D	10-23 FDR Drive	Residential
41A-41D	11-15 FDR Drive	Residential
42A-42D	1141 FDR Drive	Residential
43A-43D	1223 FDR Drive	Residential
44	84 Montgomery Street	Public Facilities (NYC School District 1)
45	75 Montgomery Street	Residential
46	626 Water Street	Residential
47	640 Water Street	Residential
48	662 Water Street	Residential
49	684 Water Street	Residential
50	32 Jackson Street	Residential
51	453 FDR Drive	Residential
52	473 FDR Drive	Residential
53	60 Baruch Drive	Residential
54	123 Mangin Street	Public Facility (Bard School)
55	484 East Houston Street	Residential
56	950 East 4th Walk	Residential
57	711 FDR Drive	Residential
58	930 East 6th Street	Residential
59	809 East 6th Street	Residential
60	110 Avenue D	Residential
61	132 Avenue D	Residential
62	465 East 10th Street	Residential
63	170 Avenue D	Residential
64	285 Avenue C	Residential
65	277 Avenue C	Residential
66	622 East 20th Street	Residential
67	6 Peter Cooper Road	Residential
68	520 East 23rd Street	Residential
69	423 East 23rd Street	Public Facilities (VA Hospital)
70	480 FDR Drive	Public Facilities (Bellevue Hospital)

Nighttime construction activity was not evaluated at receptors M3, M4, 1 through 7, 23, 26, 44, or 54. These receptors represent Open Space and Public Facility uses that would not be in use during the late night hours when construction activity is expected to occur.

F. AFFECTED ENVIRONMENT – NOISE MEASUREMENT RESULTS

EQUIPMENT USED DURING NOISE SURVEY

Measurements were performed using Brüel & Kjær Sound Level Meters (SLM) Type 2270, 2260, and Type 2250, Brüel & Kjær ½ inch microphones Type 4189, and a Brüel & Kjær Sound Level Calibrator Type 4231. The Brüel & Kjær SLMs are a Type 1 instrument according to ANSI Standard S1.4-1983 (R2006). The SLMs have a laboratory calibration date within one year of the date of the measurements, as is standard practice. The microphones were mounted at a height of approximately 5 to 6 feet above the ground (or rooftop for site 1b) and were mounted away from any large, reflecting surfaces that could affect the sound level measurements. The

SLMs were calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. Measurements at the location were made on the A-scale (dBA). The data were digitally recorded by the SLM and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

NOISE SURVEY RESULTS

The baseline noise levels at each of the noise survey locations are shown in **Table 6.12-5** for both the 6 AM mobile source screening analysis hour, the 7 AM daytime cumulative on-site equipment and construction truck trip analysis hour, and the late-night (LN) on-site equipment analysis time period (11 PM to 5 AM). Full noise survey results are shown in **Appendix K2**.

At sites M1a, M2a, and M4, the dominant noise source was vehicular traffic on the FDR Drive. At sites M1b and M3, the dominant noise source was vehicular traffic on the Williamsburg Bridge and the FDR Drive. At sites M5, M5a, and M6 through M11, vehicular traffic on the adjacent streets was the dominant source of noise.

In terms of CEQR noise exposure guidelines (shown in **Table 6.12-2**), during the morning analysis hours, existing noise levels at site M4 are in the "clearly acceptable" category, existing noise levels at sites M5, M5a, M6, M8, M9, M10, and M11 are in the "marginally acceptable" category, existing noise levels at sites M1a, M1b, and M2 are in the "marginally unacceptable" category, and existing noise levels at sites M3 and M7 are in the "clearly unacceptable" category.

G. ENVIRONMENTAL EFFECTS

MOBILE SOURCE SCREENING ANALYSIS

As described in the methodology above, a mobile-source screening analysis was conducted for construction of the proposed project at each of the at-grade noise measurement locations located adjacent to a roadway, i.e., sites M1a, M2, M5, M5a, M6, M7, M8, M9, M10, and M11. The mobile-source noise analysis examined the worst-case condition for project trip generation, which would occur under the Preferred Alternative. Increases in noise level resulting from construction worker auto and truck trips would be lower under Alternative 2.

Table 6.12-5
Existing Noise Levels at Noise Measurement Locations in dBA

Site	Location	Start Time	L_{eq}	L_{10}
M1a	East Yard of Residential Building at Grand Street and FDR Drive East Yard	6AM	73.9	75.4
		7AM	72.8	74.4
		LN	66.5	69.4
M1b	Rooftop of Residential Building at Grand Street and FDR Drive East Yard	6AM	74.9	76.2
		7AM	73.5	75.4
		LN	68.1	70.5
M2	342 First Avenue (Peter Cooper Village) East-Facing Yard	6AM	69.7	71.7
		7AM	72.1	73.0
		LN	63.2	65.1
M3	East River Park North of Williamsburg Bridge	6AM	75.8	80.1
		7AM	74.4	79.3
		LN	69.0	74.4
M4	East River Park East of East 4th Street	6AM	62.3	63.6
		7AM	61.2	62.6
		LN	54.9	57.6
M5	Montgomery Street at Cherry Street	6AM	64.4	66.3
		7AM	67.1	68.6
		LN	58.7	56.6
M5a	Montgomery Street between Cherry Street and Madison Street	6AM	63.5	67.2
		7AM	66.2	69.5
		LN	57.8	57.5
M6	Pitt Street between East Broadway and Grand Street	6AM	60.1	62.6
		7AM	62.8	64.9
		LN	54.4	52.9
M7	Pike Street between Cherry Street and Madison Street	6AM	76.0	79.7
		7AM	78.7	82.0
		LN	70.3	70.0
M8	East Houston Street at Baruch Place	6AM	65.1	68.2
		7AM	64.0	67.2
		LN	57.7	62.2
M9	East Houston Street between Norfolk and Suffolk Streets	6AM	66.4	69.5
		7AM	65.3	68.5
		LN	59.0	63.5
M10	Avenue C north of East 16th Street	6AM	63.3	65.1
		7AM	65.7	66.4
		LN	56.8	58.5
M11	East 23rd Street at Asser Levy Place	6AM	65.1	67.2
		7AM	67.5	68.5
		LN	58.6	60.6

Note: Measurements were conducted by AKRF, Inc. on June 23, 2015 and November 12, 17, and 24, 2015.

The analysis hour for the mobile source screening analysis was the 6 AM hour and consequently includes both worker auto trips to the project site as well as peak hourly construction truck trips to and from the site. Consequently, it is the hour of the day that mobile-source construction noise effects would be mostly likely to occur. The results of the mobile-source screening analysis are shown in **Table 6.12-6**.

As shown in **Table 6.12-6**, the maximum increase in noise due to construction-related vehicular traffic would be less than 3 dBA, which would be considered "just noticeable" according to the

CEQR Technical Manual. Since the results of this mobile-source screening analysis represent the locations, times, and construction scenario under which mobile-source construction noise effects would be most likely to occur, vehicle trips associated with construction of the proposed project are not expected to result in a significant adverse noise effect. The cumulative effects of construction vehicle trips and operation of on-site construction equipment are discussed below.

Table 6.12-6
Construction Mobile-Source Noise Analysis Results for 6AM Hour in dBA

Site	Location	Existing $L_{eq(1)}$	Construction $L_{eq(1)}$	$L_{eq(1)}$ Increment
M1a	East Yard of Residential Building at Grand Street and FDR Drive East Yard	73.9	75.2	1.3
M2	342 First Avenue (Peter Cooper Village) East-Facing Yard	69.7	69.8	0.1
M5	Montgomery Street at Cherry Street	63.5	65.7	2.2
M6	Pitt Street between East Broadway and Grand Street	60.1	62.8	2.7
M7	Pike Street between Cherry Street and Madison Street	76.0	77.0	1.0
M8	East Houston Street at Baruch Place	65.1	65.2	0.1
M9	East Houston Street between Norfolk and Suffolk Streets	66.4	66.5	0.1
M10	Avenue C north of East 16th Street	63.3	63.3	0.1
M11	East 23rd Street at Asser Levy Place	65.1	66.2	1.0

CUMULATIVE ON-SITE EQUIPMENT AND CONSTRUCTION TRUCK NOISE ANALYSIS

Using the methodology described above, and considering the noise reduction measures for source and path controls specified above, noise analyses were performed to determine $L_{eq(1)}$ noise levels that would be expected to occur during each year of construction under the Preferred Alternative and Alternatives 3 resulting from on-site equipment and construction truck trips. The full noise analysis results are shown for the Preferred Alternative and Alternative 3 in **Appendix K2**.

In addition, as discussed above, the construction noise analysis was performed using the quarter of each year in and the Preferred Alternative and Alternative 3 that is anticipated to result in the maximum construction noise levels. The analysis conservatively assumes that this worst-case quarter would represent construction noise levels throughout the entire year. During times of less intense construction activity than in the periods selected for modeling, construction noise levels are anticipated to be less. For instance, pile-driving at any specific location would be expected to last only three to eight days depending on specific construction methods. Consequently, an individual receptor location would experience pile-driving noise for only a limited period of time out of the construction period. Furthermore, many of the loudest pieces of construction equipment, including excavators, concrete trucks, portable cement mixers, etc., are mobile, and move about the site throughout the days and months of construction. The construction analysis considers a reasonable worst-case scenario with all mobile equipment in the locations that would tend to generate the most noise at the adjacent receptors. Such a scenario, and the high noise levels associated with it, as have been examined in this construction noise analysis, would be likely to occur only during limited times throughout the construction period, and thus represent a highly conservative analysis.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system would be constructed in the proposed project area. Therefore, this alternative is not evaluated further as there will no new construction associated with the proposed project.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative is predicted to at times result in noticeable noise level increases at noise sensitive uses in buildings immediately west of the FDR Drive along both main project areas, as well as along East 23rd Street in Project Area Two. Generally, the noise level increases resulting from construction would occur at buildings and open space areas while construction activity is in the immediate vicinity of these noise receptors, and noise level increases would be lower when construction activity moves to a new section of the project area. Areas immediately adjacent to construction work areas would experience the highest levels of noise while construction is ongoing, whereas receptors in buildings further west of the project areas would experience somewhat less noise because of the greater distance from the on-site construction equipment. Compared to Alternative 3 as discussed below, maximum construction noise levels at receptors nearest floodwall construction within East River Park for the Preferred Alternative would be slightly lower, because pile driving for the Preferred Alternative would occur further from the receptors. In order to ensure public safety, East River Park, Murphy Brothers Playground, and Asser Levy Playground would be closed to the public during the time when construction would occur at these park resources. The results of the detailed construction noise analysis of the Preferred Alternative are summarized in **Table 6.12-7**.

Table 6.12-7
Construction Noise Analysis Results (in dBA)

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
M1a	East Yard of Residential Building at Grand Street and FDR Drive East Yard	Day	72.8	72.8	72.9	76.5	0.2	3.7
		Night	66.5	66.5	66.5	70.2	0.0	3.7
M2	342 First Avenue (Peter Cooper Village) East-Facing Yard	Day	70.3	70.3	87.6	89.3	17.2	18.9
		Night	63.2	63.2	63.2	66.6	0.0	3.4
M5	Montgomery Street at Cherry Street	Day	64.4	64.4	65.3	66.6	0.9	2.2
		Night	58.7	58.7	60.3	63.7	0.0	3.4
M5a	Montgomery Street between Cherry Street and Madison Street	Day	66.2	66.2	66.9	67.7	0.7	1.5
		Night	57.8	57.8	60.3	63.9	0.0	3.6
M6	Pitt Street between East Broadway and Grand Street	Day	60.3	60.3	62.4	64.0	2.1	3.6
		Night	56.8	56.8	60.3	63.0	0.0	2.7
M7	Pike Street between Cherry Street and Madison Street	Day	76.0	76.0	76.0	76.1	0.0	0.1
		Night	70.3	70.3	70.3	70.5	0.0	0.2
M8	East Houston Street at Baruch Place	Day	65.1	65.1	65.4	66.7	0.3	1.6
		Night	57.7	57.7	60.3	60.3	0.0	0.0
M9	East Houston Street between Norfolk and Suffolk Streets	Day	66.4	66.4	66.4	66.4	0.0	0.0
		Night	59.0	59.0	60.3	60.3	0.0	0.0
M10	Avenue C north of East 16th Street	Day	63.3	63.3	63.3	69.2	0.0	5.9
		Night	56.8	56.8	60.3	68.2	0.0	7.9
M11	East 23rd Street at Asser Levy Place	Day	65.1	65.1	65.5	68.6	0.4	3.5
		Night	58.6	58.6	60.9	66.2	0.5	5.9
1	FDR Drive/Jackson Street	Day	75.0	75.0	85.3	85.3	10.3	10.3
		Night	-	-	-	-	-	-
6	FDR Drive/East 20th Street	Day	70.0	70.0	70.3	70.3	0.2	0.3
		Night	-	-	-	-	-	-
8A-8G	**570 Grand Street**	**Day**	**62.4**	**71.8**	**62.6**	**74.8**	**0.0**	**4.9**
		Night	**60.3**	**65.5**	**60.3**	**73.8**	**0.0**	**13.5**
9A-9G	**455 FDR Drive**	**Day**	**61.4**	**72.2**	**61.4**	**75.9**	**0.0**	**7.5**
		Night	**60.3**	**65.9**	**60.3**	**73.6**	**0.0**	**12.8**
10-A-10D	**71 Jackson Street**	**Day**	**63.9**	**73.4**	**64.2**	**75.8**	**0.0**	**5.5**
		Night	**60.3**	**67.1**	**60.3**	**70.0**	**0.0**	**7.8**
11A-11D	**367 FDR Drive**	**Day**	**62.0**	**73.6**	**62.1**	**75.3**	**0.0**	**4.8**
		Night	**60.3**	**67.3**	**60.3**	**71.2**	**0.0**	**7.1**
12A-12D	**645 Water Street**	**Day**	**61.4**	**73.7**	**61.6**	**75.5**	**0.1**	**4.7**
		Night	**60.3**	**67.4**	**60.3**	**73.2**	**0.0**	**7.6**

Table 6.12-7 (cont'd)
Construction Noise Anlaysis Results

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
13D-13D	**322 FDR Drive**	**Day**	**65.7**	**74.9**	**65.8**	**78.9**	**0.0**	**6.2**
		Night	**60.3**	**68.6**	**60.3**	**77.6**	**0.0**	**11.0**
14A-14D	**621 Water Street**	**Day**	**65.2**	**74.9**	**65.3**	**79.9**	**0.0**	**7.1**
		Night	**60.3**	**68.6**	**60.3**	**77.3**	**0.0**	**11.7**
15A-15D	**605 Water Street**	**Day**	**65.8**	**72.3**	**65.8**	**81.4**	**0.0**	**9.3**
		Night	**60.3**	**66.0**	**60.3**	**76.6**	**0.0**	**11.6**
16A-16C	309 Avenue C Loop	Day	60.3	66.9	60.4	72.6	0.0	9.5
		Night	60.3	60.3	60.3	69.9	0.0	9.6
17A-17C	**315-317-319-321 Avenue C**	**Day**	**63.0**	**71.3**	**63.1**	**79.8**	**0.0**	**12.3**
		Night	**60.3**	**64.2**	**60.3**	**67.6**	**0.0**	**7.3**
18A-18D	**620 East 20th Street**	**Day**	**60.3**	**70.8**	**64.4**	**84.1**	**3.6**	**15.0**
		Night	**60.3**	**63.7**	**60.3**	**66.7**	**0.0**	**3.9**
19A-19C	**601 East 20th Street**	**Day**	**66.1**	**71.8**	**66.2**	**78.2**	**0.1**	**7.3**
		Night	**60.3**	**64.7**	**60.3**	**68.0**	**0.0**	**4.5**
20A-20C	**8 Peter Cooper Road**	**Day**	**61.8**	**71.6**	**61.9**	**77.3**	**0.0**	**8.3**
		Night	**60.3**	**64.5**	**60.3**	**69.6**	**0.0**	**7.4**
21A-21C	**7 Peter Cooper Road**	**Day**	**65.0**	**71.9**	**65.1**	**77.5**	**0.0**	**7.1**
		Night	**60.3**	**64.8**	**60.3**	**72.5**	**0.0**	**10.2**
22A-22C	**530 East 23rd Street**	**Day**	**66.3**	**70.7**	**66.5**	**76.4**	**0.0**	**6.6**
		Night	**60.3**	**63.6**	**60.4**	**77.1**	**0.0**	**16.5**
23A-23D	**392 Asser Levy Place**	**Day**	**60.3**	**70.3**	**60.4**	**83.0**	**0.0**	**14.2**
		Night	**-**	**-**	**-**	**-**	**-**	**-**
24A-24E	400-440 East 26th Street	Day	60.3	73.1	60.3	76.0	0.0	11.9
		Night	60.3	66.0	60.3	69.5	0.0	9.2
25A-25C	10 Waterside Plaza	Day	60.3	69.7	60.3	71.8	0.0	6.6
		Night	60.3	62.6	60.3	74.6	0.0	14.3
26A-26C	24-50 FDR Drive	Day	60.3	65.7	60.3	68.6	0.0	4.2
		Night	-	-	-	-	-	-
27A-27D	**525 FDR Drive**	**Day**	**61.8**	**73.8**	**61.9**	**78.4**	**0.1**	**11.4**
		Night	**60.3**	**67.5**	**60.3**	**72.6**	**0.0**	**9.9**
28A-28D	**555 FDR Drive**	**Day**	**63.4**	**73.2**	**63.5**	**79.2**	**0.1**	**9.0**
		Night	**60.3**	**66.9**	**60.3**	**69.0**	**0.0**	**6.3**
29A-29-D	571 FDR Drive	Day	63.6	73.6	63.7	78.3	0.1	9.2
		Night	60.3	67.3	60.3	68.5	0.0	1.9
30A-30C	605 FDR Drive	Day	65.6	74.7	66.3	78.5	0.5	7.0
		Night	60.3	68.4	60.3	68.6	0.0	1.8
31A-+31D	500 East Houston Street	Day	63.8	74.3	64.2	77.9	0.2	8.7
		Night	60.3	68.0	60.3	68.4	0.0	2.0
32A-32D	691 FDR Drive	Day	62.5	74.5	62.9	80.3	0.1	7.9
		Night	60.3	68.2	60.3	69.0	0.0	1.5
33A-33D	709 FDR Drive	Day	64.9	74.1	66.6	79.7	1.0	10.8
		Night	60.3	67.8	60.3	68.9	0.0	1.8
34A-34D	725 FDR Drive	Day	65.7	74.1	67.8	78.9	1.1	8.4
		Night	60.3	67.8	60.3	70.0	0.0	3.8
35A-35D	903 East 6th Street	Day	60.8	74.5	64.2	77.9	1.5	8.9
		Night	60.3	68.2	60.3	70.5	0.0	5.9
36A-36D	749 FDR Drive	Day	61.9	74.5	65.4	78.0	1.7	7.5
		Night	60.3	68.2	60.3	70.6	0.0	3.7

Table 6.12-7 (cont'd)
Construciton Noise Analysis Results

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
37A-37D	**765 FDR Drive**	**Day**	**60.3**	**75.0**	**61.6**	**78.8**	**1.3**	**10.9**
		Night	**60.3**	**68.7**	**60.3**	**71.4**	**0.0**	**4.3**
38A-38D	**819 FDR Drive**	**Day**	**60.3**	**74.6**	**64.7**	**80.3**	**3.2**	**11.4**
		Night	**60.3**	**68.3**	**60.3**	**73.8**	**0.0**	**12.3**
39A-39D	**911 FDR Drive**	**Day**	**63.9**	**73.8**	**72.4**	**81.6**	**4.0**	**11.2**
		Night	**60.3**	**67.5**	**60.3**	**82.1**	**0.0**	**20.3**
40A-40D	**10-23 FDR Drive**	**Day**	**66.9**	**75.0**	**73.6**	**83.2**	**3.4**	**11.5**
		Night	**60.6**	**68.7**	**60.6**	**84.2**	**0.0**	**19.4**
41A-41D	**11-15 FDR Drive**	**Day**	**62.2**	**75.1**	**70.2**	**81.8**	**3.9**	**11.5**
		Night	**60.3**	**68.8**	**60.3**	**76.5**	**0.0**	**11.8**
42A-42D	**1141 FDR Drive**	**Day**	**60.3**	**75.0**	**66.5**	**82.1**	**1.2**	**12.3**
		Night	**60.3**	**68.7**	**60.3**	**79.6**	**0.0**	**15.6**
43A-43D	**1223 FDR Drive**	**Day**	**60.3**	**75.2**	**65.6**	**84.3**	**0.1**	**14.9**
		Night	**60.3**	**68.9**	**60.3**	**84.0**	**0.0**	**20.5**
44	84 Montgomery Street	Day	68.9	70.1	69.3	71.6	0.3	1.6
		Night	-	-	-	-	-	-
45	75 Montgomery Street	Day	67.5	68.9	67.8	71.4	0.2	3.0
		Night	61.8	63.2	61.8	67.1	0.0	5.0
46	626 Water Street	Day	64.7	65.9	64.8	68.1	0.1	2.2
		Night	60.3	60.3	60.3	63.1	0.0	2.8
47	640 Water Street	Day	65.6	67.0	65.7	68.1	0.1	1.1
		Night	60.3	61.3	60.3	65.6	0.0	5.3
48	662 Water Street	Day	66.1	68.6	66.4	70.0	0.2	1.8
		Night	60.4	62.9	60.4	66.0	0.0	4.7
49	684 Water Street	Day	65.1	66.1	66.3	70.5	1.2	4.4
		Night	60.3	60.4	60.3	66.7	0.0	6.4
50	32 Jackson Street	Day	65.4	66.1	67.3	70.1	1.6	4.4
		Night	60.3	60.4	60.3	68.7	0.0	8.4
51	453 FDR Drive	Day	63.9	68.1	65.4	73.8	1.5	6.9
		Night	60.3	62.4	60.3	72.4	0.0	11.9
52	473 FDR Drive	Day	60.7	64.5	61.6	67.6	0.8	3.4
		Night	60.3	60.3	60.3	60.8	0.0	0.5
53	**60 Baruch Drive**	**Day**	**60.9**	**64.2**	**61.2**	**70.5**	**0.2**	**8.0**
		Night	**60.3**	**60.3**	**60.3**	**68.9**	**0.0**	**8.5**
54	**123 Mangin Street**	**Day**	**60.5**	**63.7**	**62.2**	**73.1**	**1.3**	**11.1**
		Night	**-**	**-**	**-**	**-**	**-**	**-**
55	484 East Houston Street	Day	60.3	62.3	61.5	68.6	0.8	6.4
		Night	60.3	60.3	60.3	60.5	0.0	0.1
56	950 East 4th Walk	Day	60.3	60.9	62.1	70.4	1.8	10.0
		Night	60.3	60.3	60.3	60.7	0.0	0.3
57	711 FDR Drive	Day	60.3	60.3	61.4	66.8	1.1	6.5
		Night	60.3	60.3	60.3	60.4	0.0	0.1
58	930 East 6th Street	Day	60.3	60.3	62.1	70.3	1.8	10.0
		Night	60.3	60.3	60.3	60.5	0.0	0.2
59	809 East 6th Street	Day	60.3	60.3	60.7	65.6	0.4	5.3
		Night	60.3	60.3	60.3	60.4	0.0	0.1
60	110 Avenue D	Day	60.3	60.3	66.6	68.3	6.3	8.0
		Night	60.3	60.3	60.3	61.8	0.0	1.5

Table 6.12-7 (cont'd)
Construction Noise Analysis Results

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
61	**132 Avenue D**	**Day**	**60.3**	**64.1**	**68.1**	**73.8**	**7.3**	**10.3**
		Night	**60.3**	**60.3**	**60.3**	**68.6**	**0.0**	**8.3**
62	**465 East 10th Street**	**Day**	**60.3**	**65.2**	**68.7**	**74.4**	**6.0**	**10.7**
		Night	**60.3**	**60.3**	**60.3**	**66.3**	**0.0**	**6.0**
63	170 Avenue D	Day	60.3	61.6	66.7	71.9	6.0	11.0
		Night	60.3	60.3	60.3	63.0	0.0	2.7
64	285 Avenue C	Day	60.8	63.9	60.9	68.9	0.0	5.6
		Night	60.3	60.3	60.3	67.4	0.0	7.1
65	277 Avenue C	Day	60.3	60.3	60.3	69.1	0.0	8.8
		Night	60.3	60.3	60.3	69.0	0.0	8.7
66	622 East 20th Street	Day	60.3	60.3	60.9	69.6	0.6	9.3
		Night	60.3	60.3	60.3	60.5	0.0	0.2
67	6 Peter Cooper Road	Day	60.3	60.5	60.3	68.6	0.0	8.2
		Night	60.3	60.3	60.3	60.8	0.0	0.5
68	**520 East 23rd Street**	**Day**	**60.3**	**63.7**	**60.4**	**68.4**	**0.1**	**4.7**
		Night	**60.3**	**60.3**	**60.3**	**74.0**	**0.0**	**13.7**
69	423 East 23rd Street	Day	60.3	61.8	60.3	69.9	0.0	8.9
		Night	60.3	60.3	60.3	65.6	0.0	5.3
70	480 FDR Drive	Day	63.3	66.3	63.3	69.2	0.1	4.5
		Night	60.3	60.3	60.3	65.3	0.0	5.0

Notes:
[1] Values shown in **bold** for receptors where significant adverse construction noise impacts are predicted to occur.
[2] The data shown in this table reflect the maximum predicted increases in noise level resulting from construction under the Preferred Alternative. However, the significance of construction noise impacts is determined based on the duration of construction noise and its total magnitude in addition to its intensity as indicated by the noise level increments, each of which is discussed in the text below. As a result, some receptors that have lower predicted noise level increments were determined to experience significant adverse impacts and higher increments at other receptors were determined not to be significant.

Open Space Receptors along the FDR Drive

At the open space receptors along the FDR Drive—Receptors 1 and 6—the existing noise levels range from the mid 60s to mid 70s dBA, depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, and whether the adjacent section of the FDR Drive is on structure. These receptors are located in open spaces on both the east and west sides of the FDR Drive, Corlears Hook Park and the East River Bikeway between Avenue C and East 23rd Street.

Construction under the Preferred Alternative is predicted to produce noise levels at these receptors in the mid 60s to mid 80s dBA, resulting in noise level increases of up to approximately 10 dBA when construction occurs at the shortest distance from them. The predicted noise level increases at these open space locations would be noticeable and would exceed CEQR construction noise screening thresholds, and the total noise levels would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas also exceed CEQR recommended values for existing and No Action conditions.) However, the total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher noise levels.

At these receptors noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur during no more than two of the five years of construction. At these receptors, the construction activity that would produce the highest noise levels would be pile installation, as well as landscaping work. Both pile installation and landscaping would occur in a single location for a relatively brief period of time, typically not more than a month. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the entire construction period. Lower construction noise levels that would be expected to occur during activities other than pile installation may still result in exceedances of CEQR construction noise screening thresholds at some times, but would be substantially lower than the maximum levels that would occur during pile installation.

Construction noise levels at these receptors are predicted to be in the mid 60s to mid 80s dBA, noise level increases during construction were predicted to be up to approximately 10 dBA, and the elevated noise levels during construction are predicted to occur over a duration of approximately one to two years. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of open space would be limited. Furthermore, the construction noise predictions are conservative in that they consider the area of open space that remains open and accessible closest to the construction area. At other open space areas farther from construction work areas, noise levels would be lower, and open space users who are bothered by noise could choose the quieter open space areas. Based on these factors, the Preferred Alternative construction noise at these receptors would not result in a significant adverse effect.

Residential, Hospital, and School Receptors along the FDR Drive

At buildings including residences, hospital uses, and schools located along the FDR Drive immediately west of the project areas—Receptors 8–22 and 24–43—the daytime existing noise levels range from the mid-60s to high 70s dBA depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, height above grade (i.e., floor for high-rise buildings), and whether the adjacent section of the FDR Drive is on structure. Nighttime existing noise levels at these receptors range from the mid 50s to high 60s dBA.

Construction under the Preferred Alternative is predicted to produce noise levels at most of these receptors in the low-60s to low-80s dBA, resulting in noise level increases up to approximately 15 dBA when construction occurs at the closest distance to them. However, at some of the residential receptors along the FDR Drive, construction under the Preferred Alternative would produce noise levels in the mid-to-high 80s and/or would result in noise level increases of up to approximately 20 dBA. These include Receptors 14, 15, 17–22, 24, 25, and 37–43.

Receptors along Reach A

At Receptors 14 and 15, which represent 621 and 605 Water Street, respectively, daytime construction activity in Reach A occurring north of the FDR Drive near Montgomery Street and immediately adjacent to these buildings would produce noise levels in the low 80s dBA, which would result in noise level increases of up to approximately 9 dBA. These noise level increases would be noticeable, and noise levels in the low 80s are relatively high for this area.

At these receptors, daytime noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur only during the construction activity in Reach A near Montgomery Street immediately adjacent to these buildings, including construction of flood protection structures under the FDR Drive and north of the FDR Drive, which is anticipated to occur for approximately 11 months. During the rest of the construction period, daytime noise

levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during excavation and sheet pile installation.

At Receptors 14 and 15, nighttime construction activity in Reaches A and B including pile installation would produce noise levels in the low-80s dBA, which would result in noise level increases of up to approximately 17 dBA. These noise level increases would be noticeable, and nighttime noise levels in the low-80s are relatively high for this area. The pile installation work at Reaches A and B is anticipated to occur for approximately 11 months. During the rest of the construction period, nighttime noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, the buildings at 621 and 605 Water Street appear to have monolithic (i.e., non-insulated) glass windows and alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, daytime and nighttime interior noise levels during construction in this area would be in the mid-40s to high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these buildings over the course of an approximately 11 months of pile installation at Reaches A and B. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reaches M, N, and O

At Receptors 16 through 22, which represent residences along the west side of the FDR Drive between Avenue C Loop and East 23rd Street, daytime construction activity in Reaches N and O, would produce noise levels in the low-60s to mid-80s dBA, which would result in noise level increases of up to approximately 15 dBA. While the pile installation work at Reaches N and O is anticipated to occur for approximately 23 months, pile installation immediately adjacent to each receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately six months. During the remaining periods of pile driving activity in these reaches, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptor 16, daytime construction including pile installation would produce noise levels in the low to high 60s dBA, which would result in noise level increases of up to approximately 10 dBA. Daytime construction including pile installation along Reach M would occur for approximately 11 months. During the remaining 23 months of pile driving activity in these reaches, construction noise levels at this receptor would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptor 16, nighttime construction including pile driving in Reach M and construction of the flyover bridge would produce noise levels in the low to high 60s dBA, which would result in noise level increases of up to approximately 10 dBA. While nighttime construction including pile installation along Reach M and associated with the flyover bridge would occur for approximately 21 months, nighttime pile installation is proposed for only limited portions of Reach M. During the remaining periods of pile driving activity in these reaches, construction noise levels at this receptor would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

Daytime construction activity in Reaches N and O including pile installation and excavation associated with the north interceptor/drainage gate would produce noise levels in the low-60s to low 80s dBA at receptors 17 through 22, which would result in noise level increases of up to approximately 15 dBA. These noise level increases would be noticeable and daytime noise levels in the low 80s are relatively high for this area. The excavation work at the north drainage gate would occur throughout the construction period.

Nighttime construction activity in Reaches N and O including nighttime pile installation would produce noise levels in the low-60s to mid-70s dBA at receptors 17 through 22, which would result in noise level increases of up to approximately 17 dBA. These noise level increases would be noticeable and nighttime noise levels in the mid 70s are relatively high for this area. While the pile installation work at Reaches N and O is anticipated to occur for approximately 20 months, nighttime pile installation is proposed for only limited portions of Reaches N and O. During the remaining periods of pile driving activity in these reaches, construction noise levels at these receptors would not experience construction noise levels that exceed the CEQR construction noise screening thresholds.

Based on field observations, these buildings in Stuyvesant Town and Peter Cooper Village appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving at Receptor 16 would be in the high-30s to mid-40s dBA, up to 2 dBA greater than the 45 dBA threshold recommended for residential uses according to CEQR noise exposure guidelines. These minor exceedances of the CEQR noise exposure guidelines would be expected to occur during piling operations associated with the flyover bridge, up to approximately 12 months. Due to the limited duration and relatively low noise levels exceedances, this receptor is not predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

At receptors 17 through 22, interior noise levels during nighttime pile driving would be in the mid-30s to mid-50s dBA, up to approximately 9 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the six months of pile installation closest to each location. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reach P

At Receptors 24 and 25, which represent 400-440 East 26th Street and 10 Waterside Plaza, respectively, daytime pile installation in Reach P would produce noise levels in the mid-70s, which would result in noise level increases of up to approximately 12 dBA. While the pile installation work at Reach P is anticipated to occur for approximately 20 months, pile installation immediately adjacent to the receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptors 24 and 25, nighttime construction activity in Reaches O and P including pile installation in a portion of Reach P would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 15 dBA. These noise level increases would be noticeable and nighttime noise levels in the mid 70s are relatively high for this area. While the nighttime pile installation work at Reach P is anticipated to occur for approximately 20 months, pile installation immediately adjacent to the receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds, with noise level increments up to approximately 12 dBA.

Based on field observations, 400-440 East 26th Street appears to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units)), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, at this building, nighttime interior noise levels during the majority of nighttime pile driving would be in the mid-30s to mid-40s dBA, up to approximately 2 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

Based on field observations, 10 Waterside Plaza appears to have insulated glass windows and an alternative means of ventilation (i.e., package terminal air conditioning units), which would be expected to provide approximately 30 dBA window wall attenuation. Consequently, at this building, nighttime interior noise levels during the majority of nighttime pile driving would be less than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

While noise from construction of the Preferred Alternative during the daytime maximum activity level, i.e., pile installation at Reach P, would result in noise level increments up to approximately 12 dBA at 425 East 25th Street, represented by Receptor 24, these peak levels would occur only while construction activity is adjacent to this receptor. While noise from construction of the Preferred Alternative during the nighttime maximum activity level, i.e., pile installation at Reach P, would result in noise level increments up to approximately 15 dBA at 10 Waterside Plaza, represented by Receptor 25, these peak levels would occur only while construction activity is adjacent to this receptor. Noise levels would be lower during the remainder of the approximately 20 months that any construction would occur in the vicinity of this receptor. Furthermore, interior noise levels would be no more than approximately 2 dBA greater than the range considered acceptable by CEQR noise exposure guidance. While the nighttime construction noise level would be noticeable, due to the interior noise levels, construction noise would not rise to the level of a significant adverse effect at these receptors.

Receptors along Reach H

At Receptors 37 and 38, which represent 765 and 819 FDR Drive, daytime construction activity including floodwall, fill, and landscaping work at Reaches E, F, G, and H, would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable and occur over the course of the full construction period.

At these receptors, nighttime construction activity in Reaches H and I including pile installation would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 12 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 70s are relatively high for this area. The maximum noise levels described

above would occur during sheet pile installation at Reach H, which would last approximately 12 months. The pile installation work at Reach I is anticipated to occur for approximately 10 additional months and result in noise level increments up to approximately 9 dBA. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, 765 and 819 FDR Drive appear to have monolithic (i.e., non-insulated) glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the high 40s to low 60s dBA, which is up to approximately 17 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the 10 months of pile installation closest to this receptor. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reaches I and J

At Receptors 39 through 43, which represent 911 through 1223 FDR Drive, construction activity including reconstruction of the 10th Street pedestrian bridge, construction of the flyover bridge immediately adjacent to these buildings and construction of the flood wall in Reaches I and J that would occur west of the FDR Drive would produce noise levels in the mid-80s dBA, resulting in noise level increases of up to approximately 15 dBA during the day. These noise level increases would be noticeable and noise levels in the mid-80s are relatively high for this area.

At Receptors 39 through 43, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur only during the construction activity immediately adjacent to these buildings, specifically the pedestrian bridge reconstruction, which is expected to occur for 22 months. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the entire construction period. During the remaining periods of construction activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptors 39 through 43, daytime construction activity in Reaches I and J, including pile installation would produce noise levels in the mid 80s dBA, which would result in noise level increases of up to approximately 15 dBA. The pile installation work at Reaches I and J is anticipated to occur for approximately 22 months. During the rest of the construction period, noise levels due to construction would still exceed CEQR construction noise screening thresholds at times with noise level increments up to approximately 11 dBA for an additional 8 months and noise level increments up to 9 dBA for an additional 12 months.

At Receptors 39 through 43, nighttime construction activity in Reaches I and J, including pile installation would produce noise levels in the mid 80s dBA, which would result in noise level increases of up to approximately 21 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 80s are relatively high for this area. The pile installation work at Reaches I and J, including construction of the 10th Street Pedestrian Bridge and Flyover Bridge portion in East River Park, is anticipated to occur for approximately 22 months. During

the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, 911 through 1223 FDR Drive appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the high 30s to low 60s dBA, which is up to approximately 17 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the 22 months of pile installation closest to these receptors. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reaches B, C, D and E

At Receptors 8 through 13, 27, and 28, which represent residences west of the FDR Drive between Gouverneur Slip East and the Williamsburg Bridge as well as 525 and 555 FDR Drive, daytime construction activity in Reaches C, D and E including pile installation would produce noise levels in the high 70s dBA, which would result in noise level increases of up to approximately 11 dBA. Nighttime construction activity in Reaches C, D and E including pile installation would also produce noise levels in the high 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable, and nighttime noise levels in the high-70s are relatively high for this area. The maximum noise levels described above would occur during Delancey Street Bridge reconstruction, which would last approximately 19 months. The pile installation work, which is associated with the construction of the Corlears Hook Bridge as well as flood protection construction along Reaches B, C, D, and E, is anticipated to occur for approximately 10 months, resulting in noise level increments up to approximately 10 dBA. During the rest of the construction period, noise levels due to construction would still exceed CEQR construction noise screening thresholds with noise level increments up to approximately 8 dBA for an additional 5 months and up to approximately 5 dBA for an additional 9 months.

Based on field observations, residences west of the FDR between Gouverneur Slip East and the Williamsburg Bridge as well as 525 and 555 FDR Drive appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the high-30s to mid-50s dBA, which is up to approximately 11 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the 19 months of pile installation closest to these receptors during Delancey Street Bridge reconstruction. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reach G

At Receptor 33, which represents 709 FDR Drive, daytime pile installation in Reach G would produce noise levels in the high-70s, which would result in noise level increases of up to

approximately 11 dBA. While the pile installation work in Segment 2 is anticipated to occur for approximately 12 months, pile installation immediately adjacent to the receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving and fill activity in this segment, construction noise levels at this receptor would experience construction noise levels in the mid-70s dBA, which would result in noise level increases of up to approximately 7 dBA. Nighttime construction is not predicted to result in exceedances of the CEQR construction noise screening thresholds.

709 FDR Drive appears to have insulating glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, daytime interior noise levels during fill and landscape construction in this area would be up to the mid-50s dBA, which is up to approximately 11 dBA higher than the 45 dBA threshold recommended for classroom use according to CEQR noise exposure guidelines. Existing daytime interior noise levels are up to the low 50s dBA (based on the calculated existing exterior daytime noise levels up to approximately 76 dBA and the assumption of 25 dBA window/wall attenuation). Interior noise levels during daytime construction would consequently be comparable to existing noise levels. Interior noise levels during nighttime construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**) for most of the construction period, which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance. Consequently, noise resulting from construction of the Preferred Alternative would not rise to the level of a significant adverse effect at this receptor.

Remaining Receptors

At the remaining residential and school receptors along the FDR Drive—Receptors 26, 29 through 32, and 34 through 36—existing daytime noise levels are in the low-60s to mid-70s dBA and existing nighttime noise levels are in the low- to high-60s dBA. Daytime construction under the Preferred Alternative is predicted to produce noise levels up to the low-60s to low 80s resulting in noise level increases of up to approximately 9 dBA. At these receptors, nighttime construction under the Preferred Alternative is predicted to produce noise levels in the low-60s to low-70s dBA resulting in noise level increases of up to approximately 6 dBA. The predicted daytime noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The maximum predicted nighttime noise level increases would be noticeable, but nighttime construction noise levels would fluctuate based on the specific location of pile installation with each receptor experiencing nighttime construction noise over a limited duration.

Standard building façade construction with insulated glass windows would be expected to provide approximately 25 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, existing daytime interior noise levels are up to the low 50s dBA. Interior noise levels during daytime construction would be up to the mid 50s dBA and consequently be comparable to existing noise levels during most of construction. Interior noise levels during nighttime construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**) for most of the construction period, which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance. Consequently, noise

resulting from construction of the Preferred Alternative would not rise to the level of a significant adverse effect at these receptors.

Residential, Hospital, and School Receptors at Least One Building Row West of the FDR Drive

At buildings west of the project areas and separated from the FDR Drive by at least one row of buildings (this include residences, hospital uses, and schools)—Receptors 44 to 70—the daytime existing noise levels range from the mid-60s to low 70s dBA depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, height above grade (i.e., floor for high-rise buildings), and whether the adjacent section of the FDR Drive is on structure. Nighttime existing noise levels at these receptors range from the mid 50s to mid 60s dBA.

Daytime construction under the Preferred Alternative is predicted to produce noise levels at these receptors in the mid-60s to mid-70s dBA, which would result in noise level increases of up to approximately 11 dBA when construction occurs at the closest distance to them and result in noise level increases exceeding the CEQR construction noise screening thresholds throughout construction. However, at some of the school and residential receptors at least one building row from the FDR Drive, nighttime construction under the Preferred Alternative would produce noise level increases of up to approximately 14 dBA and exceedances of the CEQR construction noise screening thresholds for up to 26 months. These include Receptors 53, 54, 61–62, and 68.

Receptors along Reach E North of Williamsburg Bridge

At Receptor 53, which represents residences at 60 Baruch Drive, nighttime construction activity associated with the Delancey Street Bridge Reconstruction, including pile driving, would produce noise levels in the high 60s dBA, which would result in noise level increases of up to approximately 9 dBA. These noise level increases would be noticeable, and nighttime noise levels in the high 60s are relatively high for this area. The pile installation work at Reach E is anticipated to occur for approximately 19 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during pile driving associated with the Delancey Street Bridge Reconstruction, which would last approximately 19 months.

Based on field observations, 60 Baruch Drive appears to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving would be in the mid-to-high 40s dBA, up to approximately 3 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving would be closest to this receptor. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

School Receptor along Reach F

At Receptor 54, which represents the Bard School at 123 Mangin Street, fill and landscape construction in Reach F would produce noise levels in the low 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable, although noise levels in the low 70s are typical for the area. The fill at Reach F is anticipated to occur for approximately 4 months and landscaping at Reach F is anticipated to occur for approximately 7 months.

123 Mangin Street appears to have monolithic glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, daytime interior noise levels during fill and landscape construction in this area would be up to the low-60s dBA, which is up to approximately 16 dBA higher than the 45 dBA threshold recommended for classroom use according to CEQR noise exposure guidelines. These levels would occur for approximately 11 months while fill and landscape construction in would occur in Reach F. During fill and landscaping operations at other reaches of Segment 2 at greater distances from this receptor, noise levels would continue to exceed CEQR noise impact screening thresholds at times with noise level increments up to 10 dBA. Due to the high magnitude of the predicted construction noise and its extended duration, this receptor is predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reach I

At Receptors 61 and 62, which represent 132 Avenue D and 465 East 10th Street, respectively, construction of the flood wall in Reaches I and J that would occur west of the FDR Drive would produce noise levels in the mid-70s dBA, resulting in noise level increases of up to approximately 11 dBA during the day. These noise level increases would be noticeable, although noise levels in the mid-70s are typical for this area.

At Receptors 61 and 62, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur during the construction activity immediately adjacent to these buildings, specifically the flood wall construction west of the FDR, which is expected to occur for 36 months. During the remaining periods of construction activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptors 61 and 62, nighttime construction activity in Reaches I and J including pile installation would produce noise levels in the mid-to-high-60s dBA, which would result in noise level increases of up to approximately 8 dBA. These noise level increases would be noticeable, and nighttime noise levels in the high 60s are relatively high for this area. The pile installation work at Reach I is anticipated to occur for approximately 22 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during sheet pile installation at Reach I and pile driving associated with the 10th Street Bridge Reconstruction, which would last approximately 22 months.

Based on field observations, 132 Avenue D and 465 East 10th Street appear to have monolithic (i.e., non-insulated) glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the low- to high-50s dBA, which is up to approximately 13 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving would occur closest to these receptors, and throughout the 22 months of pile installation at Reach I and the reconstruction of the 10th Street Bridge. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

Receptors along Reach O

At Receptor 68, which represents 520 East 23rd Street, daytime construction activity in Reaches O and P would produce noise levels in the mid 60s dBA, which would result in noise level increases of up to approximately 5 dBA for a duration of fewer than 12 months.

At this receptor, nighttime construction activity in Reaches O and P including pile installation would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 14 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 70s are relatively high for this area. The maximum noise levels described above would occur during sheet pile installation at Reach P, which would last approximately 20 months. The pile installation work at Reach O is anticipated to occur for approximately 6 additional months resulting in noise level increments up to approximately 8 dBA. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, 520 East 23rd Street appears to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving would be in the mid 40s to low 50s dBA, up to approximately 6 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be closest to this receptor. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

School Receptor along Reach A

At the school receptor along Reach A—Receptor 44—which represents NYC School District 1 located at 84 Montgomery Street, daytime construction activity in Reach A including pile driving would produce noise levels in the low 70s dBA, which would result in noise level increases of less than the 3 dBA *CEQR Technical Manual* impact threshold. These noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The daytime pile driving at Reach A is anticipated to occur for approximately 11 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during pile installation construction at Reach A, which would last up to approximately 11 months.

84 Montgomery Street appears to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, daytime interior noise levels during pile driving in this area would be in the low-50s dBA, which is up to approximately 6 dBA higher than the 45 dBA threshold recommended for classroom use according to CEQR noise exposure guidelines. These levels would occur while pile driving would occur closest to the receptor, and throughout the 11 months of sheet piling at Reach A. Since construction increases of up to only approximately 4 dBA and would occur for a relatively short period of time (i.e., 11 months) and noise levels due to the construction would not exceed CEQR construction noise screening thresholds for the remainder of construction, noise from construction would not rise to the level of significant adverse impact at this receptor under the Preferred Alternative.

Hospital Receptors along Reach P

At hospital receptors along Reach P—Receptors 69 and 70—daytime construction under the Preferred Alternative is predicted to produce noise levels up to the low 70s resulting in noise level increases of up to approximately 8 dBA. At these receptors, nighttime construction under the Preferred Alternative is predicted to produce noise levels in the low- to mid-60s dBA, resulting in noise level increases of up to approximately 5 dBA. The predicted daytime noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The maximum predicted nighttime noise level increases would be noticeable, but nighttime construction noise levels would fluctuate based on the specific location of pile installation with each receptor experiencing nighttime construction noise over a limited duration. Furthermore, standard building façade construction with insulated glass windows would be expected to provide approximately 25 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, interior noise levels during most of the construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**), which is considered acceptable for hospital uses according to CEQR noise exposure guidance. Consequently, noise resulting from construction of the Preferred Alternative would not rise to the level of a significant adverse effect at these receptors.

Remaining Receptors

At the remaining residential receptors at least one building row from the FDR Drive—Receptors 45 through 52, 55 through 60, 63–67—daytime construction under the Preferred Alternative is predicted to produce noise levels up to the mid 70s resulting in noise level increases of up to approximately 10 dBA. At these receptors, nighttime construction under the Preferred Alternative is predicted to produce noise levels in the low 60s to low 70s dBA resulting in noise level increases of up to approximately 12 dBA. The predicted daytime noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The maximum predicted nighttime noise level increases would be noticeable, but nighttime construction noise levels would fluctuate based on the specific location of pile installation with each receptor experiencing nighttime construction noise over a limited duration. Furthermore, standard building façade construction with insulated glass windows would be expected to provide approximately 25 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, interior noise levels during most of the construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**), which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance. Consequently, noise resulting from construction of the Preferred Alternative would not rise to the level of a significant adverse effect at these receptors.

Asser Levy Recreation Center

At Asser Levy Recreation Center (Receptor 23), existing noise levels as determined according to the methodology above range from the high 60s to low 70s dBA depending on proximity to the FDR Drive and height above grade (i.e., floor of the Recreation Center building). The Recreation Center consists of an outdoor pool, an indoor pool, and exercise room (with exercise machines, weight machines, and free weights), a billiards room (with billiards, foosball, and ping pong), and locker rooms. Field observations at the Recreation Center indicated that many users wore headphones while exercising and that the primary source of noise inside the building

is operation of the exercise machines and ventilation equipment. Activities at the Asser Levy Recreation Center primarily include active recreation, sports, and exercise, which have a lower sensitivity to noise than other passive recreation.

At the Asser Levy Recreation Center building, construction activity including pile driving in Reach P that would occur west of the FDR Drive immediately adjacent to this building would produce exterior noise levels in the mid 80s dBA during the day, resulting in noise level increases up to approximately 14 dBA. These noise level increases would be noticeable and noise levels in the mid 80s are high for this area.

Noise level increases at Receptor 23 exceeding the CEQR construction noise screening thresholds are predicted to occur during the construction activity including pile installation in Reach P west of the FDR Drive immediately adjacent to this building. Construction in Reach P is expected to occur over the course of approximately 20 months, however, pile installation would occur in a single location for a relatively brief period of time not greater than 4 months. It is expected that this pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use. While the duration of maximum noise levels at this location would be limited and the receptor is typically used for active recreation with a lower sensitivity to noise, the maximum noise levels predicted by the construction noise analysis are relatively high, i.e., in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction of the Preferred Alternative.

OTHER ALTERNATIVE (ALTERNATIVE 2): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – BASELINE

Alternative 2 would provide flood protection for the protected area but would not include the extensive park access improvements proposed under the Preferred Alternative. This would result in fewer material deliveries and less excavation/earthwork within East River Park. Additionally, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street under all alternatives, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. Because the Alternative 2 construction would include fewer deliveries and less excavation/earthwork, it would not result in higher maximum construction noise levels compared with those in the noise analysis for the Preferred Alternative described above nor would it extend the duration of the maximum noise levels.

OTHER ALTERNATIVE (ALTERNATIVE 3): FLOOD PROTECTION SYSTEM ON THE WEST SIDE OF EAST RIVER PARK – ENHANCED PARK AND ACCESS

Construction of the proposed project under Alternative 3 is predicted to at times result in noise level increases at noise sensitive uses in buildings immediately west of the FDR Drive along both main project areas, as well as along East 23rd Street in Project Area Two that would be noticeable. As discussed in Chapter 6.0, "Construction Overview," in order to ensure public safety, East River Park, Murphy Brothers Playground, and Asser Levy Playground would be closed to the public during the time when construction would occur at these park resources. Generally, the noise level increases resulting from construction would occur at buildings and open space areas while construction activity is in the immediate vicinity of these noise receptors, and noise level increases would be lower when construction activity moves along to a new

section of the project area. Areas immediately adjacent to construction work areas that remain open and active during construction would experience the highest levels of construction noise while construction is ongoing immediately adjacent, whereas receptors in buildings further west of the project areas would experience somewhat less noise because of the greater distance from the on-site construction equipment. The results of the detailed construction noise analysis of Alternative 3 are summarized in **Table 6.12-8**.

Table 6.12-8
Construction Noise Analysis Results (in dBA)

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
M1a	East Yard of Residential Building at Grand Street and FDR Drive East Yard	Day	72.8	72.8	72.8	73.5	0.0	0.7
		Night	66.5	66.5	66.5	67.4	0.0	0.9
M2	342 First Avenue (Peter Cooper Village) East-Facing Yard	Day	70.3	70.3	70.3	73.0	0.0	2.7
		Night	63.2	63.2	63.2	65.6	0.0	2.4
M5	Montgomery Street at Cherry Street	Day	64.4	64.4	65.0	67.1	0.6	2.7
		Night	58.7	58.7	60.6	61.8	1.9	3.1
M5a	Montgomery Street between Cherry Street and Madison Street	Day	66.2	66.2	66.7	67.2	0.4	1.0
		Night	57.8	57.8	60.1	60.9	2.3	3.1
M6	Pitt Street between East Broadway and Grand Street	Day	60.3	60.3	61.7	61.7	1.3	1.4
		Night	56.8	56.8	59.4	59.4	2.6	2.6
M7	Pike Street between Cherry Street and Madison Street	Day	76.0	76.0	76.0	76.0	0.0	0.0
		Night	70.3	70.3	70.4	70.4	0.1	0.1
M8	East Houston Street at Baruch Place	Day	65.1	65.1	65.1	65.5	0.0	0.4
		Night	57.7	57.7	57.7	59.9	0.0	2.2
M9	East Houston Street between Norfolk and Suffolk Streets	Day	66.4	66.4	66.4	66.4	0.0	0.0
		Night	59.0	59.0	59.0	59.1	0.0	0.1
M10	Avenue C north of East 16th Street	Day	63.3	63.3	63.3	65.0	0.0	1.7
		Night	56.8	56.8	56.8	58.0	0.0	1.2
M11	East 23rd Street at Asser Levy Place	Day	65.1	65.1	66.3	68.9	1.2	3.7
		Night	58.6	58.6	62.4	64.4	3.8	5.8
1	FDR Drive/Jackson Street	Day	75.0	75.0	75.0	75.9	0.0	0.9
		Night	-	-	-	-	-	-
6	FDR Drive/East 20th Street	Day	70.0	70.0	70.0	73.7	0.0	3.7
		Night	-	-	-	-	-	-
8A-8G	570 Grand Street	Day	62.4	71.8	62.4	75.8	0.0	6.9
		Night	56.8	65.5	56.8	71.0	0.0	8.2
9A-9G	455 FDR Drive	Day	61.4	72.2	61.4	73.2	0.0	3.9
		Night	56.8	65.9	56.8	67.5	0.0	5.7
10-A-10D	71 Jackson Street	Day	63.9	73.4	63.9	74.9	0.0	2.7
		Night	57.6	67.1	57.6	75.5	0.0	9.5
11A-11D	367 FDR Drive	Day	62.0	73.6	62.0	75.2	0.0	4.0
		Night	56.8	67.3	56.8	71.4	0.0	10.3
12A-12D	645 Water Street	Day	61.4	73.7	61.4	75.8	0.0	3.7
		Night	56.8	67.4	56.8	69.1	0.0	5.5

Table 6.12-8 (cont'd)
Noise Receptor Locations

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
13D-13D	322 FDR Drive	Day	65.7	74.9	65.7	77.9	0.0	4.5
		Night	59.4	68.6	59.4	71.3	0.0	6.8
14A-14D	**621 Water Street**	**Day**	**65.2**	**74.9**	**65.2**	**78.7**	**0.0**	**4.2**
		Night	**58.9**	**68.6**	**58.9**	**72.3**	**0.0**	**4.6**
15A-15D	**605 Water Street**	**Day**	**65.8**	**72.3**	**65.8**	**88.4**	**0.0**	**20.1**
		Night	**59.5**	**66.0**	**59.6**	**74.2**	**0.0**	**10.1**
16A-16C	309 Avenue C Loop	Day	60.3	66.9	60.3	73.6	0.0	7.5
		Night	56.8	59.8	56.8	69.8	0.0	10.1
17A-17C	**315-317-319-321 Avenue C**	**Day**	**63.0**	**71.3**	**63.1**	**77.4**	**0.0**	**8.3**
		Night	**56.8**	**64.2**	**56.8**	**74.1**	**0.0**	**10.7**
18A-18D	**620 East 20th Street**	**Day**	**60.3**	**70.8**	**60.3**	**77.8**	**0.0**	**9.3**
		Night	**56.8**	**63.7**	**56.8**	**70.5**	**0.0**	**7.2**
19A-19C	**601 East 20th Street**	**Day**	**66.1**	**71.8**	**66.2**	**77.7**	**0.0**	**8.2**
		Night	**59.0**	**64.7**	**59.0**	**67.9**	**0.0**	**4.2**
20A-20C	**8 Peter Cooper Road**	**Day**	**61.8**	**71.6**	**61.9**	**78.0**	**0.0**	**10.6**
		Night	**56.8**	**64.5**	**56.8**	**66.3**	**0.0**	**2.6**
21A-21C	**7 Peter Cooper Road**	**Day**	**65.0**	**71.9**	**65.1**	**77.4**	**0.0**	**7.8**
		Night	**57.9**	**64.8**	**57.9**	**68.1**	**0.0**	**5.7**
22A-22C	**530 East 23rd Street**	**Day**	**66.3**	**70.7**	**66.7**	**76.3**	**0.0**	**6.1**
		Night	**59.2**	**63.6**	**60.8**	**73.7**	**0.0**	**12.9**
23A-23D	**392 Asser Levy Place**	**Day**	**60.3**	**70.3**	**60.7**	**82.4**	**0.0**	**13.6**
		Night	**-**	**-**	**-**	**-**	**-**	**-**
24A-24E	400-440 East 26th Street	Day	60.3	73.1	60.3	74.7	0.0	10.6
		Night	56.8	66.0	56.8	67.2	0.0	9.9
25A-25C	10 Waterside Plaza	Day	60.3	69.7	60.3	75.2	0.0	8.6
		Night	56.8	62.6	56.8	69.2	0.0	11.4
26A-26C	24-50 FDR Drive	Day	60.3	65.7	60.3	72.4	0.0	6.6
		Night	-	-	-	-	-	-
27A-27D	525 FDR Drive	Day	61.8	73.8	61.8	77.8	0.0	5.9
		Night	56.8	67.5	56.8	70.2	0.0	4.4
28A-28D	555 FDR Drive	Day	63.4	73.2	63.4	77.2	0.0	4.9
		Night	57.1	66.9	57.1	70.3	0.0	5.5
29A-29-D	571 FDR Drive	Day	63.6	73.6	63.6	77.2	0.0	4.8
		Night	57.3	67.3	57.3	74.0	0.0	8.7
30A-30C	605 FDR Drive	Day	65.6	74.7	65.6	76.3	0.0	3.6
		Night	59.3	68.4	59.3	73.4	0.0	6.8
31A-+31D	500 East Houston Street	Day	63.8	74.3	63.8	76.1	0.0	2.6
		Night	57.5	68.0	57.5	72.2	0.0	7.7
32A-32D	691 FDR Drive	Day	62.5	74.5	62.5	75.9	0.0	3.4
		Night	56.8	68.2	56.8	71.0	0.0	5.2
33A-33D	709 FDR Drive	Day	64.9	74.1	64.9	76.5	0.0	3.9
		Night	58.6	67.8	58.6	71.4	0.0	4.6
34A-34D	725 FDR Drive	Day	65.7	74.1	65.7	77.3	0.0	3.7
		Night	59.4	67.8	59.4	73.7	0.0	6.6
35A-35D	903 East 6th Street	Day	60.8	74.5	60.8	77.4	0.0	3.1
		Night	56.8	68.2	56.8	73.6	0.0	5.5
36A-36D	749 FDR Drive	Day	61.9	74.5	61.9	77.7	0.0	5.2
		Night	56.8	68.2	56.8	74.8	0.0	8.3

Table 6.12-8 (cont'd)
Noise Receptor Locations

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
37A-37D	**765 FDR Drive**	**Day**	**60.3**	**75.0**	**60.3**	**78.2**	**0.0**	**8.2**
		Night	**56.8**	**68.7**	**56.8**	**73.9**	**0.0**	**11.4**
38A-38D	**819 FDR Drive**	**Day**	**60.3**	**74.6**	**60.3**	**76.6**	**0.0**	**6.2**
		Night	**56.8**	**68.3**	**56.8**	**73.8**	**0.0**	**8.4**
39A-39D	**911 FDR Drive**	**Day**	**63.9**	**73.8**	**63.9**	**81.8**	**0.0**	**11.5**
		Night	**57.6**	**67.5**	**57.6**	**74.9**	**0.0**	**7.5**
40A-40D	**10-23 FDR Drive**	**Day**	**66.9**	**75.0**	**66.9**	**81.5**	**0.0**	**12.9**
		Night	**60.6**	**68.7**	**60.6**	**77.0**	**0.0**	**8.5**
41A-41D	**11-15 FDR Drive**	**Day**	**62.2**	**75.1**	**62.2**	**78.3**	**0.0**	**5.8**
		Night	**56.8**	**68.8**	**56.8**	**75.5**	**0.0**	**10.7**
42A-42D	**1141 FDR Drive**	**Day**	**60.3**	**75.0**	**60.3**	**78.5**	**0.0**	**7.5**
		Night	**56.8**	**68.7**	**56.8**	**72.5**	**0.0**	**4.8**
43A-43D	**1223 FDR Drive**	**Day**	**60.3**	**75.2**	**60.3**	**78.1**	**0.0**	**5.3**
		Night	**56.8**	**68.9**	**56.8**	**71.2**	**0.0**	**3.1**
44	84 Montgomery Street	Day	68.9	70.1	69.1	76.1	0.0	6.0
		Night	-	-	-	-	-	-
45	75 Montgomery Street	Day	67.5	68.9	67.7	76.7	0.1	7.8
		Night	61.8	63.2	62.5	67.6	0.3	4.6
46	626 Water Street	Day	64.7	65.9	64.7	67.2	0.0	1.3
		Night	59.0	60.2	59.0	60.4	0.0	0.2
47	640 Water Street	Day	65.6	67.0	65.6	67.8	0.0	0.8
		Night	59.9	61.3	59.9	62.8	0.0	1.6
48	662 Water Street	Day	66.1	68.6	66.1	70.3	0.0	1.8
		Night	60.4	62.9	60.4	64.2	0.0	1.8
49	684 Water Street	Day	65.1	66.1	65.1	67.0	0.0	1.0
		Night	59.4	60.4	59.4	61.5	0.0	1.2
50	32 Jackson Street	Day	65.4	66.1	65.4	67.8	0.0	1.8
		Night	59.7	60.4	59.7	64.3	0.0	4.1
51	453 FDR Drive	Day	63.9	68.1	63.9	70.3	0.0	2.2
		Night	58.2	62.4	58.2	67.2	0.0	4.9
52	473 FDR Drive	Day	60.7	64.5	60.7	67.0	0.0	2.5
		Night	56.8	58.8	56.8	59.7	0.0	0.9
53	60 Baruch Drive	Day	60.9	64.2	60.9	69.2	0.0	5.0
		Night	56.8	56.8	56.8	62.0	0.0	5.2
54	123 Mangin Street	Day	60.5	63.7	60.5	67.6	0.0	4.4
		Night	-	-	-	-	-	-
55	484 East Houston Street	Day	60.3	62.3	60.3	65.7	0.0	3.4
		Night	56.8	56.8	56.8	64.0	0.0	7.2
56	950 East 4th Walk	Day	60.3	60.9	60.3	64.5	0.0	3.6
		Night	56.8	56.8	56.8	59.5	0.0	2.7
57	711 FDR Drive	Day	60.3	60.3	60.3	63.1	0.0	2.8
		Night	56.8	56.8	56.8	60.5	0.0	3.7
58	930 East 6th Street	Day	60.3	60.3	60.3	66.9	0.0	6.6
		Night	56.8	56.8	56.8	65.4	0.0	8.6
59	809 East 6th Street	Day	60.3	60.3	60.3	61.2	0.0	0.9
		Night	56.8	56.8	56.8	58.0	0.0	1.2
60	110 Avenue D	Day	60.3	60.3	60.3	64.1	0.0	3.8
		Night	56.8	56.8	56.8	62.5	0.0	5.7

Table 6.12-8 (cont'd)
Noise Receptor Locations

Receptor	Location	Time Period	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
			Min	Max	Min	Max	Min	Max
61	**132 Avenue D**	**Day**	**60.3**	**64.1**	**60.3**	**72.3**	**0.0**	**8.8**
		Night	**56.8**	**56.8**	**56.8**	**68.9**	**0.0**	**12.1**
62	**465 East 10th Street**	**Day**	**60.3**	**65.2**	**60.3**	**72.9**	**0.0**	**8.2**
		Night	**56.8**	**57.8**	**56.8**	**70.4**	**0.0**	**12.6**
63	170 Avenue D	Day	60.3	61.6	60.3	67.8	0.0	6.2
		Night	56.8	56.8	56.8	63.4	0.0	6.6
64	285 Avenue C	Day	60.8	63.9	60.8	70.2	0.0	7.1
		Night	56.8	56.8	56.8	61.9	0.0	5.1
65	277 Avenue C	Day	60.3	60.3	60.3	67.8	0.0	7.5
		Night	56.8	56.8	56.8	58.8	0.0	2.0
66	622 East 20th Street	Day	60.3	60.3	60.3	65.9	0.0	5.6
		Night	56.8	56.8	56.8	58.7	0.0	1.9
67	6 Peter Cooper Road	Day	60.3	60.5	60.3	69.6	0.0	9.1
		Night	56.8	56.8	56.8	59.6	0.0	2.8
68	**520 East 23rd Street**	**Day**	**60.3**	**63.7**	**60.5**	**68.1**	**0.1**	**4.5**
		Night	**56.8**	**57.2**	**57.2**	**70.0**	**0.4**	**13.2**
69	423 East 23rd Street	Day	60.3	61.8	60.3	71.0	0.0	9.2
		Night	56.8	56.8	56.8	63.3	0.0	6.5
70	480 FDR Drive	Day	63.3	66.3	63.3	68.5	0.0	4.5
		Night	56.8	59.8	56.8	62.7	0.0	5.2

Notes:
[1] Values shown in **bold** for receptors where significant adverse construction noise impacts are predicted to occur.
[2] The data shown in this table reflect the maximum predicted increases in noise level resulting from construction under Alternative 3. However, the significance of construction noise impacts is determined based on the duration of construction noise and its total magnitude in addition to its intensity as indicated by the noise level increments, each of which is discussed in the text below. As a result, some receptors that have lower predicted noise level increments were determined to experience significant adverse impacts and higher increments at other receptors were determined not to be significant.

Open Space Receptors along the FDR Drive

At the open space receptors along the FDR Drive—Receptors 1 and 6—the existing noise levels range from the low to mid 70s dBA, depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, and whether the adjacent section of the FDR Drive is on structure. These receptors are located in open space at Corlears Hook Park and Stuyvesant Cove Park.

Construction under Alternative 3 is predicted to produce noise levels at Stuyvesant Cove Park in the low to mid 70s dBA, resulting in noise level increases of up to approximately 4 dBA when construction occurs at the shortest distance from the park. The predicted noise level increases at this open space location would be noticeable and would exceed CEQR construction noise screening thresholds, and the total noise levels would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas also exceed CEQR recommended values for existing and No Action conditions.) However, the total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher noise levels.

At Stuyvesant Cove Park, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur during no more than two of the five years of construction. At this receptor, the construction activity that would produce the highest noise levels would be pile installation, as well as landscaping work. Both pile installation and

landscaping would occur in a single location for a relatively brief period of time, typically not more than a month. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the entire construction period. Lower construction noise levels that would be expected to occur during activities other than pile installation may still result in exceedances of CEQR construction noise screening thresholds at some times, but would be substantially lower than the maximum levels that would occur during pile installation.

As described above, construction noise levels at Stuyvesant Cove Park were predicted to be in the low to mid 70s dBA, noise level increases during construction were predicted to be up to approximately 4 dBA, and the elevated noise levels during construction were predicted to occur over a duration of approximately one to two years. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of open space would be limited. Furthermore, the construction noise predictions are conservative in that they consider the area of open space that remains open and accessible closest to the construction area. At other open space areas farther from construction work areas, noise levels would be lower, and open space users who are bothered by noise could choose the quieter open space areas. Based on these factors, Alternative 3 construction noise at these receptors would not result in a significant adverse effect.

Construction under Alternative 3 is predicted to produce noise levels at Corlears Hook Park in the mid 70s dBA, resulting in noise level increases of up to approximately 1 dBA when construction occurs at the shortest distance from the park. The predicted noise level increases at this open space location would be imperceptible and would exceed CEQR construction noise screening thresholds, and the total noise levels would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas also exceed CEQR recommended values for existing and No Action conditions.) The total noise levels would be in the range considered typical for Manhattan, and for this area in general. Many New York City parks and open space areas located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher noise levels. Construction noise levels at Corlears Hook Park were predicted to be in the mid 70s dBA, noise level increases during construction were predicted to be up to approximately 1 dBA and in the range considered typical for Manhattan, and for this area in general. Based on these factors, Alternative 3 construction noise at Corlears Hook Park would not result in a significant adverse effect.

Residential, Hospital, and School Receptors along the FDR Drive

At buildings including residences, hospital uses, and schools located along the FDR Drive immediately west of the project areas—Receptors 8–22, 24–43—the daytime existing noise levels range from the mid-60s to high 70s dBA depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, height above grade (i.e., floor for high-rise buildings), and whether the adjacent section of the FDR Drive is on structure. Nighttime existing noise levels at these receptors range from the mid 50s to high 60s dBA.

Construction under Alternative 3 is predicted to produce noise levels at most of these receptors in the mid- to high 70s dBA, resulting in noise level increases up to approximately 10 dBA when construction occurs at the closest distance to them. However, at some of the residential receptors along the FDR Drive, construction under Alternative 3 would produce noise levels in the mid-to-high 80s and/or would result in noise level increases of up to approximately 20 dBA. These include Receptors 14, 15, 17, 19 through 22, 24, 25, 37, and 39–43.

Receptors along Reach A

At Receptors 14 and 15, which represent 621 and 605 Water Street, respectively, daytime construction activity in Reach A occurring north of the FDR Drive near Montgomery Street and immediately adjacent to these buildings would produce noise levels in the high 80s dBA, which would result in noise level increases of up to approximately 20 dBA. These noise level increases would be noticeable, and noise levels in the high 80s are relatively high for this area.

Additionally, at these receptors, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur only during the construction activity in Reach A near Montgomery Street immediately adjacent to these buildings, including construction of flood protection structures under the FDR Drive and north of the FDR Drive, which is anticipated to occur for approximately nine months. During the rest of the construction period, daytime noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during excavation and sheet pile installation.

At Receptors 14 and 15, nighttime construction activity in Reaches B and C including pile installation would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 70s are relatively high for this area. The pile installation work at Reach B and C is anticipated to occur for approximately nine months. During the rest of the construction period, nighttime noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, the buildings at 605 and 621 Water Street appear to have monolithic (i.e., non-insulated) glass windows and alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, daytime interior noise levels during construction in this area would be in the mid-40s to high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines, and nighttime interior noise levels during construction in this area would be in the mid-40s to low 60s dBA, which is up to approximately 18 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these buildings over the course of an approximately four months of pile installation at Reach A. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, this receptor is predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Receptors along Reaches M, N, and O

At Receptors 17 through 22, which represent residences along the west side of the FDR Drive between Avenue C Loop and East 23rd Street, daytime construction activity in Reaches N and O, including pile installation, would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 11 dBA. While the pile installation work at Reaches N and O is anticipated to occur for approximately 30 months, pile installation immediately adjacent to each receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in these reaches, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

Nighttime construction activity in Reaches M and P including nighttime pile installation would produce noise levels in the low-to-mid 70s dBA at these receptors, which would result in noise level increases of up to approximately 13 dBA. These noise level increases would be noticeable and nighttime noise levels in the mid 70s are relatively high for this area. While the pile installation work at Reaches M and P is anticipated to occur for approximately 30 months, nighttime pile installation is proposed for only limited portions of Reaches M and P. The pile installation immediately adjacent to each receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in these reaches, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

Based on field observations, these buildings in Stuyvesant Town and Peter Cooper Village appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving would be in the mid 40s to mid 50s dBA, up to approximately 9 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the four months of pile installation closest to each location. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Receptors along Reach P

At Receptors 24 and 25, which represent 425 East 25th Street and 10 Waterside Plaza, respectively, daytime pile installation in Reach P would produce noise levels in the mid 70's, which would result in noise level increases of up to approximately 11 dBA. While the pile installation work at Reach P is anticipated to occur for approximately 18 months, pile installation immediately adjacent to the receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

At Receptors 24 and 25, which represent 425 East 25th Street and 10 Waterside Plaza, respectively, nighttime construction activity in Reaches O and P including pile installation in a portion of Reach P would produce noise levels in the low 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable and nighttime noise levels in the low 70s are relatively high for this area. While the nighttime pile installation work at Reach P is anticipated to occur for approximately 18 months, pile installation immediately adjacent to the receptor, such that it would cause the maximum noise levels described above, would occur over the course of up to approximately four months. During the remaining periods of pile driving activity in this reach, construction noise levels at these receptors would still experience construction noise levels that exceed the CEQR construction noise screening thresholds.

Based on field observations, 425 East 25th Street appears to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units)), which would be expected to provide approximately 25 dBA window wall attenuation. Based on field

observations, 10 Waterside Plaza appears to have insulated glass windows and an alternative means of ventilation (i.e., package terminal air conditioning units), which would be expected to provide approximately 30 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving would be less than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

While noise from construction of Alternative 3 during the daytime maximum activity level, i.e., pile installation at Reach P, would result in noise level increments up to approximately 11 dBA at 425 East 25th Street, represented by Receptor 24, these peak levels would occur only while construction activity is adjacent to this receptor. While noise from construction of Alternative 3 during the nighttime maximum activity level, i.e., pile installation at Reach P, would result in noise level increments up to approximately 11 dBA at 10 Waterside Plaza, represented by Receptor 25, these peak levels would occur only while construction activity is adjacent to this receptor. Noise levels would be lower during the remainder of the approximately 27 months that any construction would occur in the vicinity of this receptor. Furthermore, interior noise levels would be within the range considered acceptable by CEQR noise exposure guidance. While the nighttime construction noise level would be noticeable, due to the acceptable interior noise levels, construction noise would not rise to the level of a significant adverse effect at this receptor.

Receptors along Reach H

At Receptors 37 and 38, which represent 765 and 819 FDR Drive, nighttime construction activity in Reaches H and I including pile installation would produce noise levels in the mid 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 70s are relatively high for this area. The pile installation work at Reaches H and I is anticipated to occur for approximately 21 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during sheet pile installation at Reach H, which would last approximately 10 months.

Based on field observations, 765 and 819 FDR Drive appear to have monolithic (i.e., non-insulated) glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the low 50s to mid 60s dBA, which is up to approximately 15 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the 10 months of pile installation closest to this receptor. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Receptors along Reach I

At Receptors 39 and 40, which represent 911 and 1023 FDR Drive, respectively, construction activity including reconstruction of the 10th Street pedestrian bridge immediately adjacent to these buildings and construction of the flood wall in Reach I that would occur west of the FDR Drive would produce noise levels in the low-80s dBA, resulting in noise level increases of up to approximately 13 dBA during the day. These noise level increases would be noticeable and noise levels in the low-80s are relatively high for this area.

At Receptors 39 and 40, noise level increases exceeding the CEQR construction noise screening thresholds are predicted to occur only during the construction activity immediately adjacent to these buildings, specifically the pedestrian bridge reconstruction, which is expected to occur for 18 months. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the entire construction period. During the rest of the construction period, daytime noise levels due to construction would not exceed CEQR construction noise screening thresholds.

Based on field observations, 911 and 1023 FDR Drive appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, interior noise levels during early mobilization work in this area would be in the high 40s to low 60s dBA, up to 13 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while bridge construction activity would occur adjacent to each façade of this receptor over the course of approximately 18 months. Due to the high magnitude and extended duration of the predicted construction noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Receptors along Reach J

At Receptors 41, 42, and 43, which represent 1115, 1141, and 1223 FDR Drive, respectively, nighttime construction activity in Reaches H, I, and J including pile installation would produce noise levels in the low-to-mid 70s dBA, which would result in noise level increases of up to approximately 11 dBA. These noise level increases would be noticeable, and nighttime noise levels in the mid 70s are relatively high for this area. The pile installation work at Reaches H, I, and J is anticipated to occur for approximately 25 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during sheet pile installation at Reach J, which would last approximately four months.

Based on field observations, 1115, 1141, and 1223 FDR Drive appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the low 40s to mid 50s dBA, which is up to approximately 10 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be adjacent to each façade of these receptors, and throughout the four months of pile installation closest to these receptors. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Remaining Receptors

At the remaining residential, hospital, and school receptors along the FDR Drive—Receptors 8 to 13, 16, and 26 through 36—daytime construction under Alternative 3 is predicted to produce noise levels up to the mid-to-high 70s resulting in noise level increases of up to approximately 7 dBA. At these receptors, nighttime construction under Alternative 3 is predicted to produce noise levels in the high 50s to mid 70s dBA resulting in noise level increases of up to approximately 10 dBA, The predicted daytime noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The maximum predicted

nighttime noise level increases would be noticeable, but nighttime construction noise levels would fluctuate based on the specific location of pile installation with each receptor experiencing nighttime construction noise over a limited duration. Furthermore, standard building façade construction with insulated glass windows would be expected to provide approximately 25 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, interior noise levels during most of the construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**), which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance. Consequently, noise resulting from construction of Alternative 3 would not rise to the level of a significant adverse effect at these receptors.

Residential, Hospital, and School Receptors at Least One Building Row West of the FDR Drive

At buildings west of the project areas and separated from the FDR Drive by at least one row of buildings (this include residences, hospital uses, and schools)—Receptors 44 to 70—the daytime existing noise levels range from the mid-60s to low 70s dBA depending on proximity to the FDR Drive, proximity to the Williamsburg Bridge, height above grade (i.e., floor for high-rise buildings), and whether the adjacent section of the FDR Drive is on structure. Nighttime existing noise levels at these receptors range from the mid 50s to mid 60s dBA.

Daytime construction under Alternative 3 is predicted to produce noise levels at these receptors in the low-to-mid 70s dBA, which would result in noise level increases of up to approximately 9 dBA when construction occurs at the closest distance to them and result in noise level increases exceeding the CEQR construction noise screening thresholds during no more than two of the five years of construction. However, at some of the residential receptors at least one building row from the FDR Drive, nighttime construction under Alternative 3 would produce noise level increases of up to approximately 13 dBA and exceedances of the CEQR construction noise screening thresholds for up to 3 years. These include Receptors 61, 62, and 68.

Receptors along Reach I

At Receptors 61 and 62, which represent 132 Avenue D and 465 East 10th Street, respectively, nighttime construction activity in Reaches I and J including pile installation would produce noise levels in the low 70s dBA, which would result in noise level increases of up to approximately 13 dBA. These noise level increases would be noticeable, and nighttime noise levels in the low 70s are relatively high for this area. The pile installation work at Reach I is anticipated to occur for approximately 23 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during sheet pile installation at Reach I, which would last approximately 23 months.

Based on field observations, 132 Avenue D and 465 East 10th Street appear to have monolithic (i.e., non-insulated) glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 15 dBA window wall attenuation. Consequently, nighttime interior noise levels during construction in this area would be in the mid 40s to low 50s dBA, which is up to approximately 7 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would occur closest to these receptors, and throughout the 23 months of pile installation at Reach I. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences

are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Receptors along Reach O

At Receptor 68, which represents 520 East 23rd Street, nighttime construction activity in Reaches O and P including pile installation would produce noise levels in the low 70s dBA, which would result in noise level increases of up to approximately 14 dBA. These noise level increases would be noticeable, and nighttime noise levels in the low 70s are relatively high for this area. The pile installation work at Reaches O and P is anticipated to occur for approximately 27 months. During the rest of the construction period, noise levels due to construction would not exceed CEQR construction noise screening thresholds. The maximum noise levels described above would occur during sheet pile installation at Reach O, which would last approximately 17 months.

Based on field observations, 520 East 23rd Street appears to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, nighttime interior noise levels during nighttime pile driving would be in the mid 40s to mid 50s dBA, up to approximately 2 dBA greater than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. These levels would occur while pile driving and excavation would be closest to this receptor. Due to the high magnitude of the predicted construction noise and because it would occur during nighttime hours when residences are especially sensitive to noise, these receptors are predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

Remaining Receptors

At the remaining residential, hospital, and school receptors at least one building row from the FDR Drive—Receptors 44 through 60, 63 through 67, 69, and 70—daytime construction under Alternative 3 is predicted to produce noise levels up to the low 70s resulting in noise level increases of up to approximately 8 dBA. At these receptors, nighttime construction under Alternative 3 is predicted to produce noise levels in the high 50s to high 60s dBA resulting in noise level increases of up to approximately 9 dBA, The predicted daytime noise level increases would be noticeable, but in the range considered typical for Manhattan, and for this area in general. The maximum predicted nighttime noise level increases would be noticeable, but nighttime construction noise levels would fluctuate based on the specific location of pile installation with each receptor experiencing nighttime construction noise over a limited duration. Furthermore, standard building façade construction with insulated glass windows would be expected to provide approximately 25 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, interior noise levels during most of the construction would be less than 45 dBA (i.e., during those times when noise levels are less than 70 dBA as shown in the full construction noise analysis results in **Appendix K2**), which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance. Consequently, noise resulting from construction of Alternative 3 would not rise to the level of a significant adverse effect at these receptors.

Asser Levy Recreation Center

At Asser Levy Recreation Center (Receptor 23), existing noise levels as determined according to the methodology above range from the high 60s to low 70s dBA depending on proximity to the FDR Drive and height above grade (i.e., floor of the Recreation Center building). The

Recreation Center consists of an outdoor pool (open during July and August), an indoor pool, and exercise room (with exercise machines, weight machines, and free weights), a billiards room (with billiards, foosball, and ping pong), and locker rooms. Field observations at the Recreation Center indicated that many users wore headphones while exercising and that the primary source of noise inside the building is operation of the exercise machines and ventilation equipment. Activities at the Asser Levy Recreation Center primarily include active recreation, sports, and exercise, which have a lower sensitivity to noise than other passive recreation.

At the Asser Levy Recreation Center building, construction activity including pile driving in Reach P that would occur west of the FDR Drive immediately adjacent to this building would produce exterior noise levels in the low 80s dBA during the day, resulting in noise level increases up to approximately 14 dBA during the day. These noise level increases would be noticeable and noise levels in the high 80s are high for this area.

Noise level increases at Receptor 23 exceeding the CEQR construction noise screening thresholds are predicted to occur during the construction activity including pile installation in Reach P west of the FDR Drive immediately adjacent to this building. Construction in Reach P is expected to occur over the course of approximately 20 months, however, pile installation would occur in a single location for a relatively brief period of time not greater than 4 months. It is expected that this pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use. While the duration of maximum noise levels at this location would be limited and the receptor is typically used for active recreation with a lower sensitivity to noise, the maximum noise levels predicted by the construction noise analysis are relatively high, i.e., in the "clearly unacceptable" range according to CEQR noise exposure guidance. Consequently, the Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction of Alternative 3.

OTHER ALTERNATIVE (ALTERNATIVE 5): FLOOD PROTECTION SYSTEM EAST OF FDR DRIVE

The flood protection and connectivity features of Alternative 5 throughout the project area would be identical to those described in the Preferred Alternative discussed above. However, Alternative 5 would also include raising the northbound lanes of the FDR Drive approximately 6 feet between East 13th Street and East 18th Street. A floodwall would be installed along the raised portion of the roadway to provide flood protection and would connect to the closure structures at the southern end of Stuyvesant Cove Park. Alternative 5 would likely result in additional material deliveries, excavation, and shaft drilling in the area along the FDR Drive between East 13th and East 18th Streets. Because the additional construction associated with Alternative 5 (when compared with Alternative 3) would not include additional pile installation and would not include excavation or concrete operation west of the FDR Drive, it would not result in higher maximum construction noise levels compared with those in the noise analysis for the Preferred Alternative described above, nor would it extend the duration of the maximum noise levels. However, the additional material deliveries, excavation, and shaft drilling in the area along the FDR Drive between East 13th and East 18th Streets could potentially extend the duration of construction noise that would be noticeable and potentially intrusive at the receptors in this area (i.e., Receptors 42 and 43), which were identified above as having the potential to experience such levels of construction noise.

OTHER CONSTRUCTION OPTION

HYDRAULIC PRESS-IN PILE INSTALLATION

Under any of the alternatives discussed above, pile installation may be conducted in full or in part using a hydraulic press-in method. This method is 10 to 15 dBA quieter than the impact pile driving method assumed in the detailed construction noise analysis presented above. At receptors adjacent to work areas where hydraulic press-in pile installation would be used, the maximum noise levels during pile installation would be approximately 10 dBA lower than the levels described above. For most receptors predicted in the detailed analysis to experience large noise level increases (i.e., 10 dBA or greater), the largest increases were predicted to occur during nearby pile installation. The press-in pile method would substantially reduce the maximum noise level increases and generally reduce the construction noise effects. However, during noisy construction activities other than pile installation, such as concrete operations, excavation, and soil trucking, noise levels as described above, including some noise level increases greater than 10 dBA, would still occur.

H. VIBRATION

INTRODUCTION

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibratory levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the construction of the receiver building. Construction equipment operation causes ground vibrations that spread through the ground and decrease in strength with distance. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of the case of fragile and possibly historically significant structures or buildings, generally construction activities do not reach the levels that can cause architectural or structural damage, but can achieve levels that may be perceptible in buildings close to a construction site. An assessment has been prepared to quantify potential vibration effects of construction activities on structures and residences near the project site.

CONSTRUCTION VIBRATION CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant effect was based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non-fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in significant adverse effects if they were to occur for a prolonged period of time.

ANALYSIS METHODOLOGY

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV_{equip} is the peak particle velocity in in/sec of the equipment at the receiver location;

PPV_{ref} is the reference vibration level in in/sec at 25 feet; and

D is the distance from the equipment to the received location in feet.

For purposes of assessing potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$L_v(D) = L_v(ref) - 30\log(D/25)$$

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;

$L_v(ref)$ is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

Table 6.12-9 shows vibration source levels for typical construction equipment.

Table 6.12-9
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (Impact)	0.644–1.518	104–112
Clam Shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall in rock)	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.		

CONSTRUCTION VIBRATION ANALYSIS RESULTS

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration would be those directly adjacent to pile driving locations, including the Williamsburg Bridge and several buildings west of the project area. Vibration levels at all of these buildings and structures would be below the 0.50 inches/second PPV limit, although vibration monitoring would be required for all historic structures within 90 feet of the project work areas according to the project's Construction Protection Plan (to be implemented through a Programmatic Agreement) to ensure vibration does not exceed the acceptable limit at any of these historic structures. At all other locations, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would approach the levels that would have the potential to result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit

are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location.

I. MITIGATION

As discussed above, even with the noise control measures described in "Noise Control Measures," construction of the proposed project would result in potential temporary significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street, 123 Mangin Street, and the Asser Levy Recreation Center. The predicted significant adverse construction noise effects would be of limited duration and would be up to the high 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Because the analysis is based on worst-case construction phases, it does not capture the natural daily and hourly variability of construction noise at each receptor. The level of noise produced by construction fluctuates throughout the days and months of the construction phases, while the construction noise analysis is based on the worst-case time periods only, which is conservative.

Source or path controls beyond those already identified in "Noise Reduction Measures," were considered for feasibility and effectiveness in reducing the level of construction noise at the receptors that have the potential to experience significant adverse construction noise impacts. These measures may include the following:

- Using a hydraulic press-in pile installation method instead of the standard impact pile driving provides a large reduction in noise from pile installation, which would result in a substantial reduction in overall construction noise because pile installation is the dominant source of construction noise at most receptors. However, the press-in pile installation method is not suitable for pile installation in some space-limited areas and in areas where there are large subsurface obstructions. In those cases, impact pile driving would be unavoidable.
- Hanging noise barriers or curtains made from mass-loaded vinyl around the pile driving head to shield receptors from noise of impact pile driving would provide approximately 5 to 10 dBA reduction in noise from pile installation. However, this would require a crane or cranes to hang the noise barriers, which introduces an additional noise source. Furthermore, the time required to place the noise barriers at the start of driving each pile could extend the total duration of pile driving.
- Enclosing the concrete pump and concrete mixer trucks at any time that the mixer barrels would be spinning in a shed or tunnel including 2 or 3 walls and a roof, with the opening or openings facing away from receptors would provide approximately 10 to 15 dBA reduction in Approximately 10 to 15 dBA reduction in concrete operation noise, which does not represent a substantial portion of the project's construction noise. Consequently, this measure would not be effective in reducing total construction noise levels at surrounding receptors.

- Using barging for deliveries of construction materials (including concrete) and importing of fill to the project sites, rather than trucks on roadways to from the construction work areas, would provide approximately 3 to 6 dBA reduction in noise levels from dump trucks and/or delivery trucks. If noise from pile installation is reduced by one of the means described above, the trucks would be the next greatest contributor to the total construction noise level, so this reduction measure could be effective in further reducing the total construction noise levels at surrounding receptors. However, it may result in conflicts with esplanade work, in which case truck deliveries would be unavoidable.
- Selecting quieter equipment models for cranes, generators, compressors, and lifts may result in up to a 10 dBA reduction in noise levels from construction if the pile installation and truck noise are reduced by the means described above. This is subject to the availability of quieter equipment in the quantities necessary to complete the proposed project in the projected timeframe. ✷

Chapter 6.13: Construction—Public Health

A. INTRODUCTION

Public health is the effort of society to protect and improve the health and well-being of its population. The goal of a public health analysis per the 2014 *City Environmental Quality Review (CEQR) Technical Manual* is to determine whether adverse effects on public health may occur as a result of a proposed project, and if so, to identify measures to mitigate such effects. The potential effects of the proposed project were considered with regard to effects on the surrounding community

A public health assessment is warranted for a specific technical area if there is a significant unmitigated adverse effect found in other analysis areas, such as air quality, water quality, hazardous materials, or noise. As identified in Chapter 6.12, "Construction—Noise and Vibration," the proposed project may result in unmitigated construction noise effects. No significant adverse effects are anticipated for air quality, water quality or hazardous materials. Therefore, this chapter provides a public health assessment of construction noise.

B. PRINCIPAL CONCLUSIONS

The analyses presented in this DEIS conclude that the proposed project would not result in unmitigated significant adverse effects in air quality, water quality, or hazardous materials. The analysis presented in Chapter 6.12, "Construction—Noise and Vibration," determined that construction activities could potentially result in unmitigated significant adverse construction-period noise effects at receptors in the vicinity of the proposed project's construction work areas. However, construction of the proposed projects would not result in chronic exposure to high levels of noise, prolonged exposure to noise levels above 85 dBA, or episodic and unpredictable exposure to short-term effects of noise at high decibel levels, as per the *CEQR Technical Manual*. Consequently, construction of the proposed project would not result in a significant adverse public health effect.

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No construction noise is expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative would not result in chronic exposure to high levels of noise, prolonged exposure to noise levels above 85 dBA, or episodic and unpredictable exposure to short-term effects of noise at high decibel levels. Since the area of potential noise effects is limited and as described below, the noise would not be chronic and would not exceed the

threshold of short-term, high-decibel levels, the predicted noise resulting from construction of the proposed project would not constitute a potential significant adverse public health impact according to the criteria of the *CEQR Technical Manual*.

OTHER ALTERNATIVES

Construction of Alternative 3 is predicted to result in significant adverse construction noise effects at certain locations, as described in Chapter 6.12, "Construction—Noise and Vibration." Under the Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2) and The Flood Protection System East of FDR Drive (Alternative 5), significant adverse construction noise effects are expected to be similar to those under the Preferred Alternative.

C. REGULATORY CONTEXT

The regulatory context for the proposed project includes the following requirement for which the proposed project has been analyzed with respect to in order to make a determination of potential environmental effects associated with project implementation.

EO 13045-PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks, specifies prioritization of the identification and assessment of potential environmental health and safety risks that may disproportionately affect children (it should be however be noted that in general the regulatory standards and guidelines, used for comparison purposes, already incorporate protection of sensitive individuals, including children). If adverse effects are identified, CEQR requires that the effects be disclosed and mitigated or avoided to the greatest extent practicable.

D. METHODOLOGY

The construction noise analysis presented in Chapter 6.12, "Construction—Noise and Vibration," was used to identify the extent of the potential temporary noise exposure to the public as a result of construction of the proposed project. The *CEQR Technical Manual* thresholds for construction noise are based on nuisance levels that could include quality of life and public health effects. The potential temporary noise exposure identified in Chapter 6.12, "Construction—Noise and Vibration," was evaluated for its potential to impact the health of the affected population by comparing it with the relevant health-based noise criteria as described in the *CEQR Technical Manual.*

Although the *CEQR Technical Manual* thresholds for significant adverse effects are predicted to be exceeded at certain locations during construction, these exceedances would not necessarily constitute a significant adverse public health effect. The *CEQR Technical Manual* identifies public health concerns from noise related to three factors:

- Chronic exposure to high levels of noise (i.e., high levels of noise that occur indefinitely and do not fluctuate or abate);
- Prolonged exposure to noise levels above 85 dBA (the *CEQR Technical Manual* recommended threshold for potential hearing loss); and

- Episodic and unpredictable exposure to short-term effects of noise at high decibel levels.

To determine whether public health effects could occur as a result of the construction noise related to the proposed project, predicted noise levels at the locations where significant adverse effects were predicted to occur were evaluated for the potential to impact the health of the affected population using these three criteria provided in the *CEQR Technical Manual*.

E. ENVIRONMENTAL EFFECTS

NO ACTION ALTERNATIVE (ALTERNATIVE 1)

The No Action Alternative assumes that no new comprehensive coastal protection system is installed in the proposed project area. No construction noise is expected to occur with the No Action Alternative.

PREFERRED ALTERNATIVE (ALTERNATIVE 4): FLOOD PROTECTION SYSTEM WITH A RAISED EAST RIVER PARK

Construction of the Preferred Alternative would include noise control measures as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods). Even with these measures, the analysis presented in Chapter 6.12, "Construction—Noise and Vibration," shows that construction of the proposed project is predicted to result in significant adverse effects at the following locations: 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, 520 East 23rd Street, 123 Mangin Street, and Asser Levy Recreation Center. Affected locations include residential areas immediately adjacent to proposed construction areas.

The predicted temporary noise effects identified would not constitute chronic exposure to high levels of noise because of the temporary and intermittent nature of construction noise as described in Chapter 6.0, "Construction Overview." The maximum construction noise levels predicted to occur under the Preferred Alternative at the locations identified above (up to the high 80s dBA during daytime construction and up to the mid 70s during nighttime construction) would occur primarily as a result of sheet pile installation activities occurring at very short distances from receptors. Such noise levels are highly dependent on the specific location of pile installation activity relative to the receptors, and since sheet pile installation would occur in any single location for no more than approximately four months, the maximum noise levels would not persist at any one receptor over an extended duration. At locations where maximum predicted levels of construction noise would result from construction activities other than sheet pile installation (e.g., locations near pedestrian bridge reconstruction, landscaping work, or excavation activity), maximum construction noise levels would also occur over a limited duration depending on the amount, type, and location of the construction work in that area. Since the construction noise would fluctuate in intensity, no sensitive receptors would be subject to the full effects of construction for the entire construction period, and it would not persist for the full duration of construction, these temporary noise effects are would not be prolonged (or chronic)

noise effect as defined under *CEQR* for determining public health effects. In addition, with the Preferred Alternative, the duration of construction is limited to approximately 3.5 years for project completion.

For a majority of the receptors where significant adverse noise effects would occur, the predicted absolute noise levels would be below the threshold for potential hearing loss of 85 dBA. As shown in Table 6.12-8 in Chapter 6.12, "Construction—Noise and Vibration," the maximum predicted levels of noise resulting from nighttime construction associated with the Preferred Alternative would be less than 85 dBA for all receptors and the maximum predicted levels of noise resulting from daytime construction associated with the Preferred Alternative would be less than 85 dBA or less for all receptors except receptor 1 (Corlears Hook Park). The maximum predicted levels of noise resulting from daytime construction associated with the Preferred Alternative would be less than 85 dBA or less for all receptors except receptor 15 (605 Water Street) and receptor 23 (the Asser Levy Recreation Center).

As described in Chapter 6.12, "Construction—Noise and Vibration," under the Preferred Alternative, construction noise levels up to the mid 80s dBA would occur at receptor 1, Corlears Hook Park. While pile installation within the park is expected to occur over the course of approximately 19 months during construction of the Corlears Hook Bridge, pile installation activities associated with Reach C flood protection would occur intermittently in a single location for a relatively brief period of time not greater than 4 months. Outside of this duration, it is expected that pile installation associated with flood protection installation would be at least 100 feet from the building and would consequently not result in noise levels greater than 85 dBA. During the times that pile installation adjacent to this receptor produces maximum noise levels, if noise levels in the park were to reach the threshold that would result in discomfort, it is unlikely that the users of the park would remain. Consequently, it is not expected that users of Corlears Hook Park would experience noise levels high enough to potentially result in hearing loss, but such noise levels in the park would be unpleasant.

As described in Chapter 6.12, "Construction—Noise and Vibration," construction noise levels up to the high 80s dBA would occur at receptor 23, Asser Levy Recreation Center, during pile installation in Reach P west of the FDR Drive immediately adjacent to this building. Although construction in Reach P is expected to occur over the course of approximately 19 months, pile installation activities would occur intermittently in a single location for a relatively brief period not greater than 4 months. Outside of this duration, it is expected that pile installation would be at least 100 feet from the building and would consequently not result in noise levels greater than 85 dBA. Such noise levels in the recreation center would be unpleasant. It is expected that this pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use.

Based on the limited duration of the predicted high levels of noise at these receptors, the lower noise levels that would occur inside 605 Water Street, and the likelihood that users of the Corlears Hook Park and Asser Levy Recreation Center would not remain in these areas during times of maximum construction noise, construction associated with the proposed project would not result in prolonged exposure to noise levels greater than 85 dBA.

As described in Chapter 6.0, "Construction Overview," a team of Community Construction Liaisons (CCLs), managed and staffed by a Borough Outreach Coordinator, would be available from pre-construction through the completion of the proposed project to serve as contacts for the community and local leaders. The CCLs would be available to address concerns or problems that may arise during construction, maintain direct communication with the construction project

managers, and be able to quickly troubleshoot and respond to construction-related inquiries. The CCLs would send out email advisories and notifications, weekly construction bulletins, newsletters, and other forms of information through the Neighborhood Network Notification (NNN) list. The CCLs would also attend meetings held by District Service Cabinet, Community Boards, Elected Officials and other community meetings as necessary. In addition, New York City maintains a 24-hour telephone hotline (311) so that concerns can be registered with the City. This coordination would keep the communities informed of the construction activities associated with the proposed project and minimize unpredictable exposure to noise at high decibel levels for surrounding receptors.

Additionally, at residential and school buildings predicted to experience adverse construction noise effects, the predicted noise exposure for the residents would depend on the amount of façade noise attenuation provided by the buildings. The façade noise attenuation is a factor of the building façade construction as well as whether the building's windows are able to remain closed. Buildings that have insulated glass windows and an alternate means of ventilation (e.g., some form of air conditioning) allowing for the maintenance of a closed-window condition would provide approximately 25 dBA window/wall attenuation. With this closed window condition, maximum nighttime interior noise levels at these receptors would not exceed the mid 50s dBA. This is up to approximately 11 dBA higher than the 45 dBA threshold recommended for residential areas according to the *CEQR Technical Manual* noise exposure guidelines but is typical of existing condition noise levels with windows open or daytime noise levels inside the residences. Consequently, the predicted levels of construction noise would not constitute episodic or unpredictable exposure to noise at high decibel levels at these buildings.

At buildings that do not have façade construction that would provide such levels of attenuation (i.e., 605 Water Street, 621 Water Street, 765 FDR Drive, 819 FDR Drive, 132 Avenue D, 465 East 10th Street, and 123 Mangin Street), maximum nighttime interior noise levels at these receptors would not exceed the high 60s dBA, up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential or classroom uses according to the *CEQR Technical Manual* noise exposure guidelines. For these buildings, further noise reduction measures will be considered to reduce the level of noise exposure such that it would not constitute unpredictable exposure to noise at high decibel levels for surrounding receptors. Such additional measures may include source control measures (e.g., alternative construction methods, quieter equipment, changes in construction scheduling), and path control measures (e.g., noise barriers) and are discussed in further details in Chapter 6.12, "Construction—Noise and Mitigation."

As discussed above, construction of the Preferred Alternative would not result in chronic exposure to high levels of noise, prolonged exposure to noise levels above 85 dBA, or episodic and unpredictable exposure to short-term effects of noise at high decibel levels. Since the area of potential noise effects is limited and as described above, the noise would not be chronic and would not exceed the threshold of short-term, high-decibel levels, the predicted noise resulting from construction of the proposed project would not constitute a potential significant adverse public health impact according to the criteria of the *CEQR Technical Manual*.

OTHER ALTERNATIVES

Construction of Alternative 3 is predicted to result in significant adverse construction noise effects are expected at certain locations, as described in Chapter 6.12, "Construction—Noise and Vibration." Under the Flood Protection System on the West Side of East River Park – Baseline Alternative (Alternative 2) and The Flood Protection System East of FDR Drive (Alternative 5),

significant adverse construction noise effects are expected to be similar to those under the Preferred Alternative.

As described in Chapter 6.12, "Construction—Noise and Vibration," under Alternative 3, construction noise levels up to the high 80s dBA would occur at Receptor 15, 605 Water Street, during the construction activity in Reach A near Montgomery Street immediately adjacent to these buildings. This would include construction of flood protection structures under the FDR Drive and north of the FDR Drive, which is anticipated to occur for approximately nine months. During that time, residents would experience lower noise levels inside the building, because the building façade would provide approximately 15 dBA attenuation. Consequently, these residents would not experience noise levels in excess of 85 dBA. While the predicted interior noise levels, in the mid 70s dBA, would be intrusive, they would not constitute prolonged exposure to noise levels above 85 dBA.

As described in Chapter 6.12, "Construction—Noise and Vibration," construction noise levels up to the high 80s dBA would occur at receptor 23, Asser Levy Recreation Center, during pile installation in Reach P west of the FDR Drive immediately adjacent to this building. Although construction in Reach P is expected to occur over the course of approximately 20 months, pile installation activities would occur intermittently in a single location for a relatively brief period not greater than 4 months. Outside of this duration, it is expected that pile installation would be at least 100 feet from the building and would consequently not result in noise levels greater than 85 dBA. Such noise levels in the recreation center would be unpleasant. It is expected that this pile installation would be scheduled outside of the summer months when the Recreation Center's pool would be in use.

Based on the limited duration of the predicted high levels of noise at these receptors, the lower noise levels that would occur inside 605 Water Street, and the likelihood that users of the Corlears Hook Park and Asser Levy Recreation Center would not remain in these areas during times of maximum construction noise, construction associated with the proposed project would not result in prolonged exposure to noise levels greater than 85 dBA.

EO 13045-PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH AND SAFETY RISKS

The Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, specifies the prioritization the identification and assessment of potential environmental health and safety risks that may disproportionately affect children. Of the significant adverse noise impacts resulting from construction of the proposed project discussed above, only the potential impact at 123 Mangin Street under the Preferred Alternative would have the potential to disproportionately affect children, because of that building's school use. The maximum predicted noise level increment resulting from construction at the exterior of the school building during daytime hours is approximately 11 dBA, which would be considered a perceived doubling of loudness compared to existing levels. However, the predicted total noise levels would be considered "marginally unacceptable" according to *CEQR Technical Manual* noise exposure criteria and is typical of many schools in Manhattan. Based on an estimate of 15 dBA window/wall attenuation from the school's monolithic glass windows and window air conditioning units, the maximum interior noise levels at the school resulting from construction are predicted to be in the low 60s dBA. This level would exceed the 45 dBA threshold recommended for classroom use according to *CEQR Technical Manual* noise exposure criteria, but would also be comparable to many other classroom environments in New York City adjacent

to heavily trafficked roadways or other urban noise sources. Furthermore, the predicted construction noise at this location would be temporary and would occur only during the period of floodwall construction and landscaping immediately adjacent to the school, which would not be expected to occur for more than 11 months. Consequently, while the predicted construction noise at the school was determined to result in a significant adverse effect, it would not constitute a potential environmental health or safety risk to the students. ✷

Chapter 7.0: Indirect and Cumulative Effects

A. INTRODUCTION

The federal Council on Environmental Quality's (CEQ) regulations implementing the procedural provisions of the National Environmental Policy Act (NEPA), set forth in 40 C.F.R. § 1500 et seq., requires federal agencies to consider the potential for indirect and cumulative effects from a proposed project. In addition, State Environmental Quality Review Act (SEQRA) regulations identify that the contents of an Environmental Impact Statement (EIS) include an evaluation of both cumulative effects and the growth-inducing aspects of a proposed action (6 NYCRR § 617.9 [b][5][iii][a] and [d]).

This chapter examines the potential indirect and cumulative effect from the proposed project.

LOWER MANHATTAN COASTAL RESILIENCY (LMCR)-TWO BRIDGES

Although the LMCR-Two Bridges Project is in the early design phase, the project is proposing similar coastal flood protection improvements and would also create opportunities for new programming and enhanced community access (where possible) in the Two Bridges neighborhood. The approaches to providing flood protection with this project are assumed similar to those under the proposed project and would include floodwalls and closure structures. The LMCR-Two Bridges Project has received funding through U.S. Department of Housing and Urban Development (HUD)'s National Disaster Resilience Competition (NDRC) to initiate a coastal flood mitigation project in this area and will be subject to a separate environmental review. As previously stated, the LMCR-Two Bridges Project is in its early design phase; therefore, this section provides a general assessment of the potential indirect and cumulative effects of that project.

B. PRINCIPAL CONCLUSIONS

As discussed below, the proposed project would not result in indirect adverse effects generated by induced or secondary growth. In consideration of the range of technical analyses presented in this EIS, the proposed project has little or no potential to result in any cumulative effects, except in the following areas: visual resources – by blocking views to the waterfront and East River from multiple locations and open space – during construction periods by temporarily displacing open space resources.

C. INDIRECT EFFECTS

This section of the EIS evaluates any indirect effects, both adverse and beneficial, that may occur as a result of the proposed project. The CEQ regulations define indirect effects as those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Indirect effects can occur within the full range of affected areas, such as changes in land use, economic conditions, traffic congestion, air quality, noise, vibration,

and water and natural resources. Examples of indirect effects can include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rates, and related effects on air and water and other natural systems. For the proposed project, this section evaluates any indirect social and economic effects such as the avoided costs associated with flood damage that would otherwise be incurred during design storm events, as well as the reduced likelihood of business closures due to flooding during a design storm event. Indirect hazardous materials effects are evaluated by describing how the proposed project would serve to reduce certain adverse effects associated with flooding, such as mobilization of existing contaminants (e.g., in soil or tanks), and generation of contaminants (e.g., mold or carbon monoxide).

INDIRECT SOCIAL AND ECONOMIC EFFECTS

As discussed in Chapter 5.2, "Socioeconomic Conditions," under the No Action Alternative (Alternative 1), no new comprehensive coastal protection system would be installed in the proposed project area. In the absence of the system, the existing neighborhoods would remain at risk to coastal flooding during design storm events (the 100-year flood events with sea level rise projections to the 2050s). Socioeconomic effects would include the direct physical damages associated with a design storm event; displacement; human impacts; and loss of services. In addition, the open space amenities associated with other alternatives would not be added to the project area. In particular, with the raising of the majority of East River Park in the Preferred Alternative and Alternative 5, flood damage from design storm events should be significantly reduced.

Under the No Action Alternative, area business conditions would not be affected by substantial increases in pedestrian traffic and associated consumer spending. Rent levels in projects under construction or planned for completion by 2025 also would not be affected under the No Action Alternative assuming non-storm conditions. However, unlike in the other alternatives, none of the economic benefits associated with the construction of comprehensive flood projection systems would be realized under the No Action Alternative.

Although the Preferred Alternative (Alternative 4) would result in a resilient park and neighborhood connection improvements, it does not present new uses or activities to the project area that could markedly influence the study area's commercial market, as described below. The Additional resiliency measures included as part of the Preferred Alternative for East River Park, including the raising of a majority of East River Park, would not increase the level of flood protection for the study area inland of East River Park, thus the Preferred Alternative would not result in significant indirect residential or business displacement pressures within the study area.

The Preferred Alternative does not introduce a new use to the project area that would have the potential to fundamentally alter real estate values. The project area currently includes large public open spaces—including East River Park—that offer active and passive recreation options to study area residents and visitors and are highly utilized. The proposed project would not create new public parkland that could affect property values, but would protect and reconstruct the existing parks (e.g., East River Park, Murphy Brothers Playground, and Asser Levy Playground) in the study area that already influence property values. Recent trends already show study area market housing costs to be well above rents affordable to low- and moderate-income households. These trends are expected to continue with or without this alternative's park and neighborhood connection improvements in place. There is also little existing, and limited opportunity to develop additional, market housing abutting the project area, where values and rents would have the

greatest potential to increase as a result of proximity to the park improvements. Moreover, the majority of existing housing abutting the project area is NYCHA housing developments. Thus, even with the Preferred Alternative's open space and connectivity improvements in place, rents in these developments are protected from local market forces.

The Preferred Alternative is also not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. First, to the extent that commercial rents are influenced by consumer spending, should there be some increase in visitation attributable to the proposed project, there are few businesses directly abutting the project area that would be affected by any increases in expenditure potential. Second, most of the businesses in the study area are located several blocks away from the project area, and not located on streets leading to the improved park connections across the FDR Drive, where businesses could be affected by any increased pedestrian traffic. Third, with multiple residential projects expected to be completed by 2025 and the associated increases in population and spending potential, any effects on commercial rent increases would be attributable to these projects and not the proposed project. Finally, although this alternative would provide park and neighborhood connection improvements, it does not present new uses or activities to the project area that could markedly influence the study area's commercial market.

Under the Preferred Alternative, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during design storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under this alternative, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

With the proposed project, Alternative 2 would not result in the direct displacement of any residents or businesses. While there is the potential for increases in residential and commercial property values and market-rate rents, Alternative 2 would not result in significant adverse effects due to indirect residential or business displacement. Households living in forms of rent-regulated housing within the protected area and within the larger socioeconomic study area, including approximately 5,000 units within Peter Cooper Village and Stuyvesant Town are also protected from rent increases due to market forces. In addition, recent trends already show study area market-rate housing costs to be well above rents affordable to low- and moderate-income households. These trends are expected to continue with or without the proposed flood protections in place.

Businesses within the special flood hazard area portions of the study area would benefit from reduced susceptibility to flooding during a design storm event, thereby reducing the possibility of temporary or permanent business closures due to a storm. While this reduced business risk would enhance the value of properties, potentially leading to increased rents, such an influence is not expected to result in significant indirect commercial displacement. Most commercial uses within the study area are located outside of the special flood hazard area and, therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the special flood hazard area and would not have the potential for significant effects throughout the study area. In addition, the proposed project is not expected to attract a substantial number of new visitors to the protected area or larger socioeconomic study area, nor will it introduce or attract a new building use and associated consumers (e.g., office buildings and workers) that would result in higher sales and increased rents. Therefore, the proposed project is

not expected to result in an influx of new businesses to the protected area that would substantively affect existing market conditions and trends.

Under Alternative 2, the minor open space modifications would not affect residential rents in the study area. Similarly, business conditions in the study area are not expected to materially change due to non-storm-related influences under Alternative 2. Without the provision of additional open space amenities, no new uses or activities would be introduced. Therefore, the study area would not experience a significant increase in pedestrian traffic to the project area as a result of the proposed project, and the increased consumer spending potential associated with that visitation.

Residents and businesses within the 100-year floodplain under Alternative 2 would be less vulnerable to flooding during design storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under Alternative 2, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

As with Alternative 2, Alternative 3 would not result in direct displacement of any residents or businesses. Under Alternative 3, an additional concern with respect to potential indirect displacement is whether the proposed park improvements could lead to increases in residential and commercial property values over time due to the following influences: the enhanced waterfront open space amenities that could make the study area neighborhoods a more desirable location in which to live; increased pedestrian traffic and associated consumer spending at study area businesses; and potential increased spending associated with higher income households that may be attracted to the neighborhood. Alternative 3 would not result in significant indirect residential or business displacement pressures within the study area for the same reasons as the Preferred Alternative (see above).

Alterative 5 includes similar flood protection objectives and the same general open space improvements as described in the Preferred Alternative. The addition of a flyover bridge to increase connectivity along the East River would not result in increased residential property values and rent increases that could lead to significant indirect residential or business displacement within the study area. This alternative would not add a new use to the project area.

Under Alternative 5, residents and businesses within the 100-year floodplain area would be less vulnerable to flooding during design storm events Therefore, as with the other alternatives described above, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise occur during storm events.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project is expected to provide flood protection between Montgomery Street and the Brooklyn Bridge and may create opportunities for programming and community access within that neighborhood. The LMCR-Two Bridges Project is expected to have similar influences on rents and other potential indirect effects in the project area as described above for the proposed project. These effects will be further analyzed independently as part of the environmental review for LMCR-Two Bridges.

INDIRECT HAZARDOUS MATERIALS EFFECTS

As described in more detail below, the proposed project, by reducing the likelihood of and extent of flooding of upland neighborhoods, would serve to reduce certain adverse effects associated

with flooding, such as mobilization of existing contaminants (e.g., in soil or tanks), and generation of contaminants (e.g., mold or carbon monoxide). By avoiding or reducing the likelihood of these effects, the proposed project would have beneficial indirect effects related to hazardous materials.

Under the No Action Alternative, no new comprehensive coastal protection systems would be installed, but a number of projects planned or under construction in the project area might disturb hazardous materials, possibly including MGP wastes, and potentially increase pathways for human or environmental exposure. Additional procedures may need to be set out for the following projects: Pier 42, the Lower East Side Ecology Center at the southern end of East River Park, renovation of the Fireboat House in East River Park (near Grand Street), and improvements to the East River Park Track and Field Complex. In addition, absent the proposed project it would not be expected that Con Edison would perform excavation within Stuyvesant Cove Park (or other portions of the proposed project area). To the extent that construction of elevated or re-graded park areas or flood walls would remove some soils contaminated with manufactured gas plant wastes and/or contaminated groundwater, these activities would serve as additional remediation (beyond any that Con Edison is expected to conduct upland of the project area and/or of sediments in the East River).

FLOODING AND EXPOSURE TO HAZARDOUS MATERIALS

The proposed project would reduce the potential for flooding, which is known to be associated with releases/mobilization of both subsurface contaminants via erosion. The area has known soil contamination (e.g., Peter Cooper Village soils below approximately 5 feet deep are contaminated by manufactured gas plant [MGP] wastes) and petroleum stored in above ground tanks (especially tanks located in basements). During Hurricane Sandy, many such tanks failed. Water damaged materials resulted in sometimes extensive mold conditions. Additionally, power failures resulting from flooding are known to result in increased incidents of poisoning by carbon monoxide, related to the indoor use of (improperly ventilated) portable space heaters, generators, and grills.

REDUCTION IN FLOW OF CONTAMINATION TO EAST RIVER

The proposed project would require excavation and off-site disposal of some contaminated soils and removal and treatment of some contaminated groundwater (as a result of dewatering). As such, there would be expected reductions, over the long term, of contaminant migration into the East River from the project area.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project will be subject to a separate environmental review under NEPA. Based on preliminary assumptions, with the implementation of a variety of flood protection measures, similar to those proposed for the proposed project, adverse indirect effects related to hazardous materials are not anticipated to occur from the LMCR-Two Bridges Project. As necessary, appropriate Soil Management Plans and/or Construction Health and Safety Plans would be implemented to establish appropriate protective measures and manage exposure pathways during construction. Further, similar to the proposed project, any potential excavation and off-site disposal or treatment of contaminated materials encountered during construction could, over the long term, reduce contaminant migration into the East River. Therefore, the LMCR-Two Bridges Project could have similar indirect influence on hazardous materials as those described above for the proposed project.

D. CUMULATIVE EFFECTS

This section relies on the technical analyses of the DEIS and summarizes the proposed project's potential effects in combination with expected conditions in the future without the proposed project, including a description of the potential cumulative effects from the proposed project and the LMCR-Two Bridges Project. **Table 7.0-1** provides an overview of the relevant past, current, and future projects associated with the anticipated conditions in the future without the proposed project that could have a cumulative effect, along with a description of reasonably foreseeable potential effects associated with each project.

Cumulative effects result from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even indirect effects, but nevertheless can eventually lead to a measurable environmental change. Cumulative effects are the net result of both the proposed project and other projects planned near and around the project site. According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, cumulative effects are two or more individual effects on the environment that, when taken together, are significant or that compound or increase other environmental effects.

As described in Chapter 4.0, "Analysis Framework," this DEIS acknowledges cumulative effects by comprehensively defining the environmental setting expected in the No Action Alternative, including a discussion of projects expected to be completed independently of the proposed project by 2025 (the No Action projects listed in **Appendix A1**) and the baseline growth in the No Action Alternative. The DEIS considers as the future baseline condition the combination of existing conditions together with known development plans, recent approved land use actions, public policies, projected population and employment growth, and other general background growth. The potential effects of the proposed project, presented in Chapters 5 and 6 of this DEIS, were assessed in comparison with the future baseline condition, the No Action Alternative.

Table 7.0-1
No Action Projects with the Potential for Cumulative Effects

Project	Description
Relevant Past Projects	
Con Edison Resiliency Upgrades	Upgrades to power generating facilities and installation of flood protection measures
Citywide Ferry Service	Expansion of ferry service throughout New York City
VA Hospital Resiliency Upgrades	Installation of flood protection measures
Relevant Current and Reasonably Foreseeable Future Projects	
Resiliency Projects	
LMCR-Two Bridges Project	Resiliency measures for the Two Bridges neighborhood immediately south of the proposed project area
NYCHA Resiliency Projects	Various coastal flooding protection measures underway at Jacob Riis, Jacob Riis II, Lillian Wald, Campos Plaza II, Lavanburg, Baruch, and Laguardia Houses, and URA Site 7
Open Space Projects	
Pier 42 – Phase IB	Construction of public waterfront open space
Tompkins Square Park Reconstruction	Reconstruction of two playgrounds in Tompkins Square Park with new play equipment, safety surfacing, spray showers, seating, and fencing
Luther Gulick Playground Reconstruction	Reconstruction of playground facilities
East River Park – Lower East Side (LES) Ecology Center	Improvement of the composting site by formalizing and containing the composting components and provide educational and public access opportunities.
Corlears Hook Park Dog Run	Reconstruction of the dog run, adding stable ground surface, water features and dog waste containers, and replacing fencing
Baruch Playground Synthetic Turf Field Reconstruction	Reconstruction of turf field
Seward Park Reconstruction	Reconstruction of a portion of Seward Park
Solar One Environmental Education Center	Existing facility is proposed to be replaced with a new green arts and energy education center
Pier 35	Improvements including an “eco-park”
Fireboat House Renovation	Construction of an Americans with Disabilities Act (ADA) entrance ramp and installation of solar panels
HUD-NDR TPL Green Playgrounds Program	Renovation and improvement of existing playground facilities at two public schools in the Two Bridges neighborhood
East River Waterfront Esplanade – Phase IV	Resurfacing, new seating, and play equipment between Catherine Slip and Pike Slip
Transportation Infrastructure Projects	
Traffic Calming and Bike Route Connections	Traffic calming measures and bike lane installation/connections at various locations, including Delancey, Grand, and Montgomery Street
L Train Tunnel Repair	Repair of L train tunnel under the East River
Rezoning Projects	
Lower East Side Rezoning—various locations	Rezoning to facilitate the development of new residential projects with ground floor retail
Other Projects	
Various Residential and Commercial Development Projects	Proposed mixed-use developments (residential and commercial) including Two Bridges, Extell One Manhattan, Alexandria Science Center, Brookdale Campus, and Essex Crossing
NYCHA Infill at 50 Pitt Street	NYCHA plans to rebuild, expand, and preserve public and affordable housing stock by developing on underutilized land
New York City Community Garden Coalition Gardens Rising (Gardens Rising)	Green infrastructure investments for community gardens to manage stormwater

Table 7.0-2 provides a summary of potential cumulative impacts of the proposed project in combination with other past, present, and reasonably foreseeable future actions.

Table 7.0-2
Summary of Cumulative Effects (40 CFR § 1508.7)

Resource	Proposed Project Effects		Effects of No Action Projects	Cumulative Effects
	Short-term (Construction)	Long-term (Operation)		
Land Use, Zoning, and Public Policy	Minor	Major beneficial	Minor	Major beneficial
Socioeconomic Conditions	Minor	Moderate Beneficial	Minor	Moderate Beneficial cumulative effects due to employment, compensation, and total economic activity
Open Space	Major adverse	Major beneficial	Moderate Adverse due to temporary loss of neighborhood open space during construction; moderate beneficial effects upon completion	Major adverse cumulative effects to availability of open space during construction; long-term major beneficial due to improved open space, waterfront enhancement and flood protection of open spaces
Historic and Cultural Resources	Minor	Minor	Minor	Minor
Urban Design and Visual Resources	Moderate Adverse	Moderate Beneficial with elevated shared-use flyover bridge (urban design); Major adverse due to blocked waterfront views (visual resources)	Minor	Minor
Natural Resources	Moderate adverse effects to terrestrial resources; temporary and permanent moderate adverse effects to littoral zone wetlands and Waters of the United States	Major beneficial (terrestrial resources); minor adverse (Wetlands and Waters of the United States)	Minor	Minor
Hazardous Materials	Moderate adverse	Major beneficial contamination in East River Park underlying soils would be removed	Moderate adverse	Moderate adverse
Water and Sewer Infrastructure	Minor	Major beneficial	Minor	Minor
Transportation	Moderate Adverse	Moderate Beneficial due to improved access to waterfront	Moderate adverse	Moderate adverse cumulative construction effects on transportation that is dependent on the construction schedules and peak construction intensity of each project
Neighborhood Character	Minor	Major beneficial	Minor	Minor
Environmental Justice	Minor	Major beneficial	Minor	Minor
Energy	Minor	Minor	Minor	Minor
Air Quality	Moderate Adverse	Minor	Moderate adverse	Minor
Greenhouse Gas Emissions	Minor	Minor	Minor	Minor
Noise and Vibration	Major Adverse	Minor	Major adverse during construction	Potential major adverse cumulative construction effects on noise that is dependent on the construction schedules and peak construction intensity of each project
Public Health	Moderate Adverse	Minor	Minor	Moderate Adverse

LOWER MANHATTAN COASTAL RESILIENCY (LMCR)-TWO BRIDGES PROJECT

In addition to the proposed project, resiliency measures are being developed for the Two Bridges neighborhood immediately south of the proposed project area. The study area for the Two Bridges project is bounded by Montgomery Street on the north and the Brooklyn Bridge to the south and includes the esplanade under the FDR Drive, two crossings across South Street for the tie-backs, Pier 35/36, and the East River Waterfront (see Figure 2.0-8). The City received funding through HUD's National Disaster Resilience Competition (NDRC) to initiate a coastal flood mitigation project in this area. The LMCR-Two Bridges Project is in the early design phase. It proposes improvements that would similarly protect from coastal flooding and would create opportunities for new programming and enhanced community access (where possible) in the Two Bridges neighborhood. The approaches to providing flood protection with this project are assumed to be similar to those under the proposed project and would include floodwalls and closure structures.

While the LMCR-Two Bridges Project will be subject to a separate environmental review under NEPA, SEQRA, and CEQR, the potential cumulative effects of the LMCR-Two Bridges Project and the proposed project are qualitatively considered in this DEIS. As the LMCR-Two Bridges Project is in the early design phase, the qualitative assessment of the project below is based on preliminary assumptions based on available information. Should additional cumulative effect-related information be available regarding the LMCR-Two Bridges Project after the Draft EIS is certified, the chapter will be updated prior to the issuance of the Final EIS.

LAND USE, ZONING, AND PUBLIC POLICY

The proposed project would be consistent with existing or planned land use, zoning, and public policies within the study area, and would be anticipated to have long-term beneficial effects to land uses within the study area from the improvement of open spaces and implementation of a comprehensive flood protection system, which would also greatly advance public policies that seek to improve access to open spaces, enhance open spaces, and provide coastal flood protection to Lower Manhattan.

Several planned projects will be completed in the land use, zoning, and public policy study area by the 2025 build year, including various residential and commercial development projects rezoning projects, open space projects, and resiliency projects. Several of the projects specifically involve alterations to land uses and zoning within the study area. However, these projects are subject to review under applicable City regulations, including the City Environmental Quality Review Act (CEQR) and Uniform Land Use Review Procedure (ULURP), and therefore would be anticipated to be largely consistent with long-term zoning and land use objectives for the study area. The open space and resiliency projects would be expected to result in long-term beneficial effects to land uses within the study area by improving or enhancing open spaces and providing protection from storm events, which would complement the long-term beneficial effect on land uses anticipated to result from implementation of the proposed project. Similarly, these projects would be anticipated to be compatible with public policies that seek to improve open spaces and consistent with the initiatives to protect Lower Manhattan from coastal surge events and provide access to waterfront parks as discussed in City and local plans. Therefore, it is concluded that cumulative effects would be negligible in the short-term and major beneficial in the long-term.

LMCR-TWO BRIDGES PROJECT

It is also expected that the LMCR-Two Bridges Project would not contribute to cumulative adverse land use, zoning or public policy effects when assessed in combination with the proposed project.

As discussed above, the LMCR-Two Bridges Project is expected to construct a coastal flood mitigation project for the Two Bridges neighborhood, abutting the southern end of the proposed project area. Land uses within the LMCR-Two Bridges Project area include public facilities and institutions, residential, residential with commercial below, transportation and utility, open space and recreation, vacant, commercial and office buildings, industrial and manufacturing, and parking facility. Zoning designations within the LMCR-Two Bridges Project area include R7-2, M1-4, C8-4, Park, C6-4 and M1-6. Public Policy within the LMCR-Two Bridges Project area includes the same policies described above for the proposed project, along with the Brooklyn Bridge Southeast Urban Renewal Area and the Two Bridges Urban Renewal Area.

While the proposed flood protection system in the Two Bridges neighborhood would serve the primary function of physical protection from flooding, it could also provide an opportunity to improve the neighborhood's economic and social resiliency. The flood protection system is expected to be designed to mitigate the effects of inundation from coastal storm surges; in addition, these resiliency investments are expected to create opportunities for programming and enhanced waterfront views and community access. By maintaining the existing East River shared-use path (bikeway/walkway), enhancing connections to the ongoing East River Waterfront Esplanade improvements, and reinventing the waterfront as an appealing destination in the Two Bridges neighborhood, the City aims to strengthen the connection of Two Bridges to the rest of Lower Manhattan and revitalize the area in order to promote a stronger neighborhood. If required, the LMCR-Two Bridges Project would undergo any ULURP or zoning actions independently and would therefore be assumed compatible with long-term land use and zoning objectives for this area and would be consistent with public policies, especially as it pertains to improving resiliency in Lower Manhattan. As such, given that the proposed project is concluded to be consistent with land use, zoning, and public policies for that applicable study area and it is assumed that the LMCR-Two Bridges project would be subject to review processes that would likewise ensure compatibility with long-term objectives for land use, zoning, and public policies, it is assumed no cumulative adverse effect would be anticipated.

SOCIOECONOMIC CONDITIONS

As described in the "Indirect Social and Economic Effects," section above, no direct residential or business displacement would occur as a result of the proposed project; therefore, the assessment of adverse cumulative effects focuses on the potential for indirect displacement effects. For the reasons stated in the "Indirect Social and Economic Effects," section above, potential increases in property values attributed to flood protection measures are not expected to result in cumulative significant adverse socioeconomic effects as related to indirect business displacement for the proposed project.

The proposed project's flood protection system and open space and connectivity improvements, and the various residential and commercial development projects rezoning projects, open space projects, and resiliency projects in the study area, could lead to increases in residential property values and market rate rents by making the area more attractive as a residential neighborhood. Potential increases in property values are not expected to result in cumulative significant adverse effects in the area of indirect residential displacement for the same reasons outlined in the "Indirect Social and Economic Effects," section, above.

Cumulative construction-related effects associated with the proposed project and No Action projects would not generate cumulative significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of

businesses within or surrounding the project areas, including businesses on access routes to/from construction sites. Construction activities would, at times, affect pedestrian and vehicular access in the immediate vicinity of construction activities. However, construction activities in the project area, including the Pier 42 and Solar One Environmental Education Center projects, are located far enough away from businesses such that access to businesses would not be impeded. Lane and/or sidewalk closures and construction staging areas would not obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers. Businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project would likely have similar influences on property values and rents as the proposed project. Therefore, based on currently available information about the LMCR-Two Bridges Project, there is little potential for cumulative socioeconomic effects from the LMCR-Two Bridges Project and the proposed project.

If some portion of construction under the proposed project occurs simultaneously with the construction of the LMCR-Two Bridges Project, cumulative construction activities would not be expected to generate significant adverse effects on socioeconomic conditions. As detailed in Chapter 6.1, "Construction—Socioeconomic Conditions," construction activities associated with the proposed project would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area. Similarly, any temporary effects on pedestrian and vehicular access would be isolated to areas in the immediate vicinity of construction activities. Given that construction activities associated with the LMCR-Two Bridges Project would be located almost entirely outside the socioeconomic study area for the proposed project, there is little potential for cumulative socioeconomic effects from overlapping construction activities.

Further, if construction under the proposed project occurs simultaneously with construction of the LMCR-Two Bridges Project, the LMCR-Two Bridges Project would result in additional construction costs in the area. These additional costs would result in: additional direct, indirect, and induced person-years of employment during construction; additional direct, indirect, and induced employee compensation during construction; and additional total economic activity in New York State and New York City.

OPEN SPACE

Several planned open space projects will be completed in the open space study area by the 2025 build year. These projects would result in long-term moderate beneficial effects as open spaces within the study area would be reconstructed, enhanced, or otherwise improved; no open space projects were identified that would result in long-term adverse effects on open spaces in the study area. Similarly, upon completion of construction, the proposed project would not change active or passive open space ratios within the study area but would significantly improve the open space amenities within East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground. Moreover, the proposed project would improve accessibility to these open spaces through reconstructing or improving bridge connections to East River Park and between East River Park and Captain Patrick J. Brown Walk. Further, the proposed project would not introduce a new population that would significantly increase the use of recreational resources that might have an adverse effect. The proposed project would create substantial improved open spaces

in conjunction with other nearby proposed open space projects such as Pier 35 and Pier 42, resulting in beneficial cumulative effects. In addition, the proposed project involves the development and operation of a flood protection system that would help to protect the open spaces within the protected area. Under the Preferred Alternative and Alternative 5, improvements would further enhance open spaces by raising open space amenities in East River Park to increase their resiliency against future surge events.

In combination with the construction of the proposed project, there is the potential for cumulative adverse effects on open space during overlapping periods of construction activities at nearby planned projects. These projects are described in Chapter 2.0, "Project Alternatives," and listed in **Appendix A1**. Under the With Action Alternatives, the effects of construction on open space are potentially significant and adverse. There is the potential for temporary significant adverse direct effects over multiple analysis years due to the displacement of most park features within East River Park and Stuyvesant Cove Park in addition to closures of Asser Levy Playground and Murphy Brothers Playground. Temporary displacement of open space for construction over the 5 percent threshold is considered significant since it could result in the overburdening of existing facilities within the open space study area. This adverse effect could be exacerbated by the concurrent construction of other open space projects (e.g., Luther Gulick Playground Reconstruction), further straining open space resources within the study area. Although partial mitigation measures are identified for open spaces during construction of the proposed project, it is concluded that there would be potential significant adverse direct and indirect effects on open space during construction.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges flood protection elements are not expected to increase the use of or result in the reduction or expansion of, recreational resources that might have an adverse effect.

Some of the open spaces within the Two Bridges project area include Coleman Square Playground, Murry Bergtraum Softball Field, Martin F. Tanahey Playground, East River Esplanade, Rutgers Park, Catherine Slip Park, Alfred E. Smith Playground, Little Flower Playground, and Cherry Clinton Playground. Additional open space resources may be identified when a full inventory of open spaces in the Two Bridges project area is completed. Similar to the proposed project, the Two Bridges Project may provide opportunities for recreational programming and open space improvements to be integrated with the proposed flood protection components. The combined protections provided by the proposed project and the LMCR-Two Bridges Project would cumulatively benefit open spaces within the study area by enhancing waterfront access and protecting upland resources during coastal storm events in the protected area.

The LMCR-Two Bridges Project, depending on the design, could result in potential adverse effects to opens space by temporarily displacing open space resources during periods of construction. The displaced open space resources for the LMCR-Two Bridges Project would be within the ½-mile open space study area for the proposed project. Therefore, the proposed project and LMCR-Two Bridges Project could result in additional cumulative adverse effects to open spaces during construction.

HISTORIC AND CULTURAL RESOURCES

The cumulative effects on historic and cultural resources of the proposed project and the projects proposed in the future under the No Action Alternative are described in this section. There are

multiple projects planned or under construction in Project Area One and the 400-foot portion of the Primary Area of Potential Effect (APE) that could, in conjunction with the proposed project, result in cumulative effects to historic and cultural resources. However, these cumulative effects are not expected to be significantly adverse.

For the proposed project, the City, in consultation with the New York City Landmarks Preservation Commission (LPC) and the New York State Historic Preservation Office (SHPO), would develop and implement Construction Protection Plans (CPPs) for architectural resources located within 90 feet of proposed construction activities to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

Similarly, protections for architectural resources would be put in place under the following projects: Pier 42, which will repair the portion of the East River Bulkhead (S/NR-eligible) within the Pier 42 project site and which will consult with SHPO regarding the design of the Pier 42 project on or around the historic, granite portions of the East River Bulkhead in accordance with a Programmatic Agreement between SHPO, the Lower Manhattan Development Corporation, and the Advisory Council on Historic Preservation; NYCHA resiliency projects at the S/NR-eligible Bernard Baruch and Jacob Riis Houses, as NYCHA is consulting with SHPO regarding the potential for those resiliency projects to result in adverse effects to the housing developments; and three NYC Parks projects at Asser Levy Playground, which will be coordinated with LPC so that there will be no adverse effects to the Asser Levy Playground architectural resource (S/NR, NYCL).

Building Code Section BC 3309: Protection of Adjoining Property will offer protection from accidental construction-related damage to the following architectural resources that are located within 90 feet of proposed NYC Parks park improvement projects: the Bernard Baruch Houses, and Rivington Street Bath.

One NYC Parks project to improve park facilities could result in adverse effects to one architectural resource. NYC Parks is proposing to construct an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (S/NR-eligible) in East River Park. In addition, NYC Parks plans interior renovations to the building. As the former Fireboat House has undergone previous interior renovations to house the Lower East Side Ecology Center and to provide public restrooms, it is not expected that the planned interior renovations would result in an adverse effect on the Fireboat House. However, depending on the plans for the exterior ramp, the proposed project could adversely affect the integrity of the building's materials, design, and/or setting. However, if this project were to result in adverse effects to this park facility, it would not result in an adverse cumulative effect in combination with the proposed project and other projects.

The proposed project and other projects could result in construction-related effects to architectural resources. However, these effects would not result in adverse cumulative construction-related effects.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project, which is expected to include flood protection measures similar to those provided by the proposed project, could affect historic and cultural resources located within and adjacent to the LMCR-Two Bridges Project area, as described below.

Archaeological Resources

Previous archaeological studies have determined that portions of the LMCR-Two Bridges Project area are sensitive for potential archaeological resources and recommended further archaeological testing.[1] Depending on the nature and location of the project elements, a scope of work for additional archaeological testing may be needed and prepared in consultation with LPC and SHPO as the design of the LMCR-Two Bridges Project progresses. Additional analysis of potential effects on archaeological resources will be conducted in the environmental review for the LMCR-Two Bridges Project.

Architectural Resources

Architectural resources located within the LMCR-Two Bridges Project area that could experience direct or indirect effects include the FDR Drive (S/NR-eligible), the East River Bulkhead (S/NR-eligible, the Manhattan Bridge (S/NR) and the Brooklyn Bridge (NYCL, S/NR, NHL). In addition, there are a number of architectural resources in the surrounding area that include the Two Bridges Historic District (S/NR). For architectural resources located within 90 feet of proposed construction activities, the LMCR-Two Bridges Project would be required to develop and implement CPPs to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. For any alterations to architectural resources, the project sponsor would consult with LPC and/or SHPO. Like the proposed project, it is not expected that the LMCR-Two Bridges Project would result in contextual or visual effects on architectural resources. Additional analysis of potential effects on architectural resources will be conducted in the environmental review for the LMCR-Two Bridges Project.

URBAN DESIGN AND VISUAL RESOURCES

As the proposed project would not have adverse effects on urban design, it would have no adverse cumulative effect in combination with other projects within or near the project area. It would, in fact, contribute to beneficial cumulative effects on urban design. The proposed improvements to East River Park that would occur under the proposed project (in varying degrees)—new landscaping, improved park access, a reconstructed bikeway/walkway, a new shared-use flyover bridge—would create visual improvements to East River Park, an enhanced pedestrian experience, and improved open spaces in conjunction with the new Pier 35 and Pier 42 public open spaces. Similarly, the reconstruction of Stuyvesant Cove Park under the proposed project and with the Solar One Environmental Education Center project would have beneficial cumulative effects on urban design and the pedestrian experience in Project Area Two.

The proposed project's floodwalls and closure structures alongside, across, and under the FDR Drive would be installed in locations where there are existing fences, walls, railings, jersey barriers, or where the FDR Drive is elevated on a viaduct. The floodwalls at the Con Edison East River Generating Facility would add to the system of walls and fences that define the urban design and pedestrian experience of the site, further walling it off from the surrounding streets. As the VA Medical Center New York was previously enclosed by walls and fences along East 23rd Street and its east perimeter facing Asser Levy Playground, the new floodwalls did not materially affect

[1] Historical Perspectives, Inc., East River Waterfront Esplanade and Piers – Inboard Resources North of Brooklyn Bridge Phase 1A Archaeological Assessment, 2007; and

AKRF, Inc., East River Waterfront Access Project – Catherine Slip Phase 1A Archaeological Documentary Study, 2009.

urban design and the pedestrian experience. Therefore, these three projects together would not result in adverse cumulative effects to urban design.

The proposed project could potentially result in significant adverse visual effects by blocking views to the East River from multiple locations within the study area. These potential significant adverse effects would not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls, levees and/or elevated park areas under Alternatives 2 and 3 or not elevating the majority of East River Park under the Preferred Alternative and Alternative 5 to allow continued views to the East River would impair the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park and of the East River except from Grand Street, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, the finishes are being taken into account, and the floodwalls would be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls. As no significant adverse visual effects are anticipated with any of the proposed No Action Projects within the project area, including Pier 42, Lower East Side Ecology Center, Fireboat House Renovation, and Solar One Environmental Education Center proposed in the No Action Alternative, no cumulative adverse visual effects are anticipated.

In general, the experience of park users in the vicinity of closed and fenced sections of either East River Park or Stuyvesant Cove Park (and Murphy Brothers and Asser Levy Playgrounds under Alternatives 3 through 5) would be adversely affected, but these adverse effects would be temporary during the construction period. Views from residences and sidewalks in the immediate vicinity of construction would be temporarily obstructed during construction, views from the FDR Drive toward the park would be obstructed during the different construction phases, and views of the East River would be temporarily blocked during construction. Due to the temporary nature of construction, the proposed project and the other planned projects in the study area would not be expected to result in cumulative construction-related adverse effects on urban design and visual resources.

LMCR-TWO BRIDGES PROJECT

As it is expected that the flood protection measures proposed under the LMCR-Two Bridges Project would be similar in design to those under the proposed project, the LMCR-Two Bridges Project would similarly not have adverse urban design effects. The existing urban design of the Two Bridges area is similar to that of the proposed project's urban design study area, and it is expected, based on currently available information, that the design of the flood protection measures of this project, which could introduce new urban design elements in the area, would account for the area's specific urban design characteristics and that the LMCR-Two Bridges Project, like the proposed project, would be designed to benefit the urban design of the LMCR-Two Bridges Project area, which is located south of the proposed project area and includes Pier

35. Therefore, it is not expected that the proposed project and the LMCR-Two Bridges Project would result in cumulative adverse effects on urban design.

However, depending on the design, the LMCR-Two Bridges Project, like the proposed project, could result in potential adverse effects to visual resources by blocking views to the waterfront and East River. Therefore, the proposed project and LMCR-Two Bridges Project could result in cumulative adverse effects to visual resources by blocking views to the waterfront and river from multiple locations between East 25th Street and the Brooklyn Bridge.

As construction of the LMCR-Two Bridges Project would be expected to be similar to that for the proposed project, the LMCR-Two Bridges Project may result in adverse effects on urban design and visual resources. As with the proposed project, these adverse effects are expected to be temporary. Due to the temporary nature of the adverse effects and the fact that the adverse effects would be dispersed over a large area between the Brooklyn Bridge and East 25th Street, it is not anticipated that blocked views under the proposed project and the LMCR-Two Bridges project would happen concurrently and are not expected to result in cumulative construction-related adverse effects on urban design and visual resources.

NATURAL RESOURCES

The proposed project would result in the removal of a large number of the overall trees in the project area, many of which are mature trees, resulting in temporary adverse effects to terrestrial resources as the tree canopy is gradually restored. Under the Preferred Alternative, 981 trees would be removed due to project implementation; under Alternative 2, 265 trees would be removed due to project implementation; under Alternative 3, 776 trees would be removed due to project implementation; and Alternative 5 would remove the same number of trees as the Preferred Alternative. This tree removal is a temporary adverse effect. The project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. It should be noted that Under Alternatives 2 and 3, existing trees and other terrestrial resources would remain vulnerable and could be anticipated to be significantly damaged, requiring extended periods of post-storm tree removals for damaged or dying trees. Landscaped areas would be impacted from debris, inundation, salt damage, or wind and effects to terrestrial resources. Other projects that would occur in the future without the proposed project may include tree removal, but none have comparable footprints to the proposed project. Therefore, tree removal from those projects is not expected to have significant adverse effects to terrestrial resources in the project area, and significant cumulative effects to terrestrial resources are not expected.

Several planned projects will be under construction in the natural resources study area at the same time as the proposed project. These projects include the construction of the Lower East Side

Ecology Center compost facility and the construction of Pier 42. Within East River Park, the construction of the Lower East Side Ecology Center would occur in conjunction with the construction of the flood protection system. The Lower East Side Ecology Center is currently used for composting and lacks terrestrial resources. Construction of the Lower East Side Ecology Center would not result in additive tree effects or effects to peregrine falcon habitat.

Under the proposed project, the cumulative construction effects to the East River resulting from the proposed project, and planned projects such as Pier 42, are expected to be temporary. In all projects, in-water work is expected to be minimized to the extent practicable. Pier 42 reconstruction would occur at the southern end of the study area. Barging to support construction of the proposed project would result in temporary disturbance of littoral zone tidal wetlands. In addition, under the Preferred Alternative and Alternative 5, construction to reconstruct sewer infrastructure within East River Park as well as installation of support structures for the shared use flyover bridge, demolition of the existing embayments and existing piles and formwork associated with the esplanade in these areas would also temporarily disturb regulated tidal wetlands. Additional in-water work under Alternative 5 would be required for the installation of the support shafts to elevate the FDR Drive. However, this work would be located north of in-water construction activities to support Pier 42, and appropriate best management practices (BMPs) and mitigatory measures, such as use of turbidity curtains, would be used.

Adverse effects to aquatic resources would be mitigated for with the creation of approximately 26,000 square feet new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. A consultation with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) as required by the FWCA, Magnuson Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Clean Water has been reinitiated. Any conservation measures identified as a result of that consultation will be identified in the Final EIS.

There may be overlapping noise effects from the projects in the southern end of the proposed project's study area and a portion of the study area would be inhospitable to fish, including the Atlantic and shortnose sturgeon, for a temporary period during construction. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of bubble curtains for pile driving activities, the use of a cushion block, and gradually ramping up pile driving. With these conservation measures in place, Atlantic sturgeon may be discouraged from utilizing the near-shore environment in the East River but the proposed project would not be anticipated to significant adversely affect the Atlantic sturgeon population. Any conservation measures identified as a result of the consultation with NOAA NMFS will be identified in the FEIS.

Other projects that would occur in the future without the proposed project may include in-water work but would similarly be required to avoid and minimize any adverse effects and, where necessary, mitigate any adverse effects in accordance with applicable USACE and NYSDEC permits and attendant regulations. As no major or even moderate adverse effects to wetland

resources are anticipated from those projects, no cumulative adverse effects to wetland resources are anticipated.

LMCR-TWO BRIDGES PROJECT

Depending on the design and other elements of the LMCR-Two Bridges Project, it is not expected to result in significant adverse effects on natural resources. With the exception of street trees planted landward of the East River, the entire LMCR-Two Bridges Project Area is paved. At this time, it is not known whether the LMCR-Two Bridges Project will have any in-water components. If the in-water components included, they are anticipated to be minimal. Similar to the proposed project, it is expected that the majority of the Two Bridges flood protection elements would be constructed inland. As described above, there may be overlapping noise effects from the LMCR-Two Bridges Project near the southern end of the proposed project's study area if construction occurs concurrently with the proposed project. If in-water work is required, a portion of the study area would be inhospitable to fish, for a temporary period during construction; however, fish would still be expected to utilize areas outside of the construction areas. Any in-water activities or components would require consultation with NOAA NMFS to identify measures to avoid, minimize, and mitigate any adverse effects to listed species and essential fish habitat. While there would be permanent adverse impacts to wetlands and USACE Waters of the United States as part of the proposed project, these impacts would be mitigated through a wetland restoration design that meets all NYSDEC and USACE permit conditions. Due to these mitigatory measures in addition to the limited extent of impact within the East River, the proposed project is unlikely to result in significant adverse effects to wetland or surface water resources. Therefore, based on currently available information about the LMCR-Two Bridges Project, operation of a flood protection system under the proposed project and the LMCR-Two Bridges Project is not expected to result in cumulative adverse effects on any natural resources beyond terrestrial resources, namely trees. If the Two Bridges Project results in removal of the few existing trees in the LMCR-Two Bridges Project Area, then there is the potential for temporary cumulative effects to terrestrial resources.

HAZARDOUS MATERIALS

Subsurface investigation of the project area identified areas with subsurface contamination consistent with wastes from historical MGP contamination and, throughout the project area, as expected, historical fill material. Under the No Action Alternative, no new comprehensive coastal flood protection systems would be installed, but a number of projects planned or under construction in the project area might disturb hazardous materials, possibly including MGP wastes, and potentially increase pathways for human or environmental exposure. Additional procedures would need to be set out for projects in the study area, including Pier 42, the Lower East Side Ecology Center at the southern end of East River Park, renovation of the Fireboat House in East River Park (near Grand Street), and Solar One Environmental Education Center in the project area.

The proposed project would have the potential for significant adverse effects related to hazardous materials since it involves both demolition and excavation. However, with the implementation of appropriate protection measures governing the construction and operational phases, the potential for significant adverse effects related to hazardous materials would be mitigated. Similarly, the planned projects in the study area might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure. However, these projects would also need to comply with applicable regulatory requirements. Therefore, no

significant adverse cumulative effects to hazardous materials as a result of the proposed project and the other projects in the study area are expected.

Absent the proposed project, it would not be expected that Con Edison would perform excavation within Stuyvesant Cove Park (or other portions of the proposed project area) based on current information about Con Edison's potential remediation of MGP waste in the area. To the extent that construction of levees, elevated or regraded park areas or flood walls would remove some soils contaminated with manufactured gas plant wastes and/or contaminated groundwater, these activities would serve as additional remediation (beyond that which Con Edison might conduct upland of the project area and/or of sediments in the East River) based on current information about Con Edison's potential remediation of MGP waste in the area.

LMCR-TWO BRIDGES PROJECT

Based on current data, the LMCR-Two Bridges Project area is believed to have less contamination than the proposed project area, and since the potential for significant adverse effects from both the proposed project and the LMCR-Two Bridges Project would be avoided by incorporating similar protection measures into both projects, no adverse cumulative effects to hazardous materials would be expected.

WATER AND SEWER INFRASTRUCTURE

The projects within the drainage protected area include the New York City Community Garden Coalition Gardens Rising (Gardens Rising) green infrastructure investments and the Trust for Public Land (TPL) school playground project would construct green infrastructure to reduce stormwater runoff generated from small storm events at community gardens and two playgrounds within the drainage protected area.

Under the proposed project, modifications to the sewer system include drainage management and drainage isolation components to isolate the protected area from the larger sewershed and to prevent overland flooding from compromising the sewer system during design storm events. In addition, to reduce the risk of sewer surcharge and above-grade flooding during a design storm event, additional conveyance pipes and other infrastructure improvements would be installed to provide drainage management. The new pipes and additional improvements would increase the capacity of the sewer system to store and convey sewer flow to the interceptor. During design storm events, the operation of these drainage components would reduce the risk of sewer surcharging and inland flooding under design storm conditions within the drainage protected area. Operation of the isolation components may result in negligible increases in the hydraulic grade line (HGL) in the main interceptor outside of the drainage protected area; however, any flooding experienced in these areas would be comparable to flooding experienced under the No Action Alternative. During non-storm operations, sewer infrastructure would continue to operate as under existing conditions.

Green infrastructure implemented under the Gardens Rising program and the TPL school playground project would reduce stormwater runoff at community gardens and two playgrounds, incrementally reducing the combined flow to the existing sewer infrastructure system during typical rainfall events, resulting in a moderate beneficial effect. However, the incrementally reduced runoff due to these programs during design storm conditions would not significantly reduce combined sewer flow or require alterations to the existing sewer infrastructure.

Several planned projects will be under construction in the drainage protected area at the same time as the proposed project. These projects include, but are not limited to, the Lower East Side Ecology Center and the construction of Pier 42. The cumulative construction effects on water and sewer infrastructure resulting from the proposed project and other planned projects within the water and sewer infrastructure study area would be minimal. All construction would be performed in accordance with methods and standards approved by the New York City Department of Environmental Protection (DEP). Any interference with existing infrastructure would be identified, and protected, supported, and maintained in place throughout the duration of work. If required, relocation of water and sewer mains or lines would be undertaken without affecting the conveyance of flow through the infrastructure system. No disruption to existing water supply or sewer service is expected. Therefore, no significant adverse cumulative effects to water and sewer infrastructure as a result of the proposed project and the other projects in the study area are expected.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project would include components to isolate its tributary area from the non-storm surge protected sewersheds upstream of it during a design storm event and may install additional components to provide drainage management, as with the proposed project. The LMCR-Two Bridges Project has the potential to be designed to connect to the proposed project in efforts to better protect lower Manhattan from a design storm event.

During design storm events, operation of the proposed project and LMCR-Two Bridges Project and drainage isolation components may result in HGL increases in areas outside of the two protected project areas. However, similar to effects described for the proposed project, this additional surcharge would not result in a significant adverse effect in comparison to the volume and extent of flooding in these unprotected areas under the No Action Alternative. Therefore, based on currently available information, the operation of the proposed project and the LMCR-Two Bridges Project is not expected to result in any cumulative adverse effects on water and sewer infrastructure.

It is expected that both the proposed project and the LMCR-Two Bridges Project would implement similar measures to protect, support, and maintain in place all water and sewer infrastructure during construction. Any relocation associated with the projects, if needed, would be coordinated with DEP and would not affect water or sewer service. Therefore, no adverse cumulative effects on water or sewer infrastructure are anticipated.

TRANSPORTATION

The proposed project consists of a series of flood protection features and would not generate a new residential or employee population and associated vehicular travel demand. During non-storm operations under the proposed project, with the implementation of new comprehensive coastal flood protection systems, modifications to the transportation system include converting East 10th Street between the traffic circle and the FDR Drive service road from a two-way to one-way eastbound and to close the service road in front of the BP Gas Station to vehicular traffic at East 23rd Street. During design storm events, various roads would be closed when the closure structures are deployed. The magnitude of vehicular, pedestrian, and bicycle volumes within the surrounding transportation network is expected to be minimal during emergency operations and traffic/pedestrian operations are expected to be controlled by the New York City Police Department (NYPD). Transit routes would not be restricted when the closure structures are

operational except for the Route 34A bus. Due to the placement of the closure structures across Avenue C at East 23rd Street, the Route 34A bus would not be able to make the East 23rd Street to Avenue C movement. The No Action Alternative would include a variety of new developments within ½ mile of the waterfront that are expected to be complete by 2025. Many of these planned projects would result in modest pedestrian and bicycle generators near the waterfront, and are accounted for as part of the CEQR Technical Manual background growth in addition to the larger projects mentioned above. Therefore, no significant adverse cumulative effects to transportation as a result of the proposed project under the proposed project and the other projects in the study area are expected.

Several planned large-scale development projects will be under construction in the study area at the same time as the proposed project. These projects include, but are not limited to, Brookdale Campus, One Manhattan Square/Extell, Alexandria Phase 3, and the Two Bridges development. Under the proposed project, the cumulative construction effects on transportation resulting from the proposed project and other projects within the transportation study area would be dependent on the construction schedules and peak construction intensity of each project. Typically, construction managers for simultaneous projects on nearby construction sites within New York City would generally coordinate their activities to avoid delays and inefficiencies. Further, Maintenance and Protection of Traffic (MPT) plans would be developed for any temporary curb-lane, sidewalk, and roadway closures. Under Alternatives 2, 3, and the Preferred Alternative, during the installation of closure structures (including gates and associated foundations) across the FDR Drive near East 13th Street as per the preliminary designs, the FDR Drive may require a temporary full closure during construction. Depending on the type of closure and the duration, vehicular traffic from the FDR Drive would need to be diverted to the local roadways in the study area. Approval of the MPT plans and implementation of all temporary closures during construction would be coordinated with NYCDOT's Office of Construction Mitigation and Coordination (OCMC). Therefore, taking into consideration these factors and the varying construction schedules per project, the cumulative construction transportation effects from the proposed project and nearby proposed projects within the study area could be significant.

If additional road closures were needed as part of any other No Action projects then additional significant adverse traffic effects could also be identified during construction.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges Project would be designed to mitigate the effects of inundation from flood waters and to create opportunities for programming and enhance waterfront views and community access where possible. It would not create new developments housing residential or worker populations. Therefore, similar to the proposed project, there may only be a slight increase in pedestrian traffic, which will be verified with additional pedestrian studies. Nevertheless, it is assumed that the LMCR-Two Bridges Project would not increase any pedestrian elements by more than the *CEQR Technical Manual* 200 pedestrians during a peak hour analysis threshold.

For the LMCR-Two Bridges Project, existing sidewalk and bicycle path widths could be narrowed at various locations within the Two Bridges neighborhood, if required by the design of the flood mitigation. However, that effect would only be experienced within the Two Bridges neighborhood. As discussed above, transit routes under the proposed project would not be restricted when the closure structures are operational except for the Route 34A bus due to the placement of the closure structures across Avenue C at East 23rd Street. Any effects on transit routes for the Two Bridges

project is expected to be limited to within the Two Bridges neighborhood. Therefore, the LMCR-Two Bridges Project and the proposed project are not expected to result in cumulative transportation effects.

The LMCR-Two Bridges Project, depending on the design, could result in potential adverse effects to transportation during construction. Depending on the construction schedule and peak construction duration for the LMCR-Two Bridges Project, the average daily construction traffic, pedestrians, transit, and parking demand are likely to increase within the transportation study area when construction of the LMCR-Two Bridges Project would occur simultaneously with the proposed project, especially at key roadways such as the FDR Drive, South Street, Pike Street/Allen Street, and Montgomery Street. Should the LMCR-Two Bridges Project be subject to CEQR review and trigger the CEQR traffic threshold during the construction period, a traffic Levels of Service assessment would likely be warranted, and a disclosure of effects and mitigation required. Therefore, significant adverse transportation effects in addition to those identified for just the proposed project may result where standard mitigation may not be sufficient and Traffic Enforcement agents would be needed as required.

As the design of the LMCR-Two Bridges Project becomes more defined, it will be studied as part of a separate environmental review, for which more details on the predicted construction transportation effects and associated mitigation measures for the LMCR-Two Bridges Project alone and the cumulative effects of the LMCR-Two Bridges Project and the proposed project, would be determined.

NEIGHBORHOOD CHARACTER

As defined in the *CEQR Technical Manual*, neighborhood character is an amalgam of various elements that give neighborhoods their distinct "personality." These elements may include a neighborhood's land use, socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, shadows, transportation, and/or noise. Therefore, the cumulative effects in relevant technical areas were considered for this section.

No significant adverse cumulative effects related to land use, zoning, and public policy; open space; socioeconomic conditions; and transportation are expected on neighborhoods within the study area as a result of the proposed project and the projects proposed under the No Action Alternative. Several planned projects are anticipated to be under construction in the study area at the same time as the proposed project. These projects include the conversion of Pier 42 into waterfront open space, site specific resiliency measures at study area NYCHA locations, open space improvements at two public schools, and the development of the Solar One facility in Stuyvesant Cove Park. Collectively, these planned projects to enhance open space resources, provide targeted resiliency measures, and improve access to parkland and other parts of the City are consistent with the current neighborhood uses, are not anticipated to significantly adversely affect historic and cultural resources, and are not expected to create any substantial change in neighborhood character.

The proposed project would be consistent with existing land use patterns and trends within the study area. Changes to open space resources would not significantly affect the character of the neighborhood. Under the proposed project, potential adverse effects related to one architectural resource (the FDR Drive) was identified as a result of proposed work in East River Park. However, construction of the proposed project would be conducted in coordination with NYCDOT to ensure protection of these resources. Therefore, no significant adverse cumulative effects to historic and cultural resources as a result of the proposed project and the No Action projects are expected.

Potential adverse effects to waterfront and river views from certain locations within the study area were identified as a result of the proposed project. However, none of the projects evaluated for cumulative effects are anticipated to further restrict visual access to the river. Therefore, no significant adverse cumulative effects to urban and visual resources as a result of the proposed project and the No Action projects are expected.

No significant cumulative adverse effects associated with the elements that contribute to neighborhood character were identified as a result of the proposed project and the No Action projects. Therefore, it is not expected that the proposed project and the No Action projects would combine to result in major cumulative adverse effects to the fabric and character of the neighborhoods within the study area, but rather would result in long-term moderate beneficial effects due to the open space access improvements, the enhancements to open spaces, and the installation of a comprehensive flood protection system to reduce the risk of damage from design storms to the neighborhood.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges Project would construct a flood protection system to protect the Two Bridges neighborhood, while also striving to enhance waterfront access and improving the area's economic and social resiliency. Like the proposed project, it is expected that the LMCR-Two Bridges Project would introduce flood protection elements designed to integrate into the existing parkland and streets of the study area, while enhancing open space and access to open space for residents. It is expected that any alterations to architectural resources in the LMCR-Two Bridges project area, including the Two Bridges Historic District, would be undertaken in consultation with LPC and/or SHPO. Depending on the design, the LMCR-Two Bridges Project could result in potential adverse effects to visual resources by blocking views to the waterfront and the East River. However, based on currently available information, these potential adverse effects may not result in changes to the context and feeling of the neighborhood. Therefore, no significant cumulative effects to neighborhood character as a result of the proposed project and the LMCR-Two Bridges Project are anticipated. Additional analysis of potential effects on neighborhood character is expected to be conducted as part of the environmental review for the LMCR-Two Bridges Project.

ENVIRONMENTAL JUSTICE

As described in Chapter 5.11, "Environmental Justice," the proposed project is not expected to result in any disproportionately high and adverse effects on minority and low-income populations. Residents in the project area, including minority and low-income populations would benefit from the proposed coastal flood protection. The No Action projects in the study area are not expected to result in any disproportionately high and adverse effects on minority and low-income populations. Accordingly, no adverse cumulative effects would be expected.

LMCR-TWO BRIDGES PROJECT

Similarly, it is not expected that the LMCR-Two Bridges Project would result in any such effects, even though the Two Bridges area has a high concentration of minority and low/moderate-income residents. The LMCR-Two Bridges Project will complete a separate environmental review under NEPA, which would assess the project's environmental justice effects. Together, the proposed project and the LMCR-Two Bridges Project would likely have a cumulative positive effect by reducing flooding potential and enhancing waterfront open spaces and access to the waterfront.

Like the proposed project, it is expected that the LMCR-Two Bridges Project would comply with all applicable NEPA and HUD regulations related to environmental justice protections.

CUMULATIVE CONSTRUCTION EFFECTS

As described in Chapter 6.0, "Construction Overview," with commencement of construction projected in 2020 and an approximately 3.5 to 5-year construction period, construction under the proposed project is expected to be complete by 2025. This section examines whether the overlapping of construction activities from nearby No Action projects and the proposed project would result in increased adverse effects near the surrounding community in the relevant technical areas.

CONSTRUCTION—ENERGY

The cumulative construction effects on energy resulting from the proposed project and other projects within the study area, including Pier 42 just south of the project area and Solar One Environmental Education Center, would be minimal. All construction would be performed in accordance with NYC laws and regulations. As discussed in Chapter 6.8, "Construction—Energy," protective measures would be implemented to ensure that construction of the proposed project would not disrupt the function of energy infrastructure and the electrical supply in Lower Manhattan.

LMCR-Two Bridges Project

Similar to the proposed project, LMCR-Two Bridges Project is expected to implement protective measures to ensure that construction activities would not disrupt the function of energy infrastructure and the electrical supply in Lower Manhattan. Therefore, no adverse cumulative effects on energy would be expected.

CONSTRUCTION—AIR QUALITY

The cumulative construction-related effects of the proposed project and No Action projects on air quality are described in this section. The construction air quality effects of the proposed project as described in Chapter 6.10, "Construction—Air Quality," included emissions generated by construction truck and worker vehicles traveling to and from the project areas as well as emissions generated by construction equipment operating within the project areas (i.e., non-road equipment).

The cumulative construction effects on air quality resulting from the proposed project and other projects near the project area would be dependent on the construction schedules and peak construction intensity of each project. Taking into consideration the varying construction schedules per project, even if the construction of the proposed projects under the No Action Alternative, including Pier 42 just south of the project area and Solar One Environmental Education Center in Project Area Two, would occur at the same time as construction under the proposed project, potential air quality concentration increments at nearby sensitive receptor locations during construction would be considerably diminished by dispersion due to the distance between the construction emissions sources for the proposed projects under the No Action Alternative and the proposed project. In addition, the No Action projects would be constructed in accordance with all applicable laws and regulations, including the use of clean fuel, the idling restriction for on-road vehicles, and dust suppression measures: Therefore, the cumulative air quality effects of simultaneous construction of the No Action projects and the proposed project at local sensitive receptor locations are expected to be minimal.

LMCR-Two Bridges Project

If construction for the proposed project occurs simultaneously with the construction of the LMCR-Two Bridges Project, potential air quality concentration increments at nearby sensitive receptor locations (i.e., residences, open spaces) during construction would be considerably diminished by dispersion due to the distance between the construction emissions sources for the LMCR-Two Bridges Project and the proposed project. Therefore, the cumulative air quality effects of potential simultaneous construction of the LMCR-Two Bridges project and the proposed project on local sensitive receptor locations are expected to be minimal. As the design of the LMCR-Two Bridges Project becomes more defined, it will be studied as part of a separate environmental review, for which more details on the predicted cumulative regional effects of the LMCR-Two Bridges Project and the proposed project would be determined.

CONSTRUCTION—GREENHOUSE GAS

The construction period for several planned projects, including Pier 42 and Solar One Environmental Education Center, would overlap with the construction period of the proposed project. These projects include Pier 42 just south of the project area. In addition, construction of the LMCR-Two Bridges Project could also occur simultaneously with construction for the proposed project.

The proposed project would result in increased greenhouse gas emissions during construction, but the greenhouse gas (GHG) emissions analysis for the proposed project would not be affected by concurrent construction of any other nearby projects. Therefore, no adverse cumulative effects on GHG are anticipated.

LMCR-Two Bridges Project

Construction means and methods for the LMCR-Two Bridges Project are expected to be similar to that for the proposed project. Depending on the design and the construction schedule for the LMCR-Two Bridges Project, its construction may overlap with that of the proposed project. The GHG analysis for the proposed project would not be affected by concurrent construction of the LMCR-Two Bridges Project since the analysis determines consistency with the City's GHG reduction goals based on the total GHG emissions for the estimated life of the proposed project only as well as any potential measures that may reduce emissions. Emissions from outside of the proposed project—both construction and operational—would not result a change to the total GHG emissions for the proposed project. Therefore, no adverse cumulative effects on GHG are anticipated.

CONSTRUCTION—NOISE AND VIBRATION

The construction noise effects of the proposed project as described in Chapter 6.12, "Construction—Noise and Vibration," included noise from the operation of construction equipment and noise from construction and delivery vehicles travelling to and from the site. A screening level mobile-source analysis indicated that vehicle trips associated with construction of the proposed project would not have the potential to result in significant adverse noise effects at any noise receptor locations.

During, construction of the proposed project, noise control measures would be implemented as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods). Even with these measures, the cumulative analysis of construction vehicle trips and

operation of on-site construction equipment indicated the potential for significant adverse noise effects as a result of construction at some receptors for the proposed project.

The cumulative construction effects on noise resulting from the proposed project and other projects near the project area would be dependent on the construction schedules and peak construction intensity of each project. Taking into consideration the varying construction schedules per project, the construction of the proposed projects under the No Action Alternative, including Pier 42 just south of the project area and Solar One Environmental Education Center in Project Area Two, would occur at the same time as construction under the proposed project.

Significant adverse construction noise effects are expected to be similar across the proposed project. Depending on the construction schedule and peak construction intensity of each project, this adverse effect could be exacerbated by the concurrent construction of other projects within or immediately adjacent to the project area (e.g., Pier 42 and Solar One Environmental Education Center), further increasing the temporary noise effects within the study area. Therefore, there is potential for cumulative significant adverse noise effects during construction.

Vibration resulting from construction of the proposed project would not result in exceedances of the acceptable limit, including for historic structures. However, vibration monitoring would be required for all historic structures within 90 feet of the project work areas for the proposed project and any No Action projects according to the project's CPP to ensure vibration does not exceed the acceptable limit at any of these historic structures. In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location. While the vibration may be noticeable at times, for the proposed project and any No Action Projects, it would be temporary and would consequently not rise to the level of a significant adverse effect. Therefore, the cumulative vibration effects of potential simultaneous construction of the LMCR-Two Bridges project and the proposed project on local sensitive receptor locations are expected to be minimal.

LMCR-Two Bridges Project

The combined on-site construction noise associated with both the proposed project and the LMCR-Two Bridges Project could potentially be greater than the level of construction noise from the proposed project alone at locations in proximity to both projects. However, it is unlikely that construction activities would occur in the same area (i.e., adjacent construction segments) or if so, for any extended period of time that would result in a significant adverse noise effect. The additional construction noise associated with the LMCR-Two Bridges Project is not expected to result in either significant adverse noise effects in the analysis of the proposed project or increase the magnitude or duration of effects that were identified.

PUBLIC HEALTH

As discussed in 6.13, "Public Health," the proposed project would not result in a significant adverse public health effect. Furthermore, with the implementation of the proposed project, residents would be less vulnerable to flooding during design storm events. Combining with other resiliency projects in the study area, including NYCHA and the LMCR-Two Bridges projects, the cumulative effects of the proposed project and these resiliency projects are anticipated to have long-term beneficial effects to the residents in the study area. ✷

Chapter 8.0: Unavoidable Adverse Effects

A. INTRODUCTION

This chapter summarizes the unavoidable adverse effects resulting from the proposed project and mitigation measures to address those effects. According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, unavoidable significant effects are those that would occur if a proposed project or action is implemented regardless of the mitigation employed, or if mitigation is impossible. Unavoidable significant adverse impacts resulting from the proposed project have been identified in the area(s) of analysis under operational conditions: urban design and visual resources, natural resources; and under construction conditions: open spaces, and noise and vibration.

B. URBAN DESIGN AND VISUAL RESOURCES

Alternatives 2 through 5 could potentially result in significant adverse visual effects by blocking certain views to the East River from multiple locations within the study area. Since these effects result from the installation of the flood protection structures, these potential significant adverse effects could not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls and/or raised landscapes to minimize or reduce obstructions of views to the East River would compromise the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, the finishes are being taken into account, and the floodwalls would be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls.

C. NATURAL RESOURCES

TERRESTRIAL RESOURCES

The total number of trees to be removed as a result of the Alternative 2 design would be 265, which represents a loss of 20 percent of the trees inventoried for the project.

The total number of trees to be removed as a result of the Alternative 3 design would be 776. This loss of trees represents 61 percent of the trees inventoried for the proposed project.

The total number of trees to be removed as a result of the Preferred Alternative and Alternative 5 design would be 981. This loss of trees represents 77 percent of the trees inventoried for the proposed project. For all alternatives, trees in excellent condition measuring up to 7 inches diameter breast height (dbh) would be considered potential transplant candidates and may reduce the total number of trees to be removed. Under the Preferred Alternative and Alternative 5 there would be 1,442 trees planted within the project area and the net change to trees would be an increase of 399. In addition, the project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. The landscape restoration plan would ultimately result in a net increase of 399 total trees within the project area. While these trees would not be as mature as some existing trees, over time, the new tree canopy would fill in and represent an improved habitat over the existing conditions, which is largely dominated by London plane trees, known for their poor response to salt-water inundation.

Under Alternative 2, as part of the replanting plan, at a minimum the trees removed would be replaced, resulting in no net loss of trees. Under Alternative 3, as part of the replanting plan, there would be 1,180 trees planted within the project area. The net change to trees would be an increase of 342.

WETLAND RESOURCES

Under the With Action Alternatives, a shared-use flyover bridge would be built cantilevered over the northbound FDR Drive to address the narrowed pathway (pinch point) near the Con Edison facility between East 13th Street and East 15th Street, thus providing a more accessible connection between East River Park and Captain Patrick J. Brown Walk. The support structures (shafts and footings) for the flyover bridge would result in permanent adverse effects to 652 square feet of New York State Department of Environmental Conservation (NYSDEC) littoral zone tidal wetlands and U.S. Army Corps of Engineers (USACE) Waters of the United States within the East River.

The Preferred Alternative and Alternative 5 also include the filling and relocation of two existing embayments within the project area to provide adequate space to site heavily utilized active recreation facilities and to allow for an Americans with Disabilities Act (ADA) accessible path to improve accessibility to, and enjoyment of, the waterfront for all Park users. The two proposed embayments would be comparable or larger in size, would be similarly located within East River Park, and would be designed to provide enhanced ecological value to the aquatic environment compared to the existing embayments.

The embayment relocations would result in the permanent loss of 24,085 square feet of littoral zone tidal wetland habitat as shown in Table 5.6-7. Under Alternative 5, the raised FDR Drive platform would require permanent support shafts to be constructed in tidal wetlands. Of the 15 support shafts proposed as part of the elevated FDR Drive platform, eight are anticipated to occur through the deck of the waterfront esplanade and into the East River. The support shafts would result in a permanent loss of an additional 157 square feet of unvegetated and shaded littoral zone tidal wetland habitat compared to the Preferred Alternative.

Adverse effects to aquatic resources would be mitigated for with the creation of approximately 26,000 square feet new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements, and would not be considered significant. The mitigatory elements of the Preferred Alternative are consistent with the City's WRP policies of protecting water quality, sensitive habitats, and the aquatic ecosystem.

CONCLUSION

Tree replacement would be conducted as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). The permanent loss of tidal wetland habitat associated with the With Action Alternatives would be mitigated for in accordance with all NYSDEC and USACE permit conditions.

D. CONSTRUCTION—OPEN SPACE

The open space resources within the project area, including East River Park, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Playground and Captain Patrick J. Brown Walk, would be partially or fully closed for at least a portion of the approximately 3.5 to 5-year-long construction duration to accommodate the construction of the proposed project. Therefore, there is potential for temporary significant adverse direct effects over multiple analysis years due to the displacement of the numerous recreational resources in East River Park across all alternatives. The open space ratios would exceed the *CEQR Technical Manual* threshold of 5 percent change between the With Action and No Action conditions during construction. Temporary displacement of open space for construction over the 5 percent threshold is considered significant since it could result in the overburdening of remaining available open spaces within the study area. Therefore, the construction—open space analysis concluded that there would be potential significant adverse indirect effects on open space during the construction period across all alternatives. On-site or off-site measures can be made to mitigate the effect to the greatest extent practicable; however, these impacts cannot be fully mitigated. Therefore, resulting in unavoidable significant adverse effects.

According to the *CEQR Technical Manual*, on-site improvements are considered a mitigation measure. Although construction would temporarily displace open space resources in East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, Asser Levy Playground, and Captain Patrick J. Brown Walk under the With Action Alternatives, the end result would be a refurbished open space resource. After construction, East River Park would be a newly landscaped and raised park with pathways for the Preferred Alternative, which would enhance the user experience of the park. In addition, the upland open space resources in the ½-mile study area

would be protected against future storm events, thus increasing the utility and safety of those resources. The Preferred Alternative would be especially beneficial for the open space resources in East River Park, as this alternative includes a full reconstruction of the park, raising it by approximately eight feet to meet the design flood protection criteria. These enhancements would ensure that East River Park would be more resilient in future storm events. The flood protection measures proposed to be integrated into park features aim to reduce the effects from future storm events on the community. The Preferred Alternative proposes the replacement of pedestrian crossings at Delancey Street, East 10th Street, and Corlears Hook bridges. The enhancement of pedestrian bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon project completion. The improvements to these open space resources under the proposed project would be considered partial mitigation. Additionally, as stated in the *CEQR Technical Manual*, the implementation of missing segments of the City's greenway network would be considered a mitigation strategy. By remedying a long-standing restriction/obstacle at the Con Edison "pinch-point," the proposed project under all alternatives would significantly improve the usability and access to the greenway with the construction of the shared-use flyover bridge.

The Asser Levy Recreation Center is predicted to experience a significant adverse noise effect as a result of construction. The feasibility of utilizing less impactful construction methods (i.e., press in pile) are being explored to mitigate this noise effect.

PARTIAL MITIGATION OF EFFECTS

The proposed project introduces potential temporary significant adverse direct and indirect effects on open space during the construction period. Since the proposed project would result in temporary significant adverse effects, potential on-site or off-site measures to mitigate the effect to the greatest extent practicable are being explored by the city. However, with these measures, the effects would only partially mitigate construction effects on open space resources for the five-year construction duration under Alternatives 2 and 3, and for the first three years of the construction period under the Preferred Alternative and Alternative 5.

POTENTIAL MITIGATION MEASURES

As per *CEQR Technical Manual* guidance, a mitigation effort would be to improve existing open spaces in the study area and increase the utility, safety, and capacity of those resources. To that end, the mitigation measures being explored for the Preferred Alternative by the City include:

- The New York City Department of Parks and Recreation (NYC Parks) would work to accommodate permit users, with youth leagues as highest priority, within existing facilities under NYC Parks jurisdiction. Due to the high volume of permitted use across all NYC Parks, permittees may have to limit playing time to be accommodated;
- The City is working with other entities with open space resources to identify recreational resources that may be opened to the community during construction;
- The City is assessing opportunities to open parts of East River Park as work is completed;
- NYC Parks is exploring providing alternative recreational opportunities throughout the Lower East Side neighborhoods through programs like Shape-Up classes, walking clubs, Arts, greening programs, etc.;
- The New York City Department of Transportation (NYCDOT) would reroute greenway users to the most direct alternate route within the existing bicycle network, primarily along

the protected bike lanes on First Avenue and Second Avenue; bicycles looking to access Stuyvesant Cove Park ferry landing would have access via the existing protected bike lanes onto East 20th Street;.

- NYDOT is investigating supporting bicycle infrastructure upgrades along the alternate route, including new markings and signage;
- NYC Parks is exploring a Lower East Side Greening program with the opportunity to plant up to 1,000 trees in parks and streets, and create up to 40 bioswales;
- The City is exploring purchasing lighting to be used at several Lower East Side parks to extend playing time at fields for permitted use during construction of the proposed project; and
- The City is assessing opportunities for improvements to parks and playgrounds in the vicinity.

The City is also assessing the feasibility of utilizing quieter construction methods (i.e., press in pile), to partially mitigate noise effects that would be experienced at the Asser Levy Recreation Center. Additionally, the introduction of new publically accessible open space such as Pier 42 Park, Pier 35, and Phase IV of the East River Waterfront Esplanade project, totaling 4.81 acres could be considered a mitigation effort. In addition, there has been funding allocated for the demolition of LaGuardia Bathhouse and interim recreation improvements which will create approximately 7,000 square feet of new publicly accessible open space.

Although full mitigation of the significant adverse construction open space effects is not possible as it is not feasible to acquire enough land to develop new open spaces to replace the existing resources that would be displaced under the proposed project, the measures proposed above would mitigate to the extent practicable, the construction effects on open space resources. Furthermore, the proposed project would substantially improve existing open space resources. All temporary displacement would be met with the refurbishment and re-construction of the displaced open space amenities. After construction, Murphy Brothers Playground, Stuyvesant Cove Park, and Asser Levy Playground would be redesigned and reconstructed and East River Park would be reconstructed as a newly landscaped open space, which would enhance the use experience of the park. In addition, the proposed project seeks to protect portions of the ½-mile study area that are inland from the flood protection systems. Upon completion of the proposed project, the upland open space resources in the ½-mile study area would be protected against future storm events, thus increasing the utility and safety of those resources.

IMPROVEMENT OF NON-MOTORIZED ACCESS TO PARKS

The Preferred Alternative would include the replacement of the Delancey Street, East 10th Street, and the Corlears Hook bridges. The enhancement of these bridges to East River Park would improve the east-west connectivity for residents in the ½-mile study area to East River Park upon project completion.

The proposed project would also include a shared-use fly-over bridge in the East River Bikeway along the Con Edison facility between East 13th Street and East 15th Streets. This would allow pedestrians and cyclists to travel between Stuyvesant Cove Park and the East River Esplanade/East River Bikeway without conflict with visitors travelling in the opposite directions or requiring cyclist dismounts. As stated in the *CEQR Technical Manual*, the implementation of missing segments of the City's greenway network would be considered a mitigation strategy. By

remedying a long-standing restriction/obstacles, the proposed project would significantly improve the usability and access to the greenway.

E. CONSTRUCTION—NOISE AND VIBRATION

Under the Preferred Alternative, construction of the proposed project is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street, 123 Mangin Street, and the Asser Levy Recreation Center. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to CEQR criteria. The buildings at 621 Water Street, 605 Water Street, 765 FDR Drive, 819 FDR Drive, 132 Avenue D, 465 Avenue D, 123 Mangin Street, and the Asser Levy Recreation Center appear to have monolithic glass (i.e., non-insulating) and would consequently be expected to experience interior $L_{10(1)}$ values up to the high 60s dBA, which is up to approximately 23 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. See Table 6.12-8 for a summary of construction noise analysis results for the Preferred Alternative.

Under Alternative 3, construction of the proposed project is predicted to result in significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street. The buildings at 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, and 520 East 23rd Street already have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during much of the construction period, which would be considered acceptable according to CEQR criteria.

Under Alternatives 2 and 5, significant adverse construction noise effects are expected to be similar to those under Alternatives 3 and the Preferred Alternative, respectively.

Construction of the Preferred Alternative is expected to occur over a 3.5-year duration as compared to the 5-year duration for Alternatives 2, 3, and 5. This shorter construction duration for the Preferred Alternative is primarily due to less disruption to the FDR Drive since flood protection in East River Park would be primarily along the East River rather than along the FDR Drive and the Preferred Alternative also allows full closure of East River Park so it can be reconstructed in a single stage. In addition, compared to Alternatives 2 and 3, maximum

construction noise levels at receptors nearest the East River floodwall construction within East River Park for the Preferred Alternative would be slightly lower, because pile driving for the Preferred Alternative would occur further from the receptors.

Even with the noise control measures described in Chapter 6.12, "Construction—Noise and Vibration," construction of the proposed project would result in potential temporary significant adverse noise effects at 621 Water Street, 605 Water Street, 309 Avenue C Loop, 315-321 Avenue C, 620 East 20th Street, 601 East 20th Street, 8 Peter Cooper Road, 7 Peter Cooper Road, 530 East 23rd Street, 765 FDR Drive, 819 FDR Drive, 911 FDR Drive, 1023 FDR Drive, 1115 FDR Drive, 1141 FDR Drive, 1223 FDR Drive, 570 Grand Street, 455 FDR Drive, 71 Jackson Street, 367 FDR Drive, 645 Water Street, 322 FDR Drive, 525 FDR Drive, 555 FDR Drive, 60 Baruch Drive, 132 Avenue D, 465 East 10th Street, and 520 East 23rd Street. The predicted significant adverse construction noise effects would be of limited duration and would be up to the high 80s dBA during daytime construction and up to the mid 70s during nighttime construction. Noise levels in this range are typical in many parts of Manhattan along heavily trafficked roadways. Because the analysis is based on worst-case construction phases, it does not capture the natural daily and hourly variability of construction noise at each receptor. The level of noise produced by construction fluctuates throughout the days and months of the construction phases, while the construction noise analysis is based on the worst-case time periods only, which is conservative.

Source or path controls beyond those already identified in Chapter 6.12, "Construction—Noise and Vibration," were considered for feasibility and effectiveness in reducing the level of construction noise at the receptors that have the potential to experience significant adverse construction noise impacts. These measures may include the following:

- Using a hydraulic press-in pile installation method instead of the standard impact pile driving provides a large reduction in noise from pile installation, which would result in a substantial reduction in overall construction noise because pile installation is the dominant source of construction noise at most receptors. However, the press-in pile installation method is not suitable for pile installation in some space-limited areas and in areas where there are large subsurface obstructions. In those cases, impact pile driving would be unavoidable.
- Hanging noise barriers or curtains made from mass-loaded vinyl around the pile driving head to shield receptors from noise of impact pile driving would provide approximately 5 to 10 dBA reduction in noise from pile installation. However, this would require a crane or cranes to hang the noise barriers, which introduces an additional noise source. Furthermore, the time required to place the noise barriers at the start of driving each pile could extend the total duration of pile driving.
- Enclosing the concrete pump and concrete mixer trucks at any time that the mixer barrels would be spinning in a shed or tunnel including 2 or 3 walls and a roof, with the opening or openings facing away from receptors would provide approximately 10 to 15 dBA reduction in Approximately 10 to 15 dBA reduction in concrete operation noise, which does not represent a substantial portion of the project's construction noise. Consequently, this measure would not be effective in reducing total construction noise levels at surrounding receptors.
- Using barging for deliveries of construction materials (including concrete) and importing of fill to the project sites, rather than trucks on roadways to from the construction work areas, would provide approximately 3 to 6 dBA reduction in noise levels from dump trucks and/or

delivery trucks. If noise from pile installation is reduced by one of the means described above, the trucks would be the next greatest contributor to the total construction noise level, so this reduction measure could be effective in further reducing the total construction noise levels at surrounding receptors. However, it may result in conflicts with esplanade work, in which case truck deliveries would be unavoidable.

- Selecting quieter equipment models for cranes, generators, compressors, and lifts may result in up to a 10 dBA reduction in noise levels from construction if the pile installation and truck noise are reduced by the means described above. This is subject to the availability of quieter equipment in the quantities necessary to complete the proposed project in the projected timeframe.

During construction of the proposed project, noise control measures would be implemented as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods).

However, even with these measures, the cumulative analysis of construction vehicle trips and operation of on-site construction equipment indicated the potential for significant adverse noise effects as a result of construction at some receptors under each of the analyzed alternatives. ✷

Chapter 9.0: Irreversible and Irretrievable Commitment of Resources

The Federal Council on Environmental Quality's (CEQ) regulations implementing the procedural provisions of the National Environmental Policy Act (NEPA), as set forth in 40 C.F.R. §§ 1502.16, requires federal agencies to consider any irreversible or irretrievable commitment of resources in the evaluation of environmental consequences should a proposal be implemented. Similarly, the New York State Environmental Quality Review Act (SEQRA) regulations identify that the contents of an environmental impact statement (EIS) include an evaluation of any irreversible and irretrievable commitments of environmental resources that would be associated with the proposed action should it be implemented (6 NYCRR § 617.9 [b][5][iii][c]). Resources, both natural and human-made, would be expended in the construction and operation of the East Side Coastal Resiliency (ESCR) Project (the proposed project). These resources include the building materials used in construction; energy in the form of gas and electricity consumed during construction by various mechanical and processing systems; and the human effort (time and labor) required to develop, construct, and operate various components of the flood protection system. These are considered irretrievably committed because their reuse for some other purpose would be highly unlikely.

The proposed flood protection measures and enhancements to open spaces under the proposed project also constitutes a long-term commitment of land resources, thereby rendering land use for other purposes highly unlikely in the foreseeable future. Furthermore, funds committed to the design, construction/renovation, maintenance, and operation of the proposed project are not available for other projects.

These commitments of resources and materials are weighed against the proposed project's goals to (1) provide a reliable coastal flood protection system against the design storm event for the protected area; (2) improve access to, and enhance open space resources along the waterfront, including East River Park and Stuyvesant Cove Park; (3) respond quickly to the urgent need for increased flood protection and resiliency, particularly for communities that have a large concentration of residents in affordable and public housing units along the proposed project area; and (4) achieve implementation milestones and comply with the conditions attached to funding allocations as established by the U.S. Department of Housing and Urban Development (HUD), including scheduling milestones. ✷

Chapter 10.0: List of Preparers

This document was prepared by the New York City Mayor's Office of Management and Budget (OMB) and the New York City Department of Parks and Recreation (NYC Parks), under the direction of and with involvement from the Office of the Deputy Mayor for Operations, the New York City Office of Recovery and Resiliency (ORR), New York City Design and Construction (DDC), the New York City Department of Transportation (NYCDOT), and the New York City Department of Environmental Protection (NYCDEP). Key individuals and firms involved in the preparation of this Environmental Impact Statement are indicated below.

NEW YORK CITY MAYOR'S OFFICE OF MANAGEMENT AND BUDGET (OMB)

Eram Qadri, AICP, LEED AP BD+C, Unit Head, Environmental Review
Juliet Jacobs, Supervising Analyst, Environmental Review

NEW YORK CITY DEPARTMENT OF PARKS AND RECREATION (NYC PARKS)

Colleen Anderson, Chief, Parklands and Real Estate
Emily Humes, Project Planner
Alda Chan, Project Administrator for Planning

NEW YORK CITY LAW DEPARTMENT

Haley Stein, Senior Counsel, Environmental Division
Robert Martin, General Counsel, Environmental Division

OFFICE OF THE DEPUTY MAYOR FOR OPERATIONS

Minelly De Coo, Senior Advisor

NEW YORK CITY OFFICE OF RECOVERY AND RESILIENCY (ORR)

Carrie Grassi, Deputy Director for Planning
Curtis Cravens, Deputy Director for Program Coordination and Delivery
Jordan Salinger, Senior Policy Advisor
Cherry Mui, Program Manager for Planning

NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION (DDC)

Thomas Foley, Deputy Commissioner for Public Buildings
How Sheen Pau, Assistant Commissioner
Thu-Loan Dinh, Director, Coastal Resiliency
Eleanor Rogers, Deputy Director, Coastal Resiliency
Eric Ilijevich, Associate Project Manager
Kathryn Leaman, Project Engineer
Deborah Vandermark, Associate Project Manager
Carlos Pichardo Jimenez, Project Engineer
Fay Lee, Borough Outreach Coordinator

NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYCDOT)

Judy Chang, Resiliency Projects Coordinator
Henry Colon, Project Manager, Division of Planning
Nega Lakew, City Planner, Resiliency Planning Division
Matthew Winchell, Project Engineer

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NYCDEP)

Mitchell Wimbish, Senior Project Manager, Bureau of Environmental Planning and Analysis
Terrell Estesen, Director of Wastewater Review and Special Projects, Bureau of Environmental Planning and Analysis

ENVIRONMENTAL IMPACT STATEMENT: JOINT VENTURE CONSULTANT TEAM

AKRF, INC.

Robert White, AICP, Project Manager
Kenny Mui, LEED AP, Project Manager
Michael Lee, Project Advisor
Nathan Riddle, AICP, Deputy Project Manager
Megan Porter, Deputy Project Manager
Myles Ehrlich, Technical Editor
Jacqueline Mitchell, GIS Analyst

HAZEN & SAWYER

Sandeep Mehrotra, PE, Project Executive
Annie Winter, ENV SP, Project Manager
Nicolette Leung, PE, ENV SP, Deputy Project Manager
Christopher Campbell, Project Planner
Jessica Einhorn, Project Scientist
Christina Hook, Senior Project Scientist
Caitlin Fedio, Project Engineer

HPI

Cece Saunders, RPA, President and Principal Investigator
Julie Horn, Principal Investigator and Senior Archaeologist/Historian

Chapter 11.0: Glossary of Terms

Term	Definition
100-year storm	A storm that has a 1.0 percent chance of occurring in any given year.
500-year storm	A storm that has a 0.2 percent chance of occurring in any given year.[1]
Active/passive floodproofing measures	Active floodproofing (or emergency) measures require manual operation and are effective when sufficient warning time is provided to mobilize the personnel and equipment necessary to implement them. Passive measures do not require manual operation.
CDBG Program and CDBG-DR Program	The Community Development Block Grant (CDBG) program is a United States Department of Housing and Urban Development (HUD) program that provides communities with resources to address a wide range of unique community development needs. The CDBG-Disaster Recovery (DR) program is specifically for disaster recovery assistance, granted by HUD to help cities, counties, and states recover from Presidentially declared disasters, especially in low-income areas.[2] New York City is the grantee for CDBG-DR funds for the devastation from Hurricane Sandy.
Closure Structures	Closure structures are floodgates across a street or sidewalk that is deployed during a storm event.
Coastal Protection Initiative 21	This initiative of the Community Rebuilding Resiliency Plans (CRRP) calls for an integrated flood protection system for targeted areas of protection in Lower Manhattan, including the Lower East Side from East 14th Street to Battery Park City. This initiative also expressed the City's commitment and support for the Rebuild by Design competition (see below), which ultimately shaped the proposed project.

[1] Hurricane Sandy was a 700-year storm, with a 0.14 percent chance of occurring in any given year.

[2] http/portal.hud.gov

Critical Infrastructure	The assets, systems, and networks, whether physical or virtual, so vital to an area that their incapacitation or destruction would have a debilitating effect on security, economic stability, public health or safety, or any combination of the above.
Design Storm Event	An extreme coastal storm event (the 100-year flood event with Sea Level Rise projections to the 2050s[3]) to which the proposed project provides level of protection.
Drainage Design Storm	The storm event for which the drainage management concept is designed to manage. This storm is a two-year (a storm that has a 50 percent chance of occurring every year), second quartile National Oceanic and Atmospheric Administration (NOAA) Atlas 14 24-hour rainfall event[4] coincident with a 100-year surge tide that lasts a period of twelve hours.
East Side Costal Resiliency (ESCR) Design Criteria	ESCR design criteria includes: planning for protection against the 100-year flood event for the Federal Emergency Management Agency (FEMA)-designated special flood hazard area, including consideration of the 90th percentile projections of sea-level rise to the 2050s; protecting critical open space amenities from design storm events and sea level rise; preventing surge from entering the existing sewer system; analyzing interior drainage requirements and managing hydraulic flooding; designing resiliency into the system such that surge events exceeding design do not result in catastrophic failure; and designing capacity for future system adaptation.
Flood Insurance Rate Maps (FIRMs)	The official map of a community on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to a neighborhood or community.
Flood Protection System	A series of measures that together work to protect from storm events but are otherwise minimally intrusive during non-storm periods. The proposed system includes the following components: levees, floodwalls, closure structures, and water and sewer infrastructure components.
Floodplain	The area adjacent to a stream, river or coastline that may flood. The 100-year floodplain represents a geographical area with a 1.0 percent or greater chance of flooding in any given year. The 500-year floodplain represents a geographical area with a 0.2 percent chance of flooding in any given year.

[3] Sea level rise estimate represents the 90th percentile value for 2050 as presented by the New York City Panel on Climate Change. See Chapter 2, "Project Alternatives," for additional details on design principals and sea level rise.

[4] National Oceanic and Atmospheric Administration (NOAA) Atlas 14 design rainfall events are based on statistical analysis of historical rainfall records for the northeast region.

Floodwall	Narrow, vertical structures that are designed to withstand both tidal storm surges and waves. They are typically constructed of steel, reinforced concrete, or a combination of materials with a reinforced concrete cap.
I-wall	I-walls are vertical flood protection structures with a below-grade foundation that are designed to withstand storm surge and wave forces. In profile view, the wall is I-shaped and is typically constructed of steel, reinforced concrete, or a combination of materials, has a reinforced concrete cap.
Interceptor	A large diameter sewer that receives flow from smaller sewer lines and conveys it to a wastewater treatment plant, sometimes via a pump station.
Interceptor Gates	Interceptor gates are large gates that control flow through the interceptor (see above). Interceptor gates would be sited to the north and south of the protected area to isolate flow in the interceptor from the protected area.
Isolation Gates	Isolation gates are components of the drainage management concept that isolate the sewer system in the protected area aimed at reducing storm surge waters from entering the sewer system through the outfall pipes or other access points in the existing sewer infrastructure.
L-wall	L-walls are a vertical flood protection structure with a below-grade foundation designed to withstand storm surge and wave forces. This system can also handle more intensive forces (such as vessel impacts) and can be constructed to greater heights (including extension of heights at future dates). The foundation is typically constructed of concrete, and a vertical stem extends at one end of the slab creating an "L" shape in cross-section.
Levee	A levee is an earthen structure with a core of compacted fill material, capped with a layer of stiff clay to resist erosion from storm waves and currents, and a stabilizing and landscaped top layer. Levees can be designed to varying widths and slopes depending on the availability of horizontal space, but the limiting maximum slope for flood protection is considered to be 4 feet horizontal to 1 foot vertical; this is also an acceptable grade for both pedestrian access and maintenance. To avoid seepage, the levee has an interior "cutoff wall" that is constructed of either a stiff clay, or slurry.
Non-storm Condition	Non-storm conditions are defined as typical day-to-day conditions without the occurrence of a design storm event. These non-storm conditions may include typical dry weather as well as typical rainfall events without storm surge tides that exceed a 100-year storm tide.

Overland Flooding Flooding caused by a storm surge coupled with a high tide that exceeds the elevation of the coastal topography or from a rapid rainfall event before stormwater is either captured by the sewer system or flows by gravity to a nearby waterbody.

Parallel Conveyance Parallel conveyance is a component of the drainage management concept that conveys combined sewer flow to the interceptor, reducing the risk of inland flooding during a storm surge event.

Project Area One One of the two project areas comprising the location of the proposed project alignment. Project Area One extends from Montgomery Street on the south to the north end of John V. Lindsay East River Park (East River Park) at about East 13th Street. Project Area One consists primarily of the Franklin Delano Roosevelt East River Drive (the FDR Drive) right-of-way, a portion of Pier 42 and Corlears Hook Park as well as East River Park. The majority of Project Area One is within East River Park and includes four existing pedestrian bridges across the FDR Drive to East River Park (Corlears Hook, Delancey Street, East 6th Street, and East 10th Street Bridges) and the East Houston Street overpass.

Project Area Two One of the two project areas comprising the location of the proposed project alignment. Project Area Two extends north and east from Project Area One, from East 13th Street to East 25th Street. In addition to the FDR Drive right-of-way, Project Area Two includes the Con Edison East 13th Street Substation and the East River Generating Station, Murphy Brothers Playground, Stuyvesant Cove Park, Asser Levy Recreational Playground, the VA Medical Center, and in-street segments along East 20th Street, East 25th Street, and along and under the FDR Drive.

Protected Area The area protected from flooding inland of the flood protection system with the proposed project. The area that would be protected under the proposed project includes lands within the Federal Emergency Management Agency (FEMA) 100-year special flood hazard area (SFHA). In addition, the protected area also takes into consideration the 90th percentile projection of sea level rise to the 2050s.

Proposed Project The East Side Coastal Resiliency Project (proposed project) involves the construction of a coastal flood protection system along a portion of the east side of Manhattan and related improvements to City infrastructure.

Rebuild by Design	In June 2013, HUD launched Rebuild by Design (RBD), a multi-stage planning and design competition to promote resiliency in the Hurricane-Sandy-affected region. The winning proposal for Manhattan was named "the Big U" and focused on a flood protection system around Manhattan from West 57th Street, south to the Battery, and up to East 42nd Street.
Recreational Amenities	Recreational amenities include indoor and outdoor sporting and leisure facilities, children's play areas and open space (e.g., soccer field, playground, basketball court, swimming pool).
Regulator	A component of the sewer system that controls the flow to outfalls to minimize combined sewer overflows (CSOs). Regulators serve three principal purposes: (1) to divert flow in the combined sewers to the large diameter interceptor that conveys flow to the wastewater treatment facility; (2) to prevent overloading of the interceptor and downstream treatment works during high flow events; and (3) to divert flow in excess of the system's capacity to CSO outfalls.
Resilient Infrastructure	Infrastructure designed to withstand, adapt to, and recover from extreme weather events. In the context of the proposed project, resilient infrastructure would reduce the risk to coastal flooding, and provide social and environmental benefits to the community through improvements in public amenities.
Roller Floodgate	A roller floodgate is a closure structure that is deployed in anticipation of a storm event. It consists of a gate with a single or double line of wheels that is moved into the closed position prior to a storm event and is in the open position during non-storm periods.
Special Initiative for Rebuilding and Resiliency (SIRR)	A New York City task force that analyzed the impacts of Hurricane Sandy on the City's buildings, infrastructure, and people to assess climate change risks in the medium (2020s) and long (2050s) terms and outlined strategies for increasing resiliency citywide. The SIRR analysis resulted in the report *PlaNYC: A Stronger, More Resilient New York*, released in June 2013, and containing CRRPs for five particularly vulnerable neighborhoods in the City, including Lower Manhattan.

Storm Surge	A storm surge is an extreme tide in conjunction with an astronomical and/or meteorological condition over and above the normal predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide.
Swing Floodgate	A swing floodgate is a closure structure that is deployed in anticipation of a storm event. It consists of a gate with a hinged door that is moved into the closed position prior to a storm event and is in the open position during non-storm periods.
Tide Gate	A tide gate is installed within an outfall to prevent tidal backflow into the sewer system due to high tides and storm surges.

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Chapter 12.0: List of Acronyms

ACHP	Advisory Council of Historic Preservation
ACM	asbestos-containing material(s)
ACS	*American Community Survey*
ADA	American with Disabilities Act
ANSI	American National Standards Institute
APE	Area of Potential Effect
ASFPM	Association of State Flood Plain Managers
ASTM	American Society for Testing and Materials
ATR	automatic traffic recorder
BAFHD	Best Available Flood Hazard Data
BAT	best available technology
BIG	Bjarke Ingels Group
BMPs	Best Management Practices
BPM	Best Practice Model
BTEX	benzene, toluene, ethylbenzene, xylene
Btu	British thermal units
CAA	Clean Air Act
CAAAV	Committee Against Anti-Asian Violence
CAF	Coastal Assessment Form
CAMP	Community Air Monitoring Program
CARB	California Air Resources Board
CARP	Contamination Assessment and Reduction Project
CB	Community Board
CCLs	Community Construction Liaisons
CCP	Cities for Climate Protection™
CDBG-DR	Community Development Block Grant-Disaster Recovery
CEHA	Coastal Erosion Hazard Area
CEP	Community Engagement Plan

CEQ	Council on Environmental Quality
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CH_4	methane
CHASP	Construction Health and Safety Plan
CIP	cast-in-place
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Con Edison	Consolidated Edison Company of New York
CPP	Construction Protection Plan
CRIS	Cultural Resource Information System
CRRP	Community Rebuilding Resiliency Plans
CSO	combined sewer overflow
CUNY	City University of New York
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibels
dbh	diameter at breast height
DCP	New York City Department of City Planning
DDC	New York City Department of Design and Construction
DEIS	Draft Environmental Impact Statement
DEM	digital elevation model
DEP	New York City Department of Environmental Protection
DFE	Design Flood Elevation
DO	dissolved oxygen
DOB	New York City Department of Buildings
DOE	New York City Department of Education
DOI	United States Department of the Interior
DPF	diesel particulate filters
DPM	diesel particulate matter
DPS	New York Bight Distinct Population Segment

DR	Disaster Recovery
DSNY	New York City Department of Sanitation
ECL	Environmental Conservation Law
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Environmental Site Assessment
ESCR	East Side Coastal Resiliency
ESRI	Environmental Systems Research Institute
ETC	estimated time of completion
FDNY	New York City Fire Department
FDR Drive	Franklin Delano Roosevelt East River Drive
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	Geographic Information Systems
GOLES	Good Old Lower East Side
GR	General Requirements
GWP	global warming potential
HC	hydrocarbons
HCM	2000 *Highway Capacity Manual*
HCS	*Highway Capacity Software*
HFCs	hydrofluorocarbons
HGL	hydraulic grade line
hp	horsepower
HPD	U.S. Department of Housing Preservation and Development
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
IEC	Interstate Environmental Commission
ILGWU	International Ladies Garment Workers Union
IMPLAN	Impact Analysis for PLANning

INDCs	Intended Nationally Determined Contributions
IPaC	Information Planning and Conservation
IPCC	Intergovernmental Panel on Climate Change
JFREJ	Jews for Racial and Economic Justice
JV	joint venture
LBP	lead-based paint
LCP	lead-containing paint
Leq(1)	1-hour equivalent (noise level)
LIHTC	Low-Income Housing Tax Credit
LMCR	Lower Manhattan Coastal Resiliency
LN	late night
LOMR	Letter of Map Revision
LOS	level of service
LPC	Landmarks Preservation Commission
LTCP	long-term control plan
LWCF	Land and Water Conservation Fund
MGD	million gallons per day
MGP	manufactured gas plants
MIG	Minnesota IMPLAN Group
MMBtu	Million British Thermal Units
MMP	MGP Waste Materials Management Plan
MOA	Memorandum of Agreement
MOS	New York City Mayor's Office of Sustainability
MOVES2014a	USEPA Mobile Source Emission Simulator
MPT	Maintenance and Protection of Traffic
MS4	Municipal Separate Storm Sewer System
MTA	Metropolitan Transit Authority
MTBE	methyl tertiary butyl ether
MWP	Mitigation Work Plan
N_2O	nitrous oxide
NAA	non-attainment area
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum

NDRC	National Disaster Resilience Competition
NEPA	National Environmental Policy Act
NFPC	National Nonstructural/Flood Proofing Committee (a USACE committee)
NHL	National Historic Landmark
NHP	New York Natural Heritage Program
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
NMFS	National Marine Fisheries Service
NNN	Neighborhood Network Notification
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWF	National Wildlife Federation
NWI	National Wetlands Inventory
NWS	National Weather Service
NYCDOT	New York City Department of Transportation
NYCEDC	New York City Economic Development Corporation
NYCEM	New York City Office of Emergency Management
NYCHA	New York City Housing Authority
NYCL	New York City Landmark
NYC Parks	New York City Department of Parks and Recreation
NYCRR	New York City Rules and Regulations
NYCT	New York City Transit
NYNHP	New York Natural Heritage Program
NYPA	New York Power Authority
NYPD	New York City Police Department
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation

NYSERDA	New York State Energy Research and Development Authority
NYSHPA	New York State Historic Preservation Act of 1980
NYSM	New York State Museum
NYSOGS	New York State Office of General Services
O_3	ozone
O–D	origin-destination
OCMC	(NYCDOT's) Office of Construction Mitigation and Coordination
OEM	original equipment manufacturer
OER	New York City Office of Environmental Remediation
OMB	New York City Office of Management and Budget
One NYC	*One New York: The Plan for a Strong and Just City*
OPRHP	New York State Office of Parks Recreation and Historic Preservation
ORR	New York City Mayor's Office of Recovery and Resiliency
OSHA	Occupational Safety and Health Administration
O.U.R.	Organizing and Uniting Residents
PANYNJ	Port Authority of New York & New Jersey
PAHs	polycyclic aromatic hydrocarbons
PBS	Petroleum Bulk Storage
PCB	polychlorinated biphenyls
PCEs	passenger car equivalents
PDC	Public Design Commission
PFCs	perfluorocarbons
PFIRMs	Preliminary Flood Insurance Rate Maps
PHROLES	Public Housing Residents of the Lower East Side
PID	photoionization detector
PlaNYC	*PlaNYC—A Stronger, More Resilient New York*
PM	particulate matter
$PM_{2.5}$	particulate matter with diameter of 2.5 micrometers or less
PM_{10}	particulate matter with diameter of 10 micrometers or less
PPV	peak particle velocity
PSF	price per square foot
RAP	Remedial Action Plan
RBD	Rebuild by Design

RCA	recycled concrete aggregate
RE	Responsible Entity
RGGI	Regional Greenhouse Gas Initiative
SAR	Second Assessment Report
SAV	submerged aquatic vegetation
SBS	Small Business Services
SCMs	supplementary cementitious materials
SCOs	Soil Cleanup Objectives
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEQR	*New York State Environmental Quality Review*
SEQRA	New York State Environmental Quality Review Act
sf	square feet
SF_6	sulfur hexafluoride
SFHA	Special Flood Hazard Area
SGMP	Soil and Groundwater Management Plan
SHIP	New York University Furman Center's Subsidized Housing Information Project
SHPO	New York State Historic Preservation Office
SIP	State Implementation Plan
SIRR	Special Initiative for Rebuilding and Resiliency
S/NR	State/National Register of Historic Places
SLM	Brüel & Kjær Sound Level Meters
SO_x	sulfur oxides
SPCCP	Spill Prevention Control and Countermeasure Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	semi-volatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TEAs	Traffic Enforcement Agents
THPO	Tribal Historic Preservation Officer
TIMS	NYCDOT Traffic Information Management System
TNC	The Nature Conservancy
TPPN	(New York City Department of Buildings) *Technical Policy and Procedure Notice*
TSS	tidal suspended solids

UJC	Urban Justice Center's Community Development Project
ULSD	ultra-low-sulfur diesel
ULURP	Uniform Land Use Review Procedure
URA	Urban Renewal Area
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
UWAS	*Urban Waterfront Adaptive Strategies*
v/c	volume-to-capacity
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
VdB	vibration decibels
VMT	vehicle miles traveled
VOC	volatile organic compound
WWTP	Wastewater Treatment Plant
WRP	Waterfront Revitalization Program
µg/L	micrograms per liter

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