East Bronx Waterfront

NY Rising Community Reconstruction Plan

December 2014

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Foreword

Introduction

In the span of approximately one year, beginning in August 2011, the State of New York experienced three extreme weather events. Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy wreaked havoc on the lives of New Yorkers and their communities. These tragic disasters signaled that New Yorkers are living in a new reality defined by rising sea levels and extreme weather events that will occur with increased frequency and power. They also signaled that we need to rebuild our communities in a way that will mitigate against future risks and build increased resilience.

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program, within the Governor's Office of Storm Recovery (GOSR), empowers the State's most impacted communities with the technical expertise and funding resources needed to develop thorough and implementable reconstruction plans to build physically, socially, and economically resilient and sustainable communities.

Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than $700 million planning and implementation program established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.

Launched in the summer of 2013 and completed in March 2014, Round I of the NYRCR planning process included 50 NYRCR Planning Areas, comprising 102 storm-impacted localities. In January 2014, Governor Cuomo announced a second round of the planning process, serving an additional 22 storm-impacted localities. Four of these localities were absorbed into

existing Round I NYRCR Planning Areas, bringing the number of localities participating in Round I up to 106; the other 18 localities formed 16 new Round II NYRCR Planning Areas. Between Rounds I and II, there are 66 NYRCR Planning Areas, comprising 124 localities. The program serves over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

In Rounds I and II, the State allotted between $3 million and $25 million to each participating locality for the implementation of eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.[1]

Each NYRCR Planning Area is represented by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with established local leaders, community organizations and, in some cases, municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 650 New Yorkers have represented their communities by serving on Planning Committees. Nearly 650 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's team to develop community reconstruction plans, which identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 250+ Public Engagement Events attracted thousands of community members, who provided feedback on the planning process and resulting proposals. The NYRCR Program's outreach has included communities that are traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the program's website (*www.stormrecovery.ny.gov/nyrcr*), providing several ways for community members and the public to submit feedback on the program and materials in progress.

Throughout the planning process, Planning Committees were supported by staff from GOSR, planners from New York State (NYS) Department of State and NYS Department of Transportation, and consultants from world-class planning firms that specialize in engineering, flood mitigation solutions, green infrastructure, and more.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allotted over $700 million for planning as well as implementing eligible projects identified in NYRCR Plans. NYRCR Planning Areas are also eligible for additional funds through the NY Rising to the Top Competition, which evaluates applications from Round II NYRCR Planning Committees across three categories—Regional Approach, Inclusion of Vulnerable Populations, and Use of Green Infrastructure. The winner of each category will be allotted a share of the competition's $3.5 million to fund additional eligible projects.

In April 2014, Governor Cuomo announced that projects identified in NYRCR Plans would receive priority consideration through the State's Consolidated Funding Application (CFA) process and charged the Regional Economic Development Councils (REDCs), which play an advisory role in the CFA process, to support NYRCR projects. In December 2014, Governor Cuomo announced that 24 NYRCR projects received nearly $12 million in CFA funding. This announcement is an example of the Governor honoring his commitment to leverage the work of the NYRCR Planning Committees to incorporate resilience into other State programs and to find additional sources of funding for NYRCR projects. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and to create funding opportunities where none existed before.

The NYRCR Program has successfully coordinated with State and Federal agencies to help guide the development of feasible projects. The program has leveraged the REDC State Agency Review Teams (SARTs), composed of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Planning Committees. The SARTs review projects with an eye toward regulatory and permitting needs, policy objectives, and preexisting agency funding sources. The NYRCR Program

is continuing to work with the SARTs to streamline the permitting process and ensure shovels are in the ground as quickly as possible.

On the pages that follow, you will see the results of months of thoughtful, diligent work by the East Bronx Waterfront NYRCR Planning Committee, which is passionately committed to realizing a brighter, more resilient future for its community.

The NYRCR Plan

This NYRCR Plan is an important step toward rebuilding a more resilient community. Each NYRCR Planning Committee began the planning process by defining the scope of its planning area, assessing storm damage, and identifying critical issues. Next, the Planning Committee inventoried critical assets in the community and assessed the assets' exposure to risk. On the basis of this work, the Planning Committee described recovery and resiliency needs and identified opportunities. The Planning Committee then developed a series of comprehensive reconstruction and resiliency strategies, and identified projects and implementation actions to help fulfill those strategies.

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the Planning Committee's prioritization of these projects and actions. **Proposed Projects** are projects proposed for funding through an NYRCR Planning Area's allotment of CDBG-DR funding. **Featured Projects** are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. **Additional Resiliency Recommendations** are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

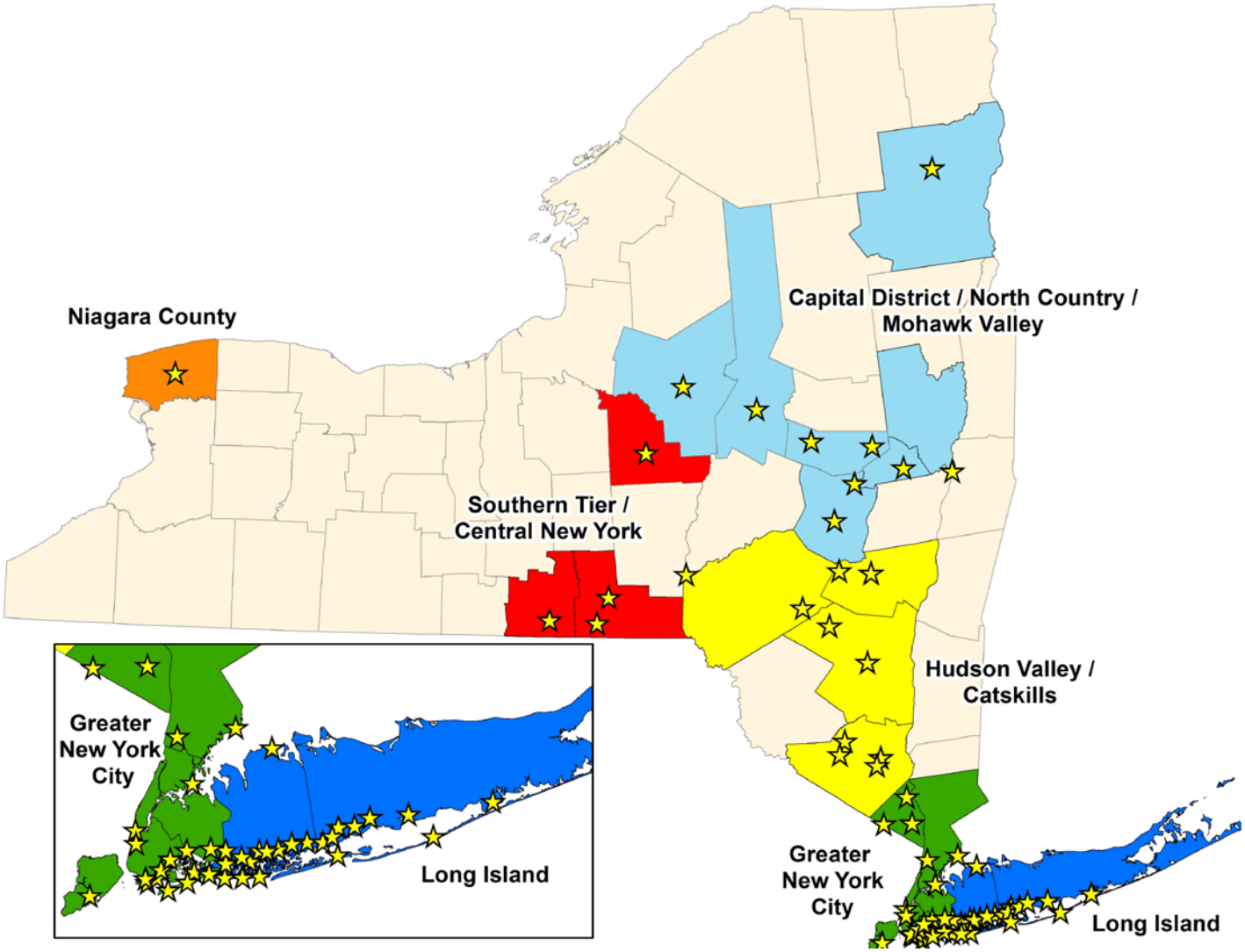
As part of Round II of the NYRCR Program, the East Bronx Waterfront NYRCR Planning Area has been allotted up to $3 million in CDBG-DR funds for the implementation of eligible projects identified in this plan.

While developing projects for inclusion in NYRCR Plans, Planning Committees took into account cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. Planning Committees also considered the potential likelihood that a project or action would be eligible for CDBG-DR funding. Projects and actions implemented with this source of Federal funding must satisfy a Federally-designated eligible activity category, fulfill a national objective (i.e., meeting an urgent need, removing slums and blight, or benefiting low- to moderate-income individuals), and have a tie to the natural disaster to which the funding is linked. These are among the factors that GOSR will consider, in consultation with local municipalities and nonprofit organizations, when determining which projects and actions are best positioned for implementation.

The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Planning Area's CDBG-DR allotment to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act. Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. Projects will be implemented on a staggered timeline, and the NYRCR Program will choose an appropriate State or local partner to implement each project. GOSR will actively seek to match projects with additional funding sources, when possible.

In the months and years to follow, many of the projects and actions outlined in this NYRCR Plan will become a reality, helping New York not only to rebuild, but also to build back better.

NY Rising Communities



Map displays the 66 NYRCR Planning Areas from Rounds I and II. (Five of the Round I Planning Areas—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.)

Contents

Foreword i
NY Rising Communities vi
Executive Summary xi

I. Community Overview
Geographic Scope I–1
Description of Storm Damages I–8
Critical Issues I–12
Community Vision I–14
Relationship to Regional Plans I–16

II. Assessment of Risk and Needs
Description of Community Assets and Assessment of Risk II–1
Assessment of Risk to Assets and Systems II–14
Assessment of Needs and Opportunities II–18

III. Reconstruction and Resiliency Strategies
Reconstruction and Resiliency Strategies III–1

IV. Implementation – Project Profiles
Projects Overview IV–1
Project List IV–2
Community Recovery Plan IV–4
Locust Point Civic Association Resource Center and Resiliency Improvements IV–8
North Tower Firehouse Resource Center and Resiliency Improvements IV–12
Vulnerable Coastal Edge Protection—Street-End Study and Pilot Project IV–16
Edgewater Park Pumping System Hardening IV–24
Ferry Point Local Street Improvement Project IV–26
Westchester Creek Waterfront Study IV–32
Community Facility Resiliency Capital Fund IV–38
Building Flood Audit Program IV–42
Hammond Cove Living Shoreline Restoration IV–46
Harding Park Edge Protection Study IV–52
City Island Wetland Restoration & Coastal Protection IV–56

V. Additional Materials
Additional Resiliency Recommendations . . . . . V–I
Master Table of Projects V–2
Public Engagement Process V–5
Community Asset Inventory V-8
Endnotes V–23
Glossary V–25

Figures

Figure ES-1: East Bronx Waterfront Project Overview xvii
Figure I–1: Overview of Planning Area I–3
Figure I–2: Extent of Superstorm Sandy Storm Surge I–9
Figure I–3: FEMA Preliminary Flood Insurance Rate Map (FIRM) I–11
Figure I–4: Existing Plans and Projects Map I–17

Figure II–1: New York State Department of State (NYS DOS) Risk Areas II–3
Figure II–2: Health and Social Services Assets Map II–5
Figure II–3: Economic Development Assets Map II–7
Figure II–4: Housing Assets Map II–9
Figure II–5: Infrastructure Assets Map II–11
Figure II–6: Natural and Cultural Resources Assets Map II–13
Figure II–7: Geographic Distribution of Risk Scores II–17

Figure IV–1: Conceptual Illustration of Street-end Protection Typology Example—Seawall Integrated into Pier and Overlook IV–17
Figure IV–2: Vulnerable Street-End Locations IV–19
Figure IV–3: Drawing of Street-End Protection Typology Example—Seawall Integrated Into Pier and Overlook IV–20
Figure IV–4: Cross Section of Street-End Protection Typology Example—Seawall Integrated Into Pier and Overlook IV–20
Figure IV–5: Cross Section of Street-End Protection Typology Example—Berm IV–21
Figure IV–6: Cross Section of Street-End Protection Typology Example—Flood Wall IV–22
Figure IV–7: Ferry Point Proposed Drainage Strategies IV–27
Figure IV–8: Roadway Drainage Improvement Design Profile and Plan IV–29
Figure IV–9: Proposed Roadway Design Option 1—New Curbs without Sidewalks IV–30
Figure IV–10: Proposed Roadway Design Option 2—New Curbs with Sidewalks IV–31
Figure IV–11: Potential Pilot Proposal—Brush Avenue Complete Street Conceptual Rendering IV–33
Figure IV–12: Westchester Creek Waterfront Study Vision IV–37
Figure IV–13: Potential Technical Assistance Provided by the Building Flood Audit Program IV–43
Figure IV–14: Hammond Cove Restoration Illustrative Plan IV–47
Figure IV–15: Hammond Cove Living Shoreline and Stormwater Management Strategy IV–49
Figure IV–16: City Island Wetland Restoration and Coastal Protection Strategy Overview IV–57

Tables

Table III–1: STRATEGY: Maintain the Community's Close Relationship to the Water by Developing Diverse Coastal Edge Protection Measures III–3
Table III–2: STRATEGY: Harden Power Panels and Provide Alternative Power Sources for Key Community Facilities. III–5
Table III–3: STRATEGY: Increase Local Preparedness and Capacity for Recovery III–7
Table III–4: STRATEGY: Ensure Economic Resiliency for Businesses and Property Owners in Flood-Prone Areas III–9
Table III–5: STRATEGY: Improve and Increase the Capacity of Stormwater Management Infrastructure III–11

View of Bronx Whitestone Bridge and Throgs Neck Bridge

Executive Summary East Bronx Waterfront

The East Bronx Waterfront is a collection of coastal communities extending from Harding Park east to City Island in the New York City Borough of the Bronx. The East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Planning Area (Planning Area) includes 12 neighborhoods: City Island, Spencer Estates, Country Club, Edgewater Park, Locust Point, Silver Beach, Throggs Neck, Schuylerville, Ferry Point, Castle Hill, Clason Point, and Harding Park.

The Planning Area has roughly 48,000 residents, with incomes that vary by neighborhood but collectively are higher than Bronx County and the New York City average. The Planning Area comprises a diverse population and has a higher median age compared to the rest of the borough. Each of its 12 neighborhoods is unique in character, with many actively engaged civic and community groups. Many of these organizations came to the aid of the East Bronx Waterfront NYRCR Community (Community) in its time of need during the recovery from Superstorm Sandy.

The Governor's Office of Storm Recovery has allotted up to $3 million in Federal Community Development Block Grant–Disaster Recovery (CDBG-DR) funds for recovery and resiliency projects in the East Bronx Waterfront. Recognizing that this funding cannot solve for all challenges, the East Bronx Waterfront NYRCR Planning Committee (the Committee) has focused on short-term projects that are sustainable, implementable, and replicable throughout the Community. Through these projects, the Community will build the foundation for long-term resiliency to climate change impacts.

Storm Impacts

Superstorm Sandy struck the East Bronx Waterfront during low tide in Long Island Sound. While this lessened the impact from surge, there was significant damage throughout the Planning Area. High-wind and wave impacts downed power lines, swept debris into buildings, and caused flooding in several neighborhoods. Homes directly facing the waterfront experienced damage and flooding.

Community Vision Statement

"The tight-knit villages of the East Bronx aim to protect their beautiful waterfront by building a more resilient shoreline and better preparing residents for extreme weather events, while also improving the network between neighborhoods and creating an overall self-sufficient community."

In the days following the storm, the Community realized its lack of emergency response and recovery planning, including a lack of communication between community facilities that were not damaged and that were able to provide recovery functions. Without a formal recovery plan in place and effective communication between community facilities, residents were uncertain of where help was available and were in many cases left to fend for themselves.

Critical Issues

The Committee wants to ensure that when the next storm or emergency hits, the Community will be prepared. The edge condition throughout the Planning Area varies from bulkheads and sea walls to wetlands and natural berms. Ownership of waterfront land is primarily private, and much of the exposed waterfront is low-lying with limited opportunity to tie-back to higher ground. Recognizing that protection strategies should enhance the relationship with water, determining optimal locations and approaches with the greatest likelihood for implementation will be a major challenge.

The recovery from Superstorm Sandy was impeded both by damage to existing community centers and the lack of physical centers in some neighborhoods. Existing centers need to be hardened, new centers need to be identified, and communities need to organize through their civic organizations to be part of a larger recovery network so that communities can be served in times of crisis. The Committee recognizes that it needs to adapt, and that adaptation will be most successful if the distinct neighborhoods of the East Bronx can band together to develop a holistic resiliency strategy.

Community Driven Process

The Committee and members of the public acknowledge the Community's inextricable link to the water, and endorse a future vision that not only ensures the preservation of this relationship but is broad enough to facilitate more effective community-wide communication and collaboration during storm events.

Public Engagement Meeting #3

The Community is a collection of distinct neighborhoods that prize their access and unique relationships to the water. The vision for the Community speaks to the desire to retain and embrace this connection to the water by creating a more resilient shoreline. The Community recognizes the challenges it faces to protect the waterfront from climate change and is committed to adhering to sustainable development principles that work to enhance its neighborhoods and improve quality of life.

Public Engagement

The Committee recognizes that a comprehensive resiliency plan in this community will be successful only if there is broad involvement and support. Extensive outreach was undertaken, led by Civic Associations embedded in each neighborhood distributing flyers in their mailings and emails to the members. Through the NYRCR planning process, public engagement sessions were held at Providence Rest Nursing Home. In addition to flyer distribution, two local newspapers covered the events. The first three public engagement sessions were held to identify needs, refine strategies, and review and add input to Proposed and Featured projects. More than 300 people participated, providing input through comment cards and public dialogue, and voting to help the Committee select and refine the projects and develop the final plan.

Blueprint For Implementation

The Committee created a list of sustainable, implementable and replicable projects. A particular focus was placed on pilot projects that could be replicated throughout the Planning Area. The Committee developed strategies for social, economic, and physical resiliency by proposing projects that strengthen the edge against future flooding and sea-level rise, fix power and drainage infrastructure, and identify studies that will achieve long-term economic and social sustainability. The Community recognizes that it will become more resilient through education and community capacity building. The Committee wants to bolster this initial capacity building effort with a holistic recovery plan for the Community.

Health & Social Services

Community Planning & Capacity Building

Economic Development

Natural & Cultural Resources

Housing

Infrastructure System

Recovery Support Functions

The Governor's Office of Storm Recovery has structured each plan to focus on a set of criteria, known as the Recovery Support Functions. These six Recovery Support Functions were used to develop needs, opportunities, strategies, and projects to ensure that a comprehensive approach is reinforced throughout the planning process to shape a well-rounded resiliency strategy for the Community.

Needs and Opportunities

The Committee identified needs based on impacts from Superstorm Sandy. Needs are areas where the Community aims to reduce short- and long-term risks, and increase the resiliency of physical assets as well as build strength in community-based services. The following needs were identified:

- A protected coastal edge
- A more diverse power generation system
- Resiliency measures that address localized flooding along key access routes
- Natural stormwater management strategies to reduce inland flooding from heavy rain and storm events and reduce impervious surface area
- Housing that is more resistant to flooding
- Improved communication networks and education programs
- Suitable development in flood-prone locations
- Multiple storm recovery facilities in central locations
- A stable local economy following storm-related events

While the needs are significant, a number of opportunities will help lead the Community toward a resilient future. Multiple partners at the Federal, New York State and New York City levels are already working in several neighborhoods in the Planning Area, allowing the Committee to focus on specific interventions that can be replicable throughout the Community. Perhaps the most significant opportunity comes from the local community based organizations. The Community has relied upon these strong and active groups of civic organizations, and this plan builds upon these organizations to develop the capacity and capability to formulate the recovery plan. The Committee has built upon these strengths and opportunities in developing its NYRCR Plan.

Connection to the water draws residents to the area

Waterfront edge in Edgewater Park

Strategies

The plan develops strategies to address the critical needs previously identified. The strategies look to strengthen the edge against future flooding and sea-level rise, harden critical infrastructure, address localized flooding, and build capacity within the Community to quickly recover following an emergency.

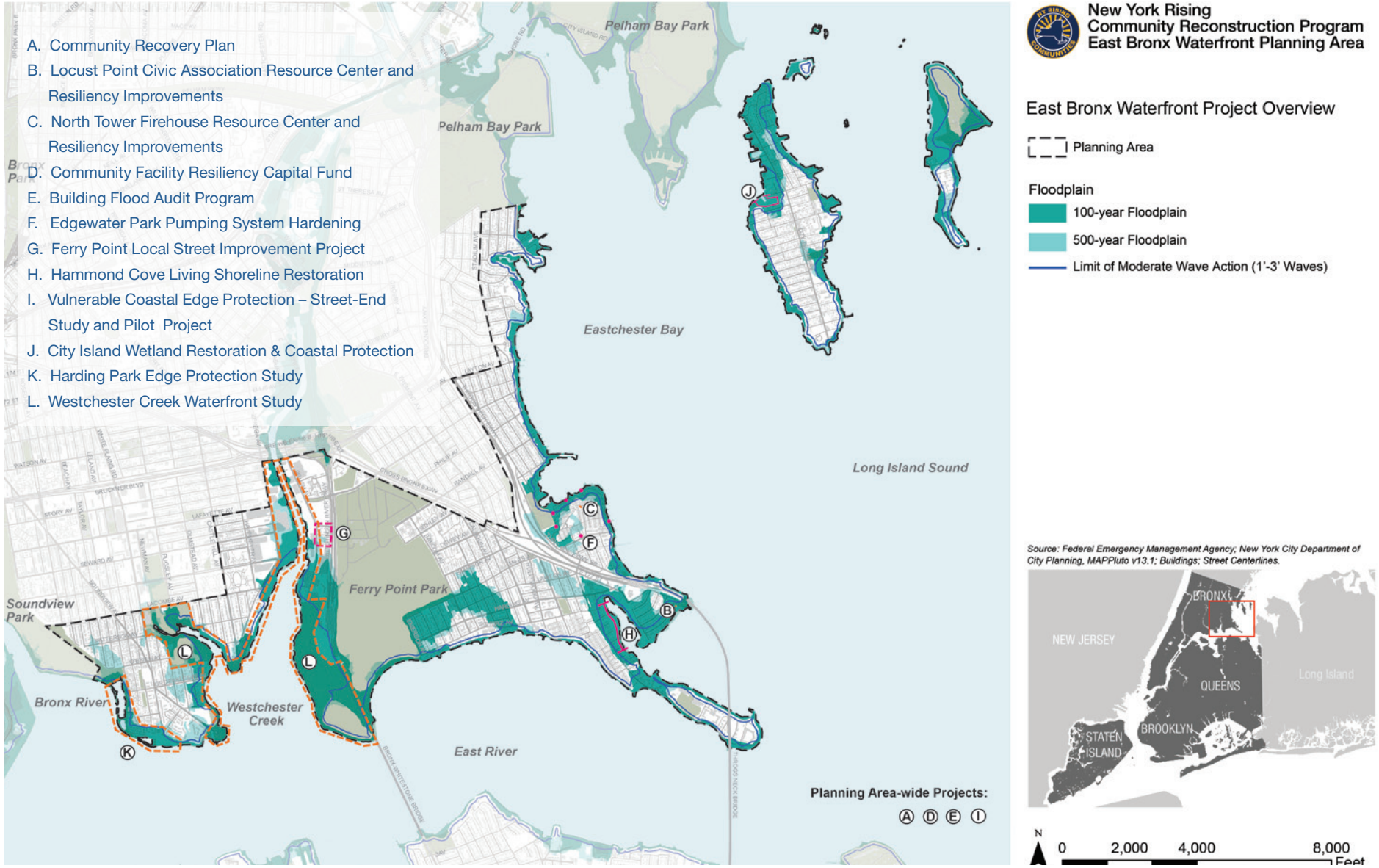
The key strategies are:

- Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures
- Harden power panels and provide alternative power sources for key Community facilities
- Increase local preparedness and capacity for recovery
- Ensure economic resiliency for businesses and property owners in flood-prone areas
- Improve and increase the capacity of stormwater management infrastructure

Proposed and Featured Projects

The NYRCR planning process has resulted in 12 Proposed and Featured Projects to improve the resiliency of the East Bronx Waterfront. Proposed Projects are projects that the Committee has recommended for full funding through the NYRCR process. Featured Projects are innovative projects that may require additional funding sources for implementation, and for which the Committee might have recommended funding an initial phase of implementation. The following Proposed and Featured Projects are together the product of a collaborative, community process that was led by the Committee with public input.

Figure ES-1: East Bronx Waterfront Project Overview



The Community wants to preserve its close connection to the water.

Community Recovery Plan (Proposed Project)
This project would create a local community recovery plan to enhance coordination with existing New York City resources, educate communities about the effects of climate change, and provide access to information about post-disaster resource services.

Locust Point Civic Association Resource Center and Resiliency Improvements (Proposed Project)
This project would provide funds for flood-proofing of the Locust Point Civic Association Center, a key community facility in Locust Point.

North Tower Firehouse Resource Center and Resiliency Improvements (Proposed Project)
This project would provide funding for resiliency improvements to the North Tower Firehouse to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.

Children playing basketball in the Planning Area

Vulnerable Coastal Edge Protection – Street End Study and Pilot Project (Proposed Project)
The study would examine the many different low-lying street end conditions that will need to be addressed throughout the Community and identify possible coastal protection typologies that could be used to protect the street ends. The project would fund up to three pilot projects identified in the study.

Edgewater Park Pumping System Hardening Improvements (Proposed Project)
This project would harden the sewage pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.

Ferry Point Local Street Improvement Project (Featured Project)
This project would repave and regrade up to three local streets in the Ferry Point neighborhood. A similar green infrastructure approach to roadway paving could be replicated in similar neighborhoods with streets where the mapped width exceeds the built width.

Westchester Creek Waterfront Study (Proposed Project)
This project would provide funding for a study to re-envision the Westchester Creek waterfront. Waterfront access is limited along the Creek but the many underutilized lots create an opportunity to transfer Westchester Creek into a resilient, accessible community asset.

Community Facility Resiliency Capital Fund (Featured Project)
This project would fund resiliency improvements for critical community buildings and facilities that serve vulnerable populations. Resiliency measures could include flood-proofing, raising mechanical and electrical equipment, and purchasing and installing backup generators.

Vulnerable homes along the waterfront

Building Flood Audit Program (Featured Project)
This project would provide technical assistance to homeowners who want to retrofit their buildings to mitigate future storm damage.

Hammond Cove Living Shoreline Restoration (Featured Project)
This project would enhance the shoreline on the west side of Hammond Cove that is threatened by sea-level rise.

Harding Park Edge Protection Study (Featured Project)
This project would study potential protection measures along the Bronx and East Rivers to reduce the risk of future flooding caused by coastal storm events.

City Island Wetland and Coastal Protection Strategy (Featured Project)
This project would create additional waterfront access for the Community, increase wetland habitat, and improve stormwater storage capabilities while adding a strategic piece to the long-term overall coastal protection strategy needed for City Island.

When coupled together, the NYRCR Plan for the East Bronx Waterfront offers a blueprint for implementation that would build the capacity for the Community to cope with future storms, protect the edge and power supplies, improve drainage, and re-envision the Community's relationship with the water.

I. Community Overview

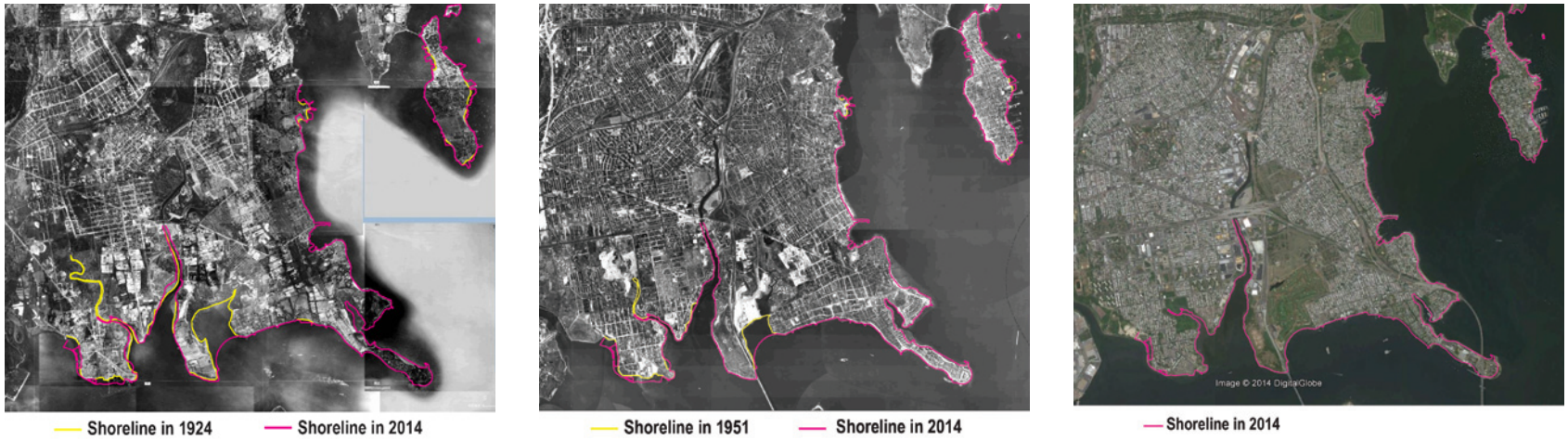
Geographic Scope

The East Bronx Waterfront NYRCR Planning Area (Planning Area) is approximately 2,500 acres and contains more than 22 miles of coastline. This coastal community extends from Harding Park east to City Island and is punctuated by several water bodies, including the Bronx River, Pugsley Creek, Westchester Creek, Hammond Cove, and Eastchester Bay.

The Planning Area comprises 12 neighborhoods: City Island, Spencer Estates, Country Club, Edgewater Park, Locust Point, Silver Beach, Throggs Neck, Schuylerville, Ferry Point, Castle Hill, Clason Point, and Harding Park (Figure I-1).

The Planning Area is located on relatively flat land between the Bronx River and Eastchester Bay that is interrupted by linear open spaces and tributaries. This section of the Bronx experienced notable physical transformations, including increases in land area and changes in geometry and location of its shoreline edges. Ferry Point Park, for example, grew significantly when Baxter Creek was filled. Several other parts of the Planning Area expanded in land area after the filling of salt marshes and shallow tidal flats in the 1950s. Also contributing to the changing landscape was residential development that occurred close to the coastal edge, which led to the hardening of much of the shoreline throughout the East Bronx Waterfront NYRCR Community (the Community).

The early history of the Bronx dates back to 1639, when Swedish sea captain Jonas Bronck settled the area between the Harlem River and the modern day Bronx River. The settlement was formally established in 1654 through a treaty between Thomas Pell and the Siwanoy band of Lenape Indians and was combined with the original 17th-century settlement of the Village of Westchester near today's Westchester Square.[1] In the mid-18th century,



Left, Aerial photo of planning area (1924), *NYC DOITT, NYCityMap;* Middle, Aerial photo of planning area (1951), *NYC DOITT, NYCityMap;* Right, Aerial photo of planning area (2014), *Google Earth.*

then-sparsely populated City Island (known as Minefer's Island) was purchased by New York native Benjamin Palmer, with the intention of building a port city that could rival Manhattan.[2] The local population in the East Bronx grew with the acceleration of agricultural production throughout the 19th century.

After the War of 1812 the Throggs Neck peninsula was identified as a key location to help protect New York from a naval attack coming from the Long Island Sound. This led to the construction of Fort Schuyler in 1833.[3] Construction of the fort drew laborers and craftsmen, many of whom were Irish, to the Throggs Neck area. Later, the decommissioned fort became the campus of the State University of New York Maritime College, which now trains professionals for the government, military, maritime, and private industries. The East Bronx remained a part of Westchester County until it was annexed by New York City in 1895.

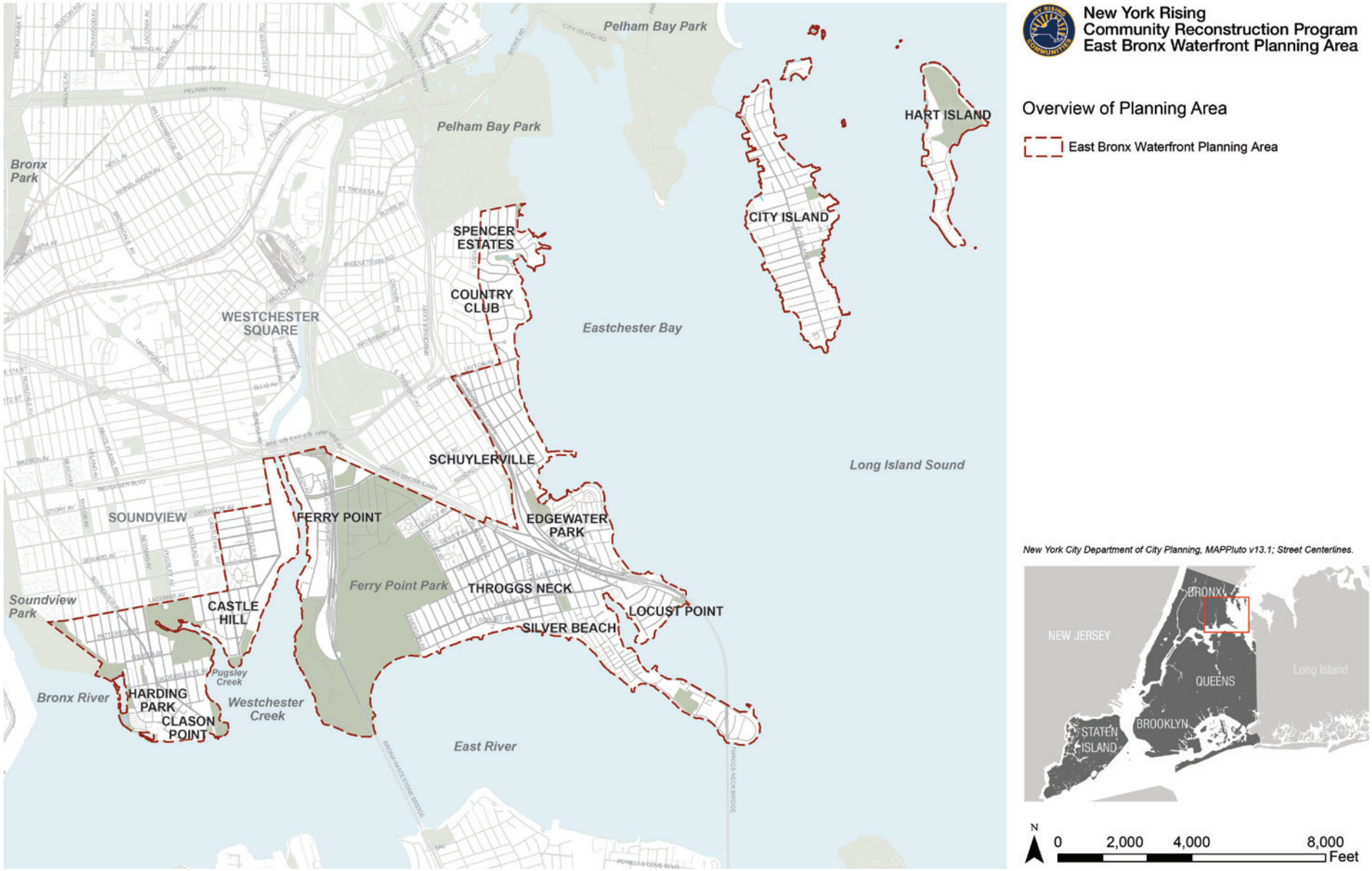
The Planning Area experienced significant physical and demographic changes during the 20th century. Transportation connections between the East Bronx and Queens, Manhattan, and areas west of the Bronx River, shaped a diverse assortment of neighborhoods and facilitated the rise of a commuting middle class. Between the 1930s and 1960s, new residential, commercial, and industrial developments in the East Bronx arose subsequent to the construction of the Interborough Rapid Transit (IRT) Pelham Line (the 6 Line Train), the Bronx-Whitestone Bridge, the Throgs Neck Bridge, and the Cross-Bronx Expressway. The expansion of rail transit system, along with the development of the interstate highway system in the mid-20th century, led to a population influx and shifts in travel behavior. The availability of relatively inexpensive real estate and shorter work commutes from the Bronx to Manhattan made possible by transportation improvements transformed the area from a quiet low-density suburb to a diverse higher-density urban community. Today, more than half of the labor force in the Planning Area works outside of the Bronx.

The ease of the commute to Manhattan from outlying areas created considerable demand for housing in the East Bronx, affecting development patterns, housing stock, and lot sizes. Today, the Planning Area comprises a variety of housing types including small bungalows, detached homes, and multifamily structures. Although some homes were built with Dutch Colonial stylistic detailing, most houses were built in a vernacular architectural style. That is, the aesthetic of many structures was rarely designed to go beyond the functional needs of the home. An example is the "bungalow," which, in many neighborhoods of the Planning Area, is minimally adorned and constructed of locally available building materials. This vernacular style of residential structures, in combination with consistent building façade articulations, building entrance designs, and uniform front yard setbacks along residential blocks, sets a distinctive urban identity unique to this part of the Bronx.

The Planning Area is a quilt of waterfront neighborhoods, knit together by a robust network of interconnected streets, bridges, sidewalks, public spaces, and the water's edge. Although each neighborhood is unique, one notable commonality is the Community's close relationship with and clear orientation to the water. For example, many of the streets in each waterfront neighborhood run perpendicular to the water's edge. In addition, many homes abutting the shoreline take advantage of unobstructed views of the water.

Harding Park, Clason Point, and Castle Hill are located within the western section of the Planning Area. These neighborhoods are clustered communities consisting of single-family homes, gated cooperatives, and several multifamily residential developments. The neighborhoods' coastal edge consists of large swaths of parks and open spaces, including

Figure I–1: Overview of Planning Area



Left, Homes in Throggs Neck; Right, Home on City Island

Soundview Park, which offers residents and visitors opportunities to stroll while enjoying views of Manhattan.

With the exception of large publicly owned parks along the waterfront, much of the coastal edge is inaccessible to the Community in the Planning Area. This is due in part to private ownership and the lack of a comprehensive and continuous waterfront trail system. The banks of Westchester Creek, for example, are mostly inaccessible to the general public, where utility infrastructure, surface parking lots, and commercial and industrial developments occupy most of the edge. This commercial and industrial development trend along the creek has limited or removed waterfront access for nearby residents, including the Ferry Point neighborhood, which is located between the Hutchinson River Parkway and Brush Avenue.

The neighborhoods east of Ferry Point Park, including Throggs Neck, Silver Beach, Locust Point, Edgewater Park, Spencer Estates, and Country Club, have a similar residential composition to the western communities. As is the case with many waterfront homes in the western neighborhoods, homes here have an intimate relationship with the water. The neighborhoods also have many private docks and recreational and/or commercial marinas extending into the East River, Hammond Cove, Long Island Sound, and Eastchester Bay to take advantage of the navigable waters and direct waterfront access.

City Island is a neighborhood at the eastern edge of the Planning Area and is connected to the mainland via the soon-to-be reconstructed City Island Bridge. The island's development is organized around a geographically central commercial corridor (City Island Avenue), with flanking residential development and a rich historic and cultural identity. The historic lotting and street grid pattern reveal a strong relationship to and dependency on the waterfront. Today, large marinas and boat yards are still found along the shoreline. On a pleasant day, the narrow waterway between City Island and Orchard Beach is crowded with boats and kayaks, and the commercial corridor of City Island Avenue, is flush with residents and tourists shopping and strolling.

According to the 2010 census, the Planning Area contains 48,447 residents, which represents a slight decrease since 2000. The racial composition of residents in the Planning Area is diverse, with 45% of the neighborhood reporting as Hispanic or Latino, 36% White, 14% Black or African American, and 3% Asian. The median age of residents in the Planning Area is 36.8 years, which is greater than the median age for Bronx County (32.8 years) and New

York City (35.5 years). While incomes vary from neighborhood to neighborhood, as of 2013, the residents in the Planning Area collectively have a higher median household income ($58,517) when compared to Bronx County ($34,300), New York City ($51,800), and New York State ($57,600).

Approximately one-third of the land within the Planning Area is in residential use. According to the U.S. Census Bureau, in 2012, there were approximately 18,876 housing units, of which 54% were owner-occupied and 39% renter-occupied. Within the Planning Area, approximately two-thirds of the homes were built prior to 1968. Housing built prior to this year, which is when the New York City Building Code was revised, is more susceptible to damage from storm events than structures built afterward since these older coastal homes are almost exclusively constructed of combustible materials.

Although there is a relatively small amount of land in commercial use in the Planning Area (approximately 2%), there are commercial corridors of note that contain a relatively high concentration of retail uses—Castle Hill Avenue, East Tremont Avenue, and City Island Avenue—and provide the Community with goods and services. Of the total land area, public facilities and institutional uses make up 10%, industrial and manufacturing comprise 4%, and commercial uses and surface parking lots each make up 2%. The Planning Area contains an abundance of parks and open spaces that compose approximately 28% of the land area. The remaining 16% of the Planning Area is occupied by vacant land and other uses.[3]

Private boats and docks in Pelham Bay

Government, education, and transportation industries are the largest area employers, with each sector representing over 10% of the area's employees.[5]

Historically, the economic vitality of the Planning Area was tied to water access. In the 19th and

20th centuries, City Island, for example, was an important shipbuilding and yachting center. During World Wars I and II, City Island shipbuilders constructed specialty boats and landing crafts for use by the U.S. government.[6] The addition of a ferry from College Point, Queens, in the early 1900s made the area a popular tourist destination with seaside resorts, dance halls, and amusement parks. When the ferry service ended during World War II, these attractions faded away.[7] While the Planning Area is less economically dependent on waterfront access today, the marinas, beach clubs, and seafood restaurants that continue to populate the communities of the East Bronx Waterfront reflect a rich nautical past.

City Island Touring Kayak Club

The character of the business community in the Planning Area is shifting. Food services and restaurants represent the largest gross number of establishments. However, most current business growth is occurring in other industry sectors. According to the U.S. Census Bureau, the number of businesses specializing in health care and social assistance grew by over 400% between 2000 and 2010. Food service and accommodation industries and administrative support industries increased by almost 120% and 170%, respectively, during the same period. Conversely, the entertainment, education, and retail industries lost 30%–50% of all businesses in each sector. The majority of the area's retail sales continue to occur in food and drinking establishments, grocery stores, and full-service restaurants.[8]

The main commercial corridors in the Planning Area are located along Castle Hill Avenue, extending from Randall Avenue to Lafayette Avenue north of the Planning Area, on East Tremont Avenue north of Miles Avenue in Throggs Neck, and down the entirety of City Island Avenue. Each corridor is heavily dominated by restaurants and food service establishments. The Castle Hill Avenue and East Tremont Avenue corridors contain grocery stores, banks, laundry facilities, pharmacies, and auto repair facilities that primarily serve local residents. The recently opened Throggs Neck Shopping Center at Lafayette Avenue and the Hutchinson River Parkway features

some of the first large-scale chain retailers in the Planning Area. The shopping center, which is located in a moderate flood-risk area, will bring new employment opportunities and retail options to the Planning Area. Located north of the Planning Area is the Mall at Bay Plaza and Bay Plaza Shopping Center, which combined to form one of the largest shopping centers in New York City.

Industrial uses are concentrated in the high and moderate flood-risk zones on both sides of Westchester Creek. Although they make up a small percentage of the total land area, the industrial uses are a vital resource and contribute to the economic well-being of the Planning Area.

Commercial corridor along City Island Avenue

Description of Storm Damages

Local Impacts

The Planning Area neighborhoods were each affected differently by Superstorm Sandy. The Planning Area was largely spared from the storm surge that devastated many other parts of New York City in part because Superstorm Sandy struck when Long Island Sound was at low tide. While the damage could have been much more severe had it occurred during high tide, the Planning Area did sustain significant damage from wave action and high winds. Superstorm Sandy knocked down trees and power lines, washed debris and boats into buildings, flooded streets and homes, and caused widespread sewer backup. The waves overtopped seawalls in Edgewater Park, flooding many homes that face Long Island Sound. Wave action washed away vehicles and destroyed docks along Hammond Cove in the Throggs Neck neighborhood. Harding Park experienced up to 3 feet of flooding, which damaged several homes. The storm surge flooded the neighborhood of Locust Point up to and beyond Tierney Place, a full block inland of the water's edge. The Locust Point Civic Association Community Center, the first property along the waterfront west of the Throgs Neck Bridge, was severely damaged during the storm, receiving several feet of water.

Several yacht clubs and residences on City Island lost docks, boats, and sustained physical damage. Tony's Pier Restaurant was heavily damaged by a fire that was sparked by a downed power line. Edgewater Park has six pumping stations that lost power during the storm, which caused local sewers to backup into homes.

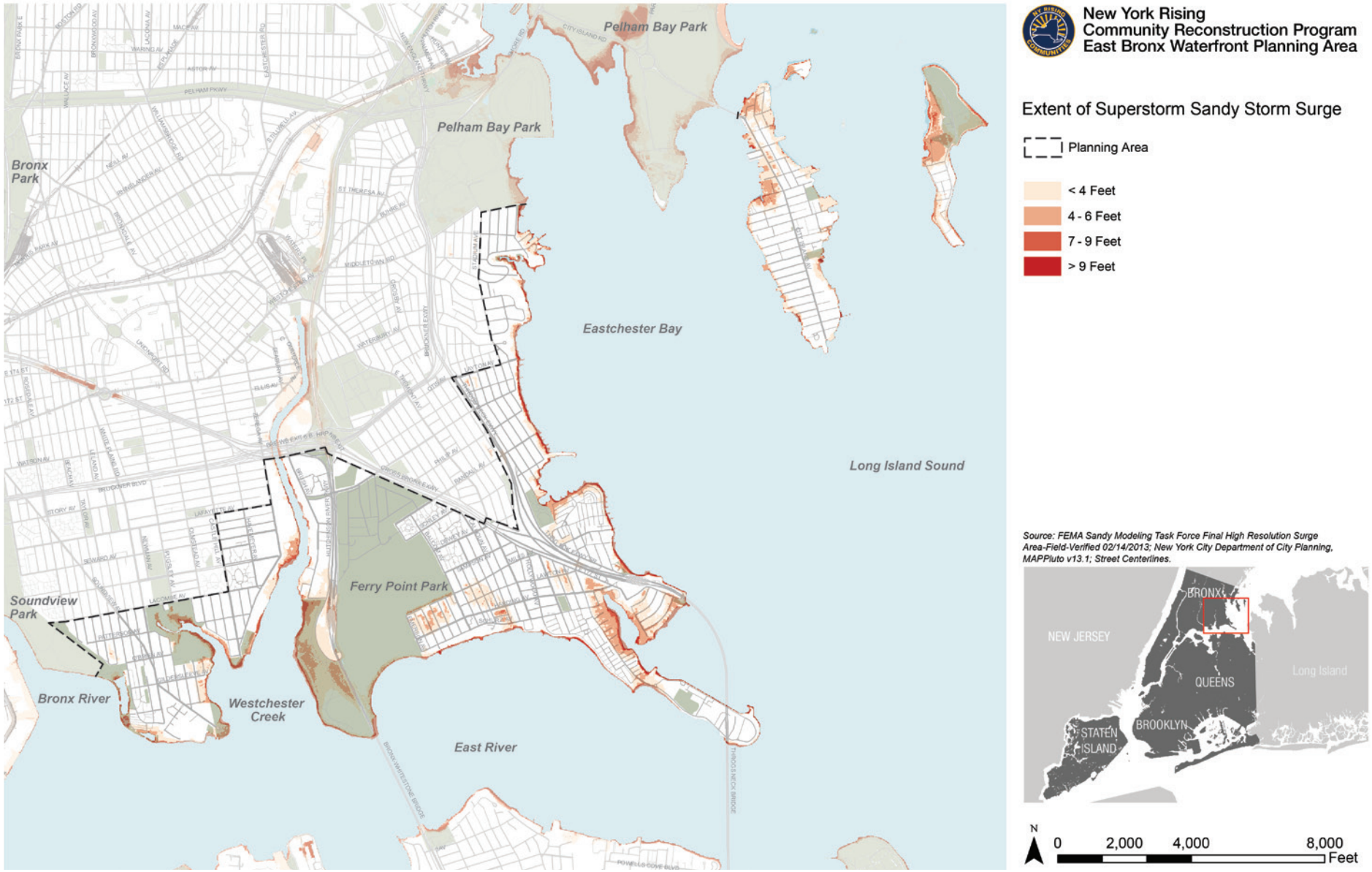
Recovering From The Storm

The Planning Area suffered damage along the waterfront edge and in low-lying areas as a result of extreme winds, storm surge, and wave action during Superstorm Sandy. Parts of Edgewater Park, Harding Park, Throggs Neck, Locust Point, and City Island lost power from several days to more than a week. Residents of Pilot Cove Manor, a senior housing facility on City Island, waited 10 days for full power to be restored. The Ferry Point neighborhood was isolated by floodwaters that made Brush Avenue impassable. Vital MTA-New York City Transit bus routes were left in poor condition. At the north end of City Island, the extent of the flooding rendered boat travel the only way for residents to leave their homes. Older or disabled residents who did not or could not evacuate were left isolated after the storm without access to resources.

With the extended loss of power and communication throughout much of the Planning Area during Superstorm Sandy, many local

Waves from Superstorm Sandy washing a boat into the seawall. *Denise Noble, East Bronx Waterfront Planning Committee Member.*

Figure I–2: Extent of Superstorm Sandy Storm Surge



community facilities that were not damaged provided recovery functions for the residents in the neighborhoods. In Edgewater Park and City Island, for instance, the Federal Emergency Management Agency (FEMA) established a local command center and provided relief efforts to the surrounding areas. Without having a formal recovery plan in place, the neighborhoods were unaware of the available relief efforts and were left to fend for themselves.

Lingering Effects

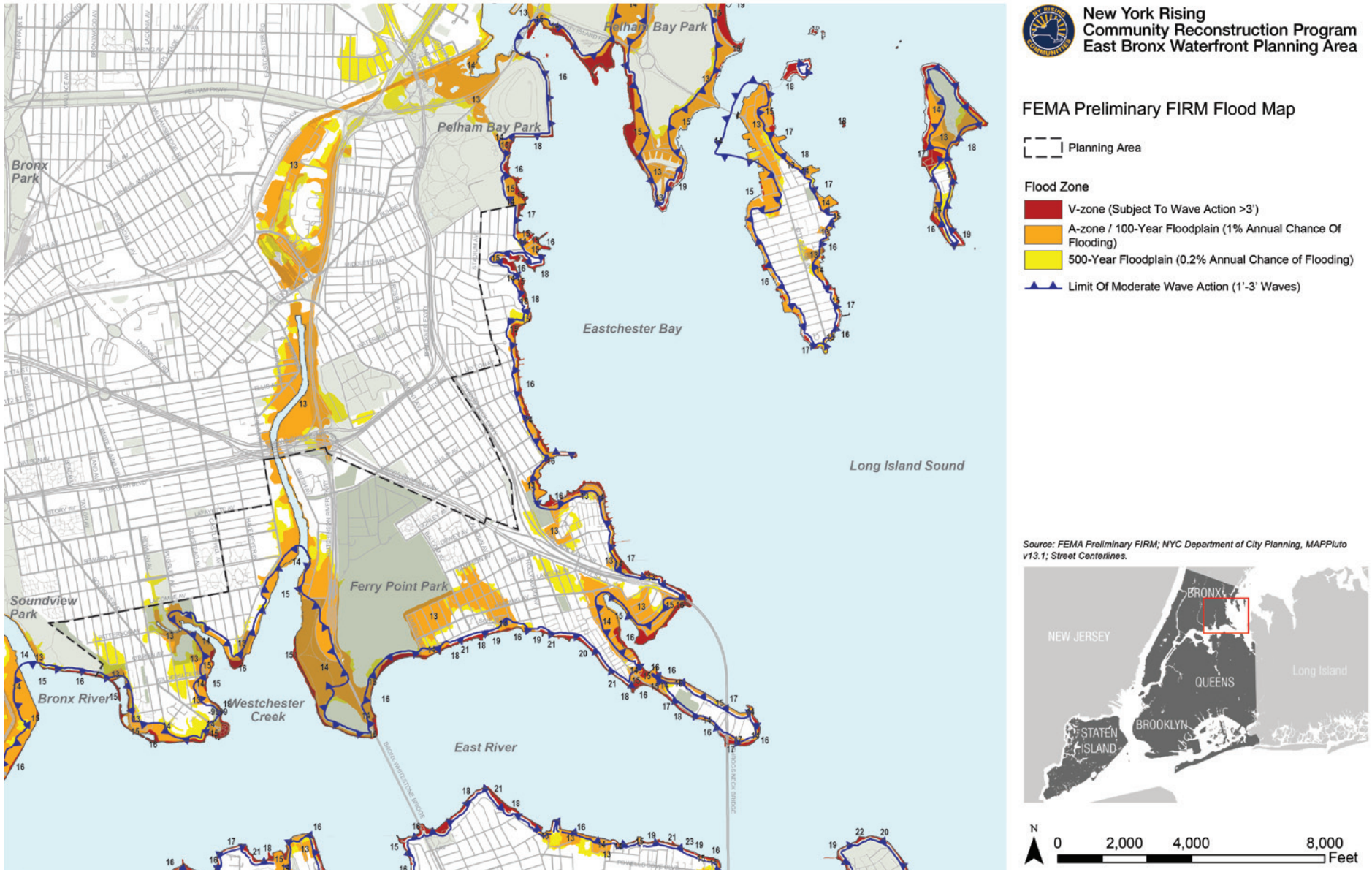
Damage caused by Superstorm Sandy continues to have an effect on parts of the Planning Area. Some residents are still working to repair the damage to their homes. As the residents rebuild, there remains a lack of clarity as to how building code updates will affect their Community. The increase to flood insurance premiums is seen as an additional burden. The yacht clubs and marinas that suffered damage have also struggled to rebuild.

In addition to rebuilding, the Planning Area is committed to being prepared for future storm events. The East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) is particularly concerned about its senior and disabled populations and the long-term impacts of the storm on their mobility and well-being.

There is a general lack of knowledge within the Community with regard to what to do in the case of an emergency and how to best prepare for future storms. The need for greater education and planning has been at the forefront of concerns expressed by the Community.

Storm surge overtopping the seawall in Edgewater Park, *Denise Noble, East Bronx Waterfront Planning Committee Member.*

Figure I–3: FEMA Preliminary Flood Insurance Rate Map (FIRM)



Critical Issues

Residents value the area's connection to the water, which has catalyzed a water-based economy that includes marinas, water-themed stores and restaurants, and other maritime businesses. While the Community seeks protection against future flooding and storm damage, it is also concerned about altering its current relationship with water. A major challenge will be to identify and implement appropriate protection measures that would lessen the impacts of sea-level rise and the increasing frequency and severity of storms while preserving a strong connection to the waterfront.

Resiliency strategies should have a positive effect on the Community, enhancing views, providing renewed access to the water, and improving the quality of the natural environment.

The Planning Area is home to many maritime businesses and water-based activities.

Neighborhoods in the Planning Area face multiple local infrastructure challenges. A number of locations in Spencer Estates and Country Club are vulnerable to flooding and sewer backup since historical sewer reconstruction placed many residences below built street level. In addition to the numerous businesses and residential properties in low-lying areas, most neighborhoods contain long and continuous segments of privately owned shoreline, hampering or prohibiting public waterfront access. Furthermore, many of the publicly owned street ends that terminate at the waterfront are low-lying, which leaves the surrounding neighborhoods vulnerable to flooding. More than 70 street ends lie within the future 100-year floodplain, posing a risk to the waterfront communities, including City Island, Spencer Estates, Country Club, and Throggs Neck. Other infrastructure-related issues include vulnerable pumping stations in Throggs Neck, Castle Hill, Clason Point, and Edgewater Park and above ground power lines throughout the Community. If the Planning Area is going to be more resilient to future climate change and storm events, it is critical that these infrastructure systems be protected.

Many neighborhoods in the Planning Area like Ferry Point, Silver Beach and Locust Point are isolated by major transportation infrastructure (highways and bridges), waterways, parks, and varied topography, and rely upon a

Left,Vulnerable publicly owned street-ends; Middle, Homes in Country Club that are below street level; Right, Locust Point Civic Association

single roadway for access into their Community. These access roads are often in a flood-prone or low–lying location, leaving large portions of the neighborhood vulnerable to becoming isolated during emergencies and recovery efforts. Increased and resilient access is important for emergency services and for evacuation. Limited accessibility and infrastructure prone to flooding will need to be analyzed and mitigated.

Many houses suffered damage during Superstorm Sandy and there is increased concern over the damage that future storms could bring. Property owners with homes located at or near the coastal edge are paying more to prepare against future flood risk and experience greater difficulty obtaining flood insurance. Homeowners are concerned about the affordability of their homes and the economic loss that could be experienced since increased costs could result in lower property values.

Following Superstorm Sandy, the lack of community space was acutely felt in those neighborhoods that do not have community centers or where community centers were damaged or put out of commission by the loss of electricity. Neighborhoods where the community centers were not damaged were able to use those valuable assets in the recovery efforts. Neighborhoods where their community centers were badly damaged (Locust Point) and areas lacking their own community space (Ferry Point, City Island, and Pelham Bay) struggled in their recovery efforts. The functioning community centers following Superstorm Sandy lacked working support systems and were largely unaware of services being offered elsewhere.

Better communication networks and community resiliency plans should be developed so that these community facilities are better prepared to address the Community's needs during and after a storm event, including being able to service adjacent neighborhoods and broadcast information prior to storm events.

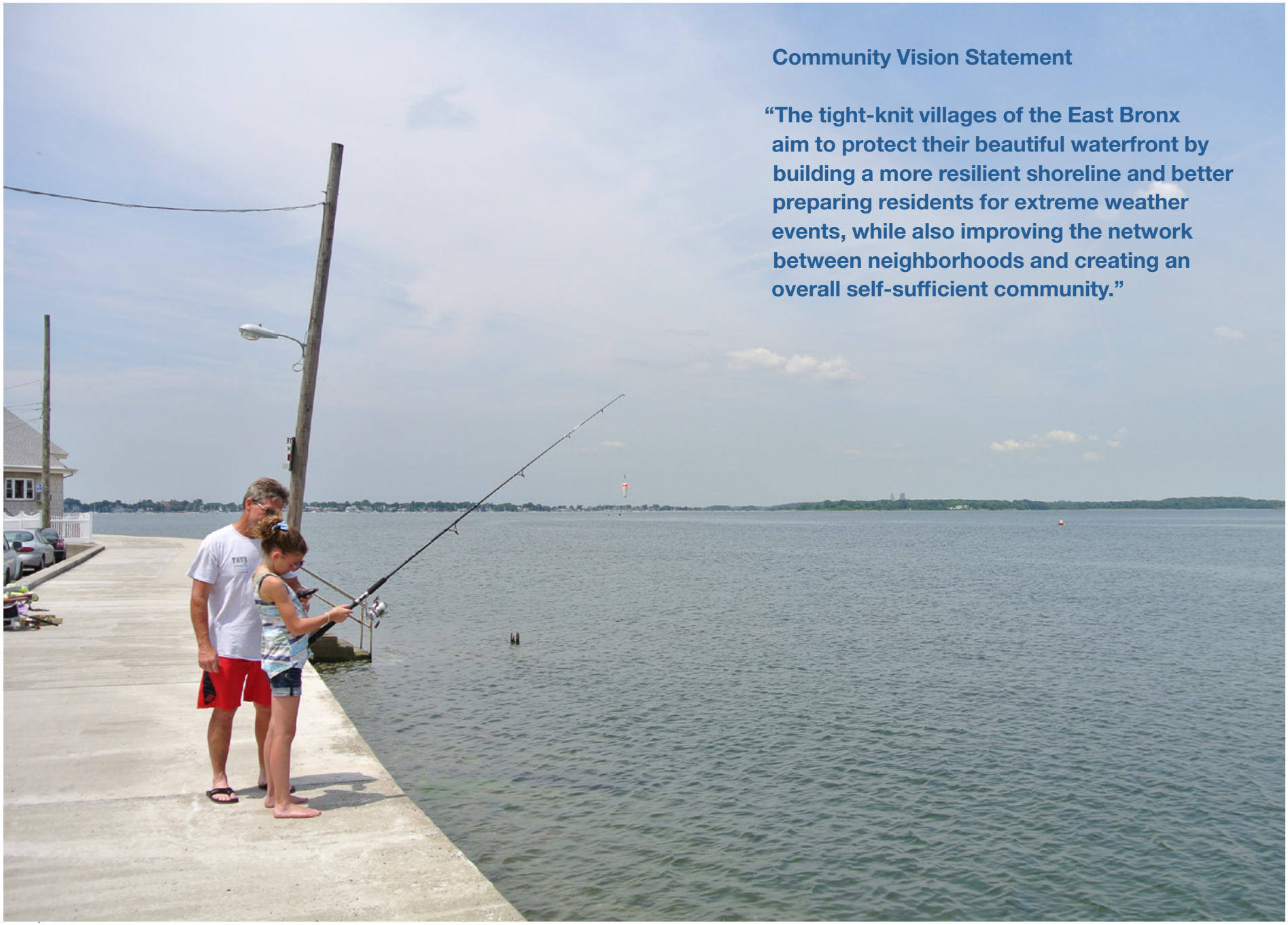
Community Vision

In defining a resiliency plan to address these critical issues, the Planning Committee has put forth an overarching vision for the future, and listed its most crucial needs and potential opportunities to leverage existing assets. This vision begins to forge a path toward a more sustainable and resilient future for the Community and its individual neighborhoods. The Committee and members of the public acknowledge the Community's inextricable link to the water, and endorse a future vision that not only ensures the preservation of this relationship, but is broad enough in scope to ensure better community wide communication and collaboration during storm events.

The Community is a collection of distinct neighborhoods that prize their access and unique relationship to the water. The vision for the Community speaks to the desire to retain and embrace this connection to the water by creating a more resilient shoreline. The Community recognizes the challenges it faces to protect the waterfront from climate change, and is committed to adhering to sustainable development principles that work to enhance its neighborhoods and improve quality of life.

The Community recognizes that while its recovery continues, it remains vulnerable to climate change and future storms and needs to be better prepared to respond and recover from such events.

Left, Leaving PS 175; Middle, Child playing in Harding Park; Right, On the waterfront in Edgewater Park



Community Vision Statement

"The tight-knit villages of the East Bronx aim to protect their beautiful waterfront by building a more resilient shoreline and better preparing residents for extreme weather events, while also improving the network between neighborhoods and creating an overall self-sufficient community."

Relationship to Regional Plans

The Community's plan for resilience will be informed by past and ongoing planning efforts. This includes resiliency and Superstorm Sandy recovery plans, as well as other plans such as hazard mitigation, waterfront, infrastructure, and ecosystem restoration plans. Planning initiatives that include the Community are ongoing at the regional, city, and local level. The plans most relevant to the NYRCR Program planning process are described in greater detail on the following pages. Below is a brief synopsis of these plans:

- There are resiliency planning and recovery efforts being conducted by agencies within the City of New York that can be leveraged to maximize benefits to the Community.
- Much of the regional and citywide planning related to the Bronx has focused on enhancing transportation access and connectivity in support of the larger goals of increasing resident access to jobs and other resources as well as promoting appropriate and sustainable new development.
- The focus of most of the local plans is west of the Planning Area along major north-south transit and roadway corridors.
- Recent plans have recommended increasing public access to the Bronx waterfront.

Outstanding key issues drawn from a review of these existing plans include:

- Protecting housing, retail, and infrastructure from Long Island Sound flooding and future sea-level rise.
- Improving the connections between retail corridors while mitigating congestion.
- Expanding the range of programs that target housing and building resiliency.
- Fostering economic resiliency through stable employment.
- Understanding the range of services provided by non-governmental programs and the populations that they serve.

Existing Plans, Studies and Projects

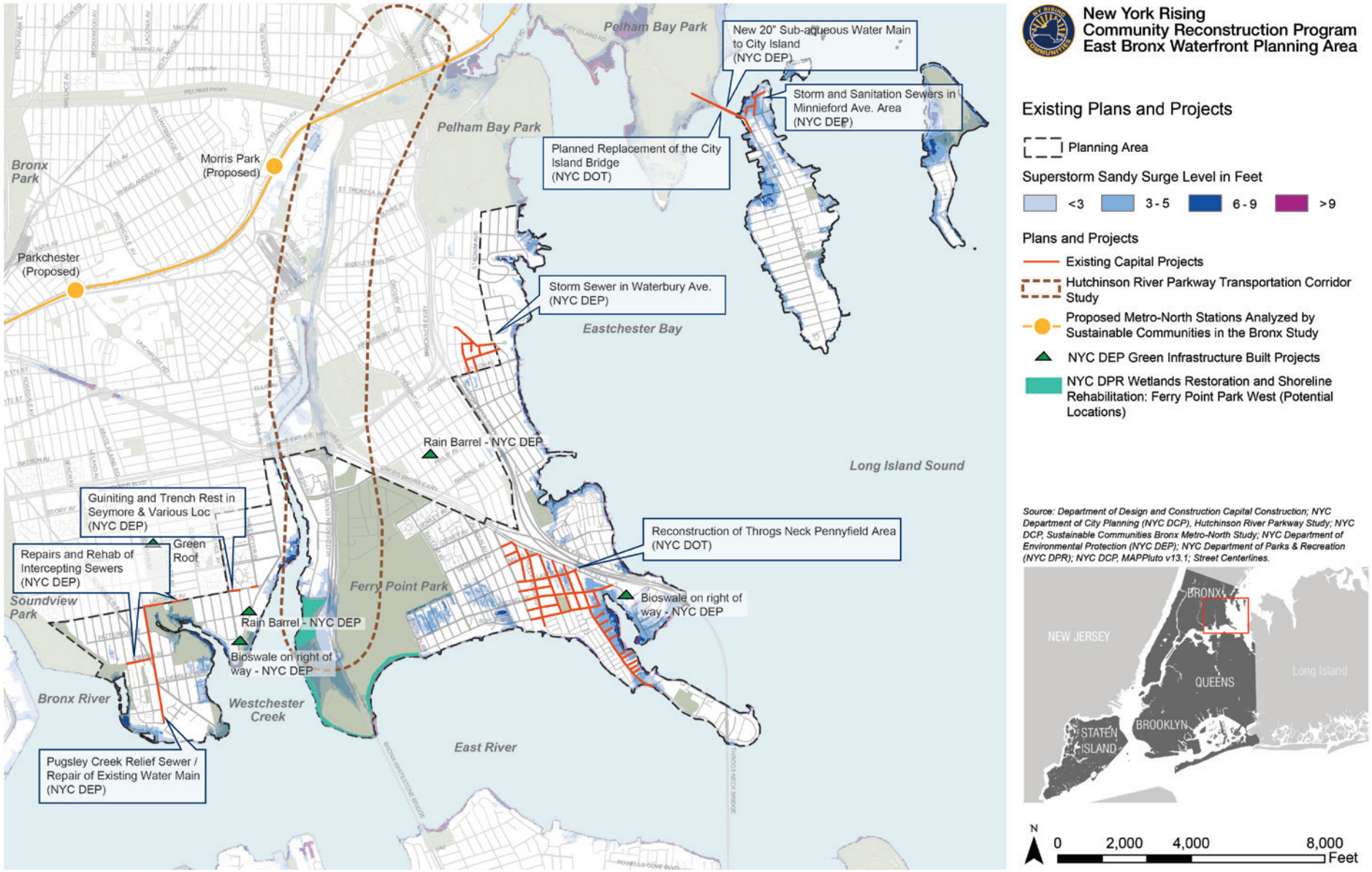
Federal Initiatives

At the Federal level, there are two ongoing studies that should be noted relevant to resiliency. The first is that the Federal Emergency Management Agency (FEMA) is in the process of revising *Flood Insurance Rate Maps (FIRM)* for New York and New Jersey coastal areas. These maps are used by the National Flood Insurance Program (NFIP) to set flood insurance rates. When Superstorm Sandy hit New York City, the FIRMs in use were based on information from 1983. Superstorm Sandy inundation extended well beyond what these maps estimated would be the 100-year floodplain. In fact, before the storm, FEMA had already begun a coastal flood study to update FIRMs for portions of New York and New Jersey using improved methods and data to better reflect coastal flood risk.

After Superstorm Sandy, FEMA first released Advisory Base Flood Elevation (ABFE) maps based on the partially completed flood study for certain communities, which were designed to help in rebuilding and recovery efforts. In 2013, FEMA released preliminary FIRMs for New York City, including the full results of the coastal flood study. The final updated FIRMs are anticipated to be released in 2015. These final FIRMs will guide new flood insurance rates for homeowners and businesses in the floodplain.

Secondly, the U.S. Army Corps of Engineers (USACE) is in the process of undertaking the *North Atlantic Coast Comprehensive Study*. The USACE's study will produce risk reduction and resiliency strategies for coastal communities in the North Atlantic area from Virginia to Maine, including New York City. The study

Figure I–4: Existing Plans and Projects Map



will examine the natural-based infrastructure, identifying the location of existing infrastructure, and will determine how they performed during Superstorm Sandy and other storms. The USACE is collaborating with State governments, Federal agencies, and national non-governmental organizations to produce the study. A final report will be delivered to Congress in early 2015.

In addition to the studies, the U.S. Department of Housing and Urban Development (HUD) has had an active role in coordinating Superstorm Sandy recovery efforts across the region. Primarily, it has provided leadership and oversight in programming Community Development Block Grant–Disaster Recovery (CDBG-DR) funds for recovery and resiliency. It has also led a cutting-edge initiative, *Rebuild by Design*, to catalyze development along the coastlines, including the *Hunts Point Lifelines* project, one of the winning projects from the competition for which the City of New York was awarded $20 million in CDBG-DR funds to advance innovative protection measures.

City Initiatives

New York City's *A Stronger, More Resilient New York (2013)* (the SIRR Report), released in June 2013, was the culmination of the Mayor's Special Initiative for Rebuilding and Resiliency (SIRR). SIRR was convened by former Mayor Michael Bloomberg in December 2012 to assess the damage wrought by Superstorm Sandy and to consider the implications going forward for New York City in light of climate change and sea-level rise projections. In addition to assessing the impacts of Superstorm Sandy and risks from future storm events, the SIRR Report outlined New York City's plan for rebuilding post-Superstorm Sandy and ensuring resiliency into the future. The plan contains actionable initiatives for communities affected by the storm as well as chapters covering citywide issues, such as coastal protection, buildings, insurance, utilities, liquid fuels, health care, transportation, parks, water and wastewater, and other critical networks. While the SIRR Report does not focus on the Bronx directly, it does outline the City's approach to resiliency across a range of issues and is a beneficial resource in the planning process.

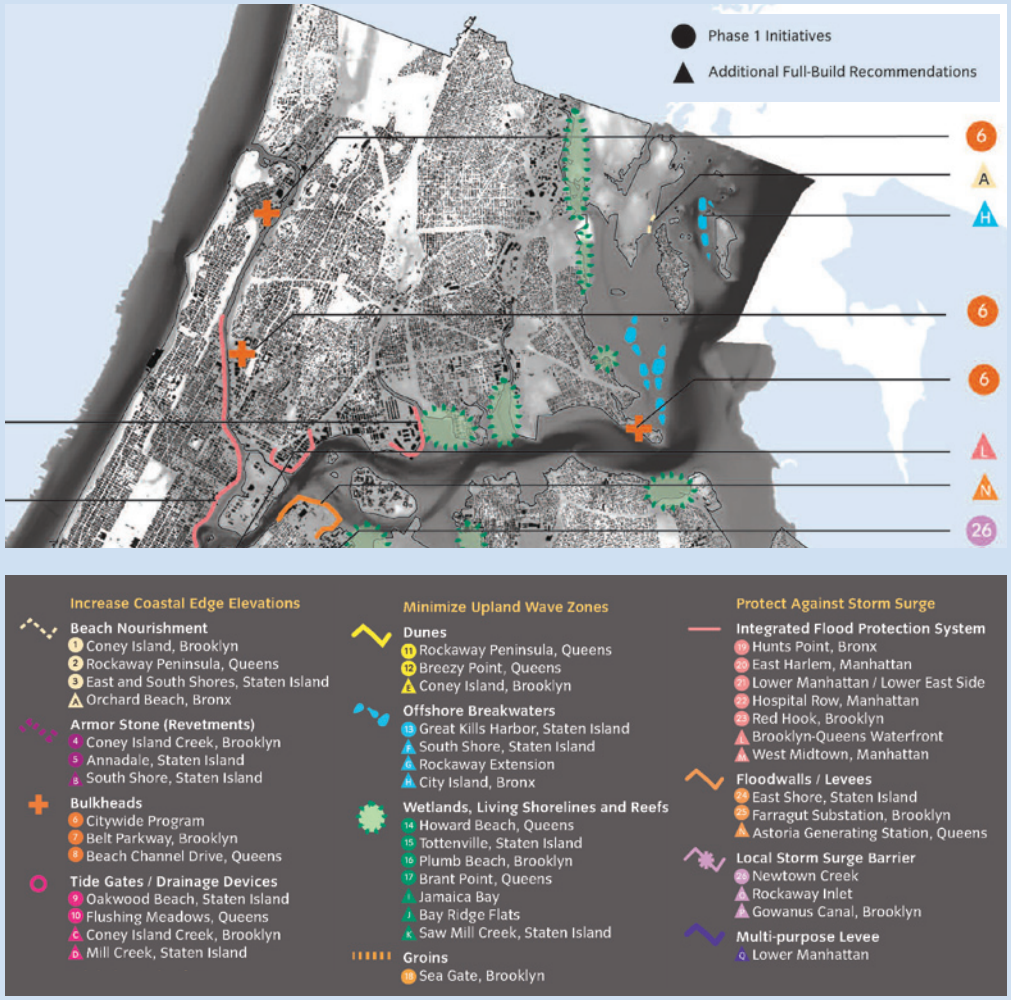
The SIRR Report is part of PlaNYC, a planning effort and series of reports initiated by former Mayor Michael Bloomberg to address long-term planning and sustainability in New York City across a variety of issues. The City's *PlaNYC Progress Report 2014* includes an update on the City's sustainability and resiliency initiatives, including a progress report on all of the initiatives identified in the 2013 SIRR Report. The report also lists several Bronx initiatives such as South Bronx Greenway, construction of bioswales, NYC Cool Roofs that have covered over 500,000 square feet in the Bronx, and the construction of new green streets in the Bronx River sewer shed.

The New York City Office of Emergency Management (NYC OEM) in partnership with the NYC Department of City Planning (NYC DCP) recently released the *2014 New York City Hazard Mitigation Plan*. Replacing the previous Hazard Mitigation Plan from 2009, the new plan will be effective from April 17, 2014, to April 17, 2019. The plan assesses New York City's risk and lays out its mitigation strategies for a variety of hazards that include coastal storms, coastal erosion, and flooding. The report also provides a retrospective analysis of Superstorm Sandy.

The NYC DCP recently embarked on the *Resilient Neighborhoods Initiative*, a neighborhood-level planning initiative to develop recovery and resiliency action plans for coastal communities across New York City. This is a two-phased program and includes several communities in the Bronx: Harding Park – Clason Point and Edgewater Park in Phase I, and Sheridan Expressway – Hunts Point, Locust Point, Hutch Metro Center – Morris Park and City Island in Phase II. As part of the

A Stronger, More Resilient New York, Comprehensive Coastal Protection Plan, Full-Build Recommendations for the Bronx

The long-term coastal protection plan identified potential opportunities for breakwaters and wetland restoration that could help minimize wave zones and combat ongoing coastal erosion and damage to coastal structures resulting from regular wave action as well as the potential for raising bulkheads in low-lying locations susceptible to sea-level rise and flooding from storm events less intense and more frequent than storms like Superstorm Sandy.



Resilient Neighborhoods program, NYC DCP is collaborating with community members to produce neighborhood planning studies that aim to reduce risks, strengthen local communities and economies, and coordinate land use planning. Building on input received during other planning exercises, these studies will incorporate community suggestions about zoning and land use changes and suggest other strategies for improving resiliency and mitigating flooding risk.

Since Phase I of the initiative is proceeding concurrently with the NYRCR Program's planning process in the Bronx, coordination between agencies will maximize benefits to the Community.

In addition to these resiliency planning efforts, New York City has made a number of amendments and revisions to its building and zoning codes that are aimed at reducing flood risk and enabling resilient development. The NYC DCP's *Flood Resilience Zoning Text Amendment*, adopted in October 2013, is another critical resource for resiliency planning. The text amendment changed zoning regulations to enable new and existing buildings to incorporate flood-protection measures based on the best available data on flood risk from FEMA. The NYC DCP has also published three documents that are resources for coastal protection planning and resilient building. *Designing for Flood Risk (2013)* offers architectural strategies and design principles for complying with higher flood-protection standards in a manner that reflects New York City's diverse neighborhoods and building types. The recently released *Retrofitting Buildings for Flood Risk (2014)* is a comprehensive guide that examines retrofit options for the building typology that are typical for the New York City area. *Urban Waterfront Adaptive Strategies (2013)* identifies strategies for improving coastal resilience, assesses the costs and benefits of these strategies, and then provides a framework for communities to evaluate the applicability of a given strategy for their neighborhood. While these documents are not targeted toward the East Bronx Waterfront specifically, the design strategies for 1–2 family homes in *Designing for Flood Risk*, the various coastal protection strategies presented in *Urban Waterfront Adaptive Strategies* and the evaluation framework for assessing resiliency strategies presented in these documents are useful for NYRCR Program's planning efforts.

The NYC Department of Buildings (NYC DOB) has revised a number of building codes to enable and encourage resilient building in flood-prone areas. The NYC DOB also published *Rebuilding NYC After Hurricane Sandy (2014)*, a report that reviews the changes in code and zoning standards for the repair and reconstruction of buildings damaged by Superstorm Sandy. It also describes some of the resources that the NYC DOB provides, including free consultations for architects and engineers working on floodplain projects.

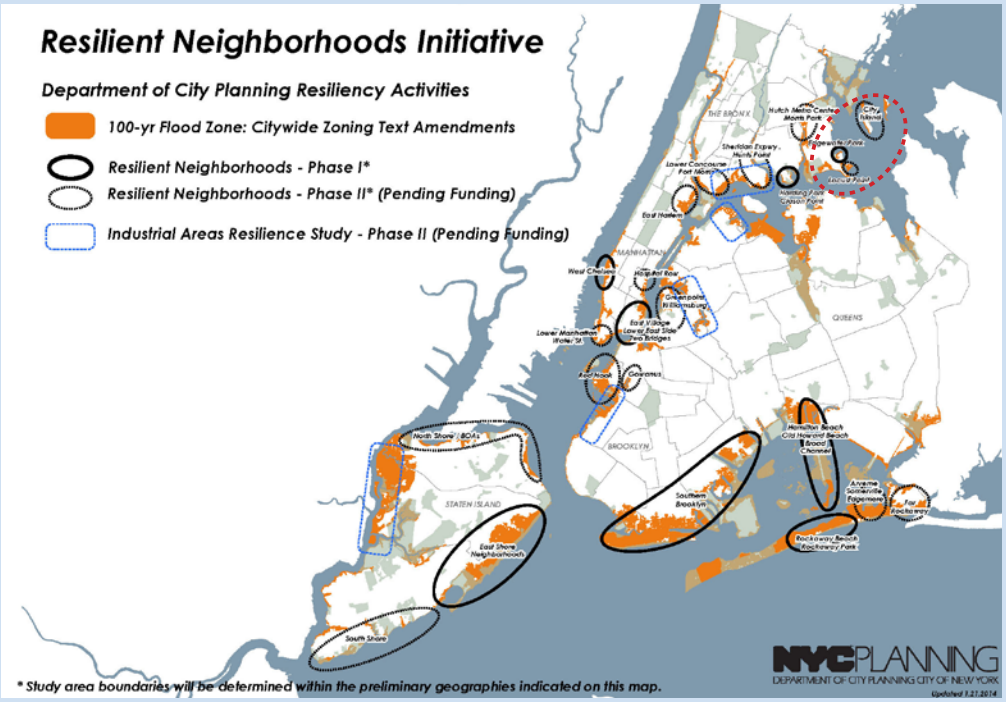
Additionally, in 2013, the City's *Building Resiliency Task Force* identified 33 recommendations to the New York City Council, 16 of which have been implemented. The recommendations are summarized in their report published in June 2013, and they maintain an online "implementation tracker" for these initiatives.

The City has launched several initiatives under the NYC Recovery program to help residents across the five boroughs recover from the damage caused by Superstorm Sandy. Some of these recovery programs support resiliency investments and will help improve individual homes and businesses in the communities The *Build it Back* program seeks to assist homeowners, landlords, and tenants whose homes were damaged by the storm.

At the local level, unlike some of the Bronx communities to the west of the study area, such as Hunts Point and the South Bronx, considerably less planning has taken place since Superstorm Sandy. There is significant planning work underway in Hunts Point to

New York City Department of City Planning Resilient Neighborhoods Initiative Target Areas

With the Resilient Neighborhoods Initiative, the NYC DCP is working with targeted communities to identify changes to zoning and land use and other actions that support the vitality of neighborhoods that are at risk of coastal flooding, and that will help residents and businesses withstand and recover quickly from future storms and other climate events.



make the peninsula more resilient, such as the Rebuild by Design competition project. In addition, the New York State Office of Parks, Recreation & Historic Preservation has applied for funding under the FEMA Hazard Mitigation Grant Program to replace a seawall at Roberto Clemente State Park that will protect the Morris Heights neighborhood. The results of these efforts and strategies developed can inform the NYRCR Program resiliency efforts in the Planning Area.

In summary, while this lack of resiliency planning in the Planning Area means there are gaps that the NYRCR planning process will need to address, there are many recent and ongoing resources and initiatives to build on, and existing New York City initiatives that may be leveraged.

Other Planning Efforts

Looking beyond resiliency-specific planning, there are a number of recent and ongoing planning efforts that are relevant to the NYRCR planning process as they relate to various recovery functions.

Federal Initiatives

Planning for open space and ecological restoration in the Planning Area has also taken place at the New York City and regional level.

The Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP) is a collaborative undertaking of many agencies and non-governmental organizations at work in the HRE region. Adopted in 2009, the USACE and Port Authority of New York/New Jersey developed the HRE-CRP in collaboration with Federal, State, municipal, and non-governmental organizations as well as other regional stakeholders. The plan sets forth a vision, master plan, and strategy for future ecosystem restoration in the New York/New Jersey Harbor that has support from City and State agencies as well as major non-governmental organizations working in the region. The interim draft report identified restoration opportunities throughout the estuary, including wetland creation opportunities in Soundview Park, City Island, and Hart Island, and freshwater wetland restoration at Pugsley Creek.

The Planning Area lies at a unique intersection of the HRE and Long Island Sound. Focusing on environmental, water quality and ecosystem issues in the sound, the Long Island Sound Study (LISS) published a report on Long Island Sound health in 2012 and has published a *Comprehensive Conservation and Management Plan (CCMP)*. As waterfront planning and coastal protection endeavors will inevitably engage these water bodies and the ecosystems within them, it is important that the understanding of existing ecosystems and the goals laid out for ecosystem restoration encompassed by these plans is taken into consideration in resiliency planning efforts.

View of Hammond Cove

New York City Initiatives

Relating to economic development, the *New York City Regional Economic Development Council's (NYC REDC) Five-Year Strategy Plan (2011)* describes a comprehensive economic plan to address and promote poverty prevention/job training, government fiscal responsibility and infrastructure investment, and balanced investment among all of New York City's businesses. The NYC REDC outlines four key objectives to address these principles: improve quality of life, create a pro-growth, pro-jobs environment, invest in the future, and foster innovation and inter-regional cooperation. Specific approaches such as supporting small businesses and neighborhood revitalization align with the goals of the NYRCR Program.

The focus of New York City, as well as regional planning studies and initiatives in the Bronx, has been to enhance transportation connectivity and access in the Bronx with the larger goal of improving access to jobs and services for residents and promoting sustainable development. The plans have focused on the transportation needs of the Bronx and the critical transit and roadway routes that connect New York and Connecticut that pass through this area. Key initiatives among these are described briefly below.

The *Sustainable Communities Bronx Metro-North Study*—undertaken by the NYC DCP—examined neighborhoods surrounding six existing and two proposed Metro-North Railroad stations and defined targeted strategies for land use, transportation, and urban design improvements that will support transit-oriented development and expand opportunities for housing, jobs, and economic growth as well as support livable, walkable neighborhoods. The report was made possible through a regional planning grant from the Partnership for Sustainable Communities, a joint initiative of HUD, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency. While the stations in the Bronx lie significantly east of the study area, the planning focus on key transportation corridors is important to note and could be a potential tie-in for local initiatives relating to transportation access and connectivity.

The *Hutchinson River Parkway Study* by the NYC DCP evaluates the transportation needs along and surrounding the Hutchinson River Parkway corridor with the goal of improving existing conditions and developing longer-term recommendations for improvements as the area continues to grow. The study will examine existing traffic conditions with the goal to improve traffic circulation, pedestrian and bicyclist access, and safety, and to support connections to transit.

The NYC Economic Development Corporation (NYC EDC) has recently undertaken a citywide *Ferry Study (2014)*. The report examined potential new ferry service opportunities throughout the five boroughs. The study identified several sites in the Bronx that may be suitable for use as a future ferry site including Orchard Beach, City Island, Ferry Point Park, Soundview, and Hunts Point. Route 3B, which was identified as one of the most promising new ferry routes, would provide ferry service between Soundview and Pier 11 at Wall Street in Lower Manhattan. Route 3B would require $19.6 million in funding to construct new ferry landings.

In addition to these studies, the NYC Department of Transportation (NYC DOT) has a planned replacement of the City Island Bridge. Based on community feedback, the bridge has been redesigned to reflect the historic character of City Island and construction is expected to be completed in 2017.

The NYC Department of Environmental Protection (NYC DEP), in collaboration with NYC Department of Parks and Recreation (NYC DPR) and NYC DOT, annually releases the

Green Infrastructure Annual Report and Plans (2014). This plan acts as the Long-Term Control Plan (LTCP) to achieve specific water quality standards and is currently being evaluated for the Westchester Creek combined sewer overflow (CSO) area. Additionally, NYC DEP is designing two flow control structures to divert smaller storm combined sewage to the Hunts Point Wastewater Treatment Plant; a new parallel sewer will be constructed to reduce CSO discharges into Pugsley Creek, and green infrastructure will be designed within the Westchester Creek watershed.

There are also a number of infrastructure projects ongoing or in the City's capital budget that should be noted as they relate to both transportation and drainage issues. These will largely be implemented as NYC Department of Design and Construction capital construction projects and include the installation of a new Pugsley Creek relief sewer and water main work, reconstruction of Pennyfield Avenue area streets, remediation of petroleum contaminated sites, rehabilitation and repair of intercepting sewers, and installation of a new subaqueous water main to City Island. In addition, the installation of new storm sewer extensions on Waterbury Avenue between Ellsworth and Stadium Avenues was recently completed.

Finally, for all waterfront planning initiatives, it is important to note that New York City drafted a waterfront vision and enhancement strategy. This vision is articulated in two documents: *Vision 2020: New York City Comprehensive Waterfront Plan (2009) and the New York City Waterfront Action Agenda (WAVES)* (2011). Together, these documents detail the City's long- and short-term visions for the waterfront. Vision 2020 focuses on eight goals for the waterfront over the next decade and was produced with community input from all five boroughs. As required by law, the Vision 2020 plan will be updated every 10 years. WAVES, developed by NYC DCP in collaboration with the NYC DPR, NYC DEP, the NYC OEM, and the Department of Housing Preservation and Development, sets forth 130 priority projects to be implemented in the three years following the plan's 2011 release, with the goal of reconnecting New Yorkers and visitors to the waterfront. In October 2013, the New York City Council approved the revisions to New York City's *Waterfront Revitalization Plan (WRP)* that were proposed by NYC DCP to advance the goals of the City's Comprehensive Waterfront plan.

Local Initiatives: Community Board 10

A portion of the Planning Area falls within Bronx Community Board 10, which includes City Island, Spencer Estates, Throggs Neck, Country Club, Eastchester Bay, Schuylerville, Edgewater, Locust Point, Silver Beach, and Ferry Point. Bronx Community Board 10 recently issued its *Statements of Community District Needs, Community Board 10 (FY 2015, Infrastructure, Community Planning and Capacity Building)*. The report surveys existing City, State, and Federal work in the Community Board area and identifies ongoing challenges and priorities, including Community Board funding and improved water access for communities. They also recommend that City of New York-owned land be converted into pocket parks or green streets, that alternatives are developed in order to limit the shipment of goods by truck, and public access to the waterfront is increased. Bronx Community Board 10 is also working with Pratt Institute to conduct a comprehensive survey of existing conditions along the shoreline within the Community Board 10 boundary limits. This survey will guide future seawall maintenance and restoration efforts.

II. Assessment of Risk and Needs

Marcel Negret, Community Board 10.

Description of Community Assets and Assessment of Risk

Description of Community Assets

Assets may facilitate economic, social, and recreational activities, or refer to infrastructure that supports those activities. Assets may be man-made facilities or existing natural resources. The goal of the asset inventory is to develop a keen understanding of what the East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Community (Community) believes are the most important assets, with sufficient information to assess risk to those assets under current and potential future conditions. Community assets fall within one of two categories:

- Community assets that are damaged by past storms or at risk of damage by future storms (i.e., assets within high- or extreme-risk areas, as illustrated in Figure II-1); or
- Community assets that are critical in the emergency preparedness, response, and/or recovery from future storms.

What Do The Risk Areas Mean?

New York State Department of State (NYS DOS), with the assistance of the National Oceanic and Atmospheric Administration (NOAA), mapped geographic areas representing the likelihood for coastal flooding. They identified three risk areas:

Extreme: Areas currently at risk of frequent inundation and vulnerable to erosion and wave action over three feet (FEMA V zone), subject to shallow coastal flooding (within the National Weather Service's shallow coastal flooding advisory threshold), or likely to be inundated in the future due to sea level rise (assumes three feet).

High: Areas outside the extreme risk area that are currently at risk of infrequent inundation (FEMA A zone, meaning there is a 1% annual chance of flooding) or at future risk of shallow coastal flooding with sea level rise (assumes three feet).

Moderate: Areas outside the extreme and high risk areas but currently at moderate risk of inundation from infrequent events (FEMA shaded X zone, meaning there is a 0.2% annual chance of flooding) or at risk of being in the 100 year floodplain with sea level rise (assumes three feet), and any areas expected to be inundated by a category three hurricane.

A more detailed description of the NYS DOS Risk Assessment Area Mapping Methodology can be found on the NY Rising Community Reconstruction (NYRCR) Program website, as can a link to an online viewer for the risk assessment area maps, at *http://www.stormrecovery.ny.gov/nyrcr*.

Assets were identified in the East Bronx Waterfront NYRCR Planning Area (Planning Area) using a combination of publicly available data from the New York City Department of City Planning and input collected from the East Bronx Waterfront NYRCR Planning Committee (Committee) and members of the public. The asset inventory was mapped and the assets and accompanying maps were refined by the Committee and at the first East Bronx NYRCR Public Engagement Meeting. The asset inventory is organized by five asset categories: 1) Health and Social Services; 2) Economic Development; 3) Housing; 4) Infrastructure; and 5) Natural and Cultural Resources.

Recovery Support Functions

Recovery Support Functions are used to frame needs and opportunities identified by the Community. These functions are derived from the Federal Emergency Management Agency's (FEMA) National Disaster Recovery Framework developed by President Barack Obama in 2011 and provide a structure for analyzing the community recovery needs and the subsequent assistance that must be provided. They also tie closely to the asset categories used in the asset inventory. They are defined as follows:

Natural & Cultural Resources
Natural infrastructure systems can play an important role in resiliency and recovery. The ability of natural features to withstand disruptive events and mitigate damage is addressed by this function. Cultural resources can play an important role in recovery through provision of spaces and forums for recovery.

Health & Social Services
This function addresses the ability of public health services, health care facilities, and essential social services to be restored after a disruptive event.

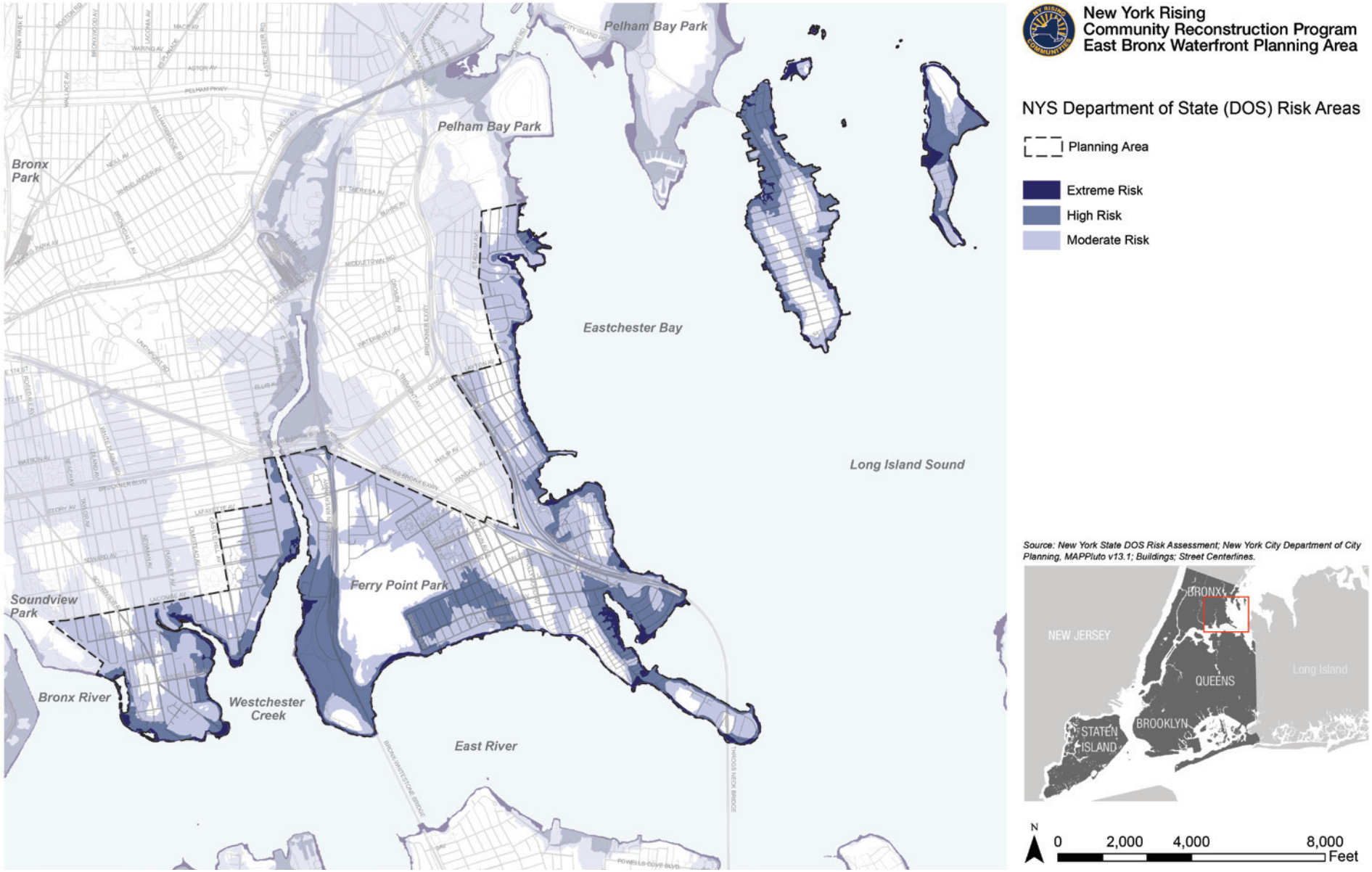
Housing
The resiliency of a community's housing stock is addressed by this function—including both physical resiliency and financial health and resources.

Community Planning & Capacity Building
This function addresses a community's ability to implement immediate storm recovery activities and organize long-term resiliency plans. Formal and informal community networks, dedicated emergency education and planning efforts, and experience recovering from past emergency events are characteristics that may enhance this function.

Economic Development
This function addresses the ability for economic and business activities to return to normal. Developing new economic opportunities that result in a sustainable and economically strong community is a component of this function.

Infrastructure
This function relates to local and regional transportation, water management, utility systems, and the ability of these to withstand and recover from disruptive events. The economic development and job creation capacity of these systems are also critical to this function.

Figure II–1: New York State Department of State (NYS DOS) Risk Areas



Health and Social Services Assets

The Planning Area is home to several critical response facilities, including the New York City Fire Department (FDNY) Engine Company 70 and Ladder Company 53 (located in City Island), and FDNY Engine Company 72 and the adjacent Throggs Neck Volunteer Ambulance Corps on East Tremont Avenue (located in the Throggs Neck neighborhood). The Edgewater Park Volunteer Fire Department is located at the intersection of Main and Dock Streets in the Edgewater Park Cooperative.

Emergency Medical Service Station 3 in Soundview has six ambulance bays and serves the surrounding communities. The 45th Precinct for the New York City Police Department (NYPD) is located outside the Planning Area at Barkley Avenue and East Tremont Avenue.

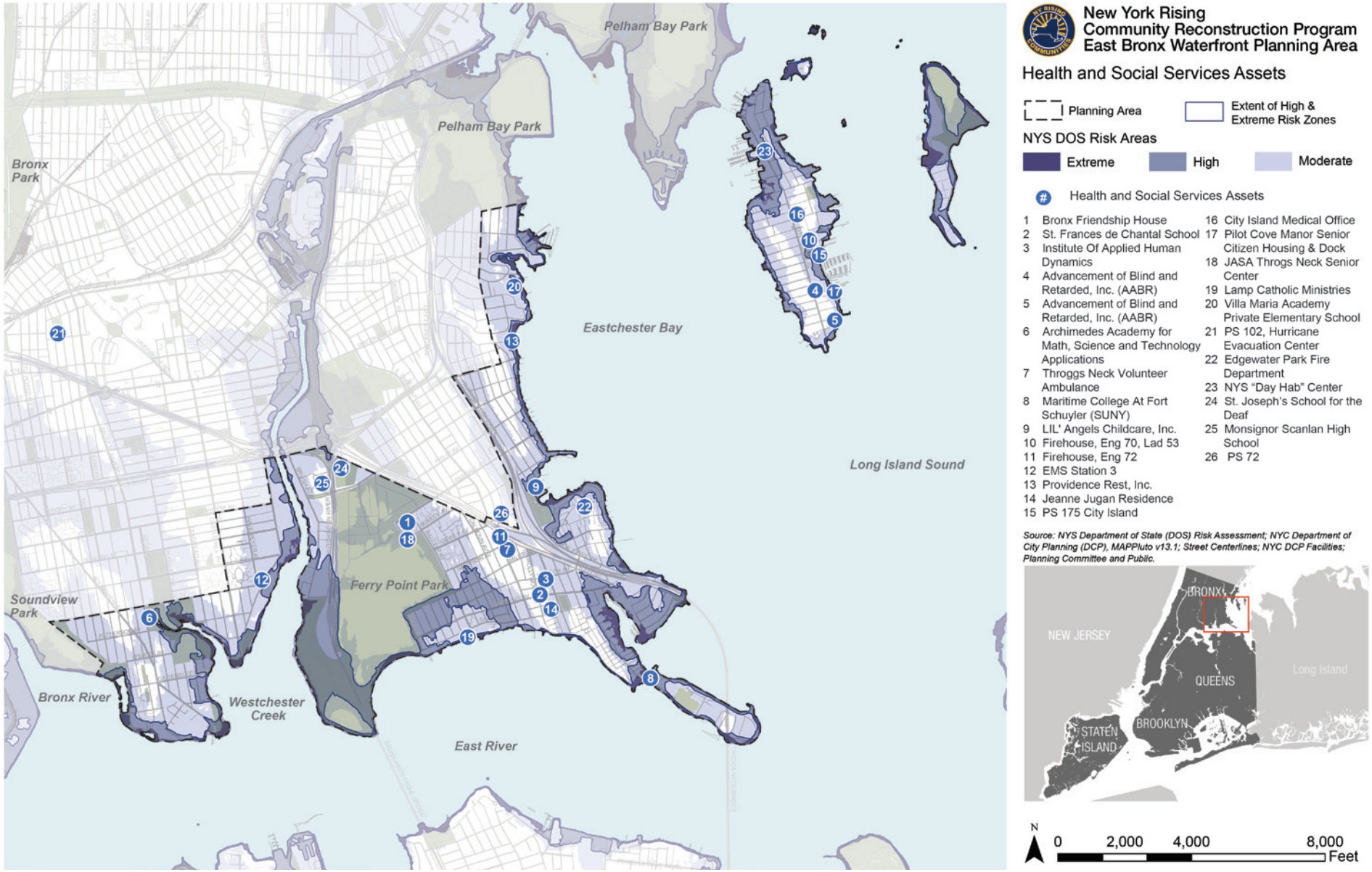
The Planning Area contains multiple education assets. PS 175 (located in City Island) and Archimedes Academy for Math, Science and Technology Application (located in Clason Point) are the only public schools located in the Planning Area. There are several private schools, including Saint Frances de Chantal School and Preston High School (located in Throggs Neck), Villa Maria Academy Private Elementary School (located on the edge of Eastchester Bay in Country Club), Monsignor Scanlan High School and Saint Joseph's School for the Deaf (located south of the intersection of the Cross Bronx Expressway and I-678). The State University of New York (SUNY) Maritime College is located in historic Fort Schuyler on the Throggs Neck peninsula and serves as a major institutional anchor in the Planning Area.

There are a number of community facilities that serve the mentally ill and other vulnerable populations who require special assistance and day care. In Throggs Neck, the Bronx Friendship House provides a mental health program, the Institute of Applied Human Dynamics provides housing for people with developmental disabilities, and Lamp Catholic Ministries serves indigent populations.

The Planning Area contains senior housing facilities, including the Throggs Neck Senior Center, Jeanne Jugan Residence in Throggs Neck, Providence Rest in Country Club, and Pilot Cove Manor Senior Citizen Housing in City Island. Also in City Island are two group homes and a day rehabilitation program. Improvements are being made to the Providence Rest senior facility, and a new senior housing facility is planned for City Island.

The Community considers these segments of the population—including the elderly and disabled—to be more vulnerable to the impacts of disaster events than other populations in the Planning Area, and would like resiliency efforts to provide them with a higher degree of protection.

Figure II–2: Health and Social Services Assets Map



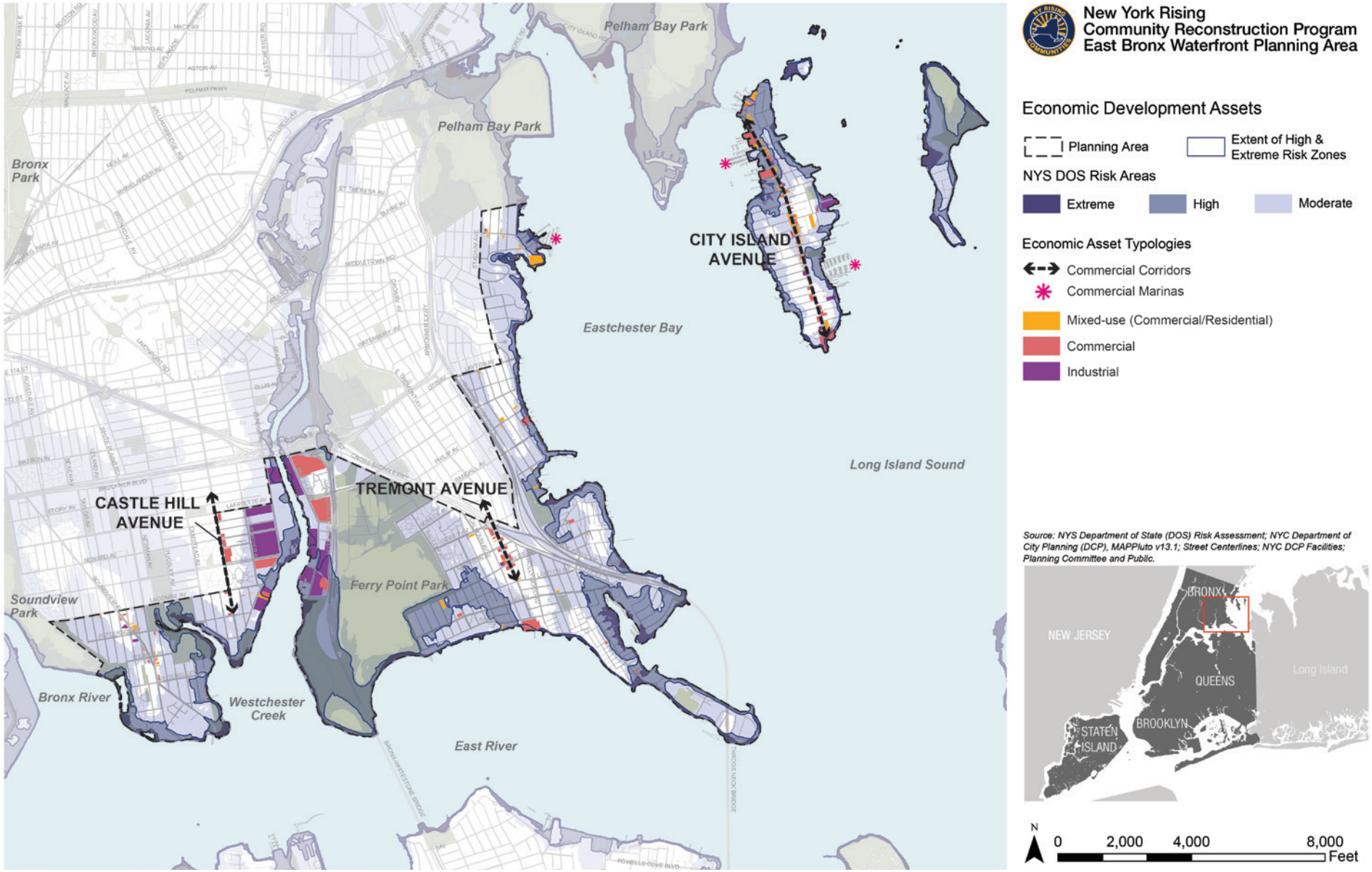
Economic Development Assets

The Planning Area contains three principal commercial corridors. The first is City Island Avenue, which forms the central commercial "spine" of City Island. The corridor is developed with restaurants, real estate offices, antique shops, art galleries, fishing and diving establishments, and grocery stores. Many of the restaurants overlook the water and are important assets that draw tourists to the island and contribute to the island's economy. The second principal commercial corridor is Castle Hill Avenue, which begins at Randall Avenue and continues north to Lafayette Avenue. It consists of single-story, auto-oriented retail sales and service establishments, restaurants, automobile dealerships, and gas stations. The third corridor is a section of East Tremont Avenue between East 177th Street and Miles Avenue. The majority of commercial uses along this corridor are located just north of the Planning Area; however, these commercial uses likely draw residents from neighborhoods within the Planning Area, and thus are an important economic asset to the Community. In combination, these corridors provide key goods and services for the surrounding neighborhoods and help drive the local economy.

Commercial marinas: Evers Marina at Spencer Estates. *Marcel Negret, Community Board 10.*

The northern section of Ferry Point, along Brush Avenue south of the Cross Bronx Expressway, contains two large-scale retail developments: The Home Depot and the Throggs Neck Shopping Center anchored by Target. Ferry Point is also home to several industrial businesses developed along both sides of Brush Avenue along Westchester Creek, including the UPS, Pepsi, and other warehousing and shipping facilities. There are a number of light industrial uses on the western edge of Westchester Creek along Zerega Avenue, including FedEx, Häagen-Dazs, and a large school-bus layover yard.

Figure II–3: Economic Development Assets Map



Housing Assets

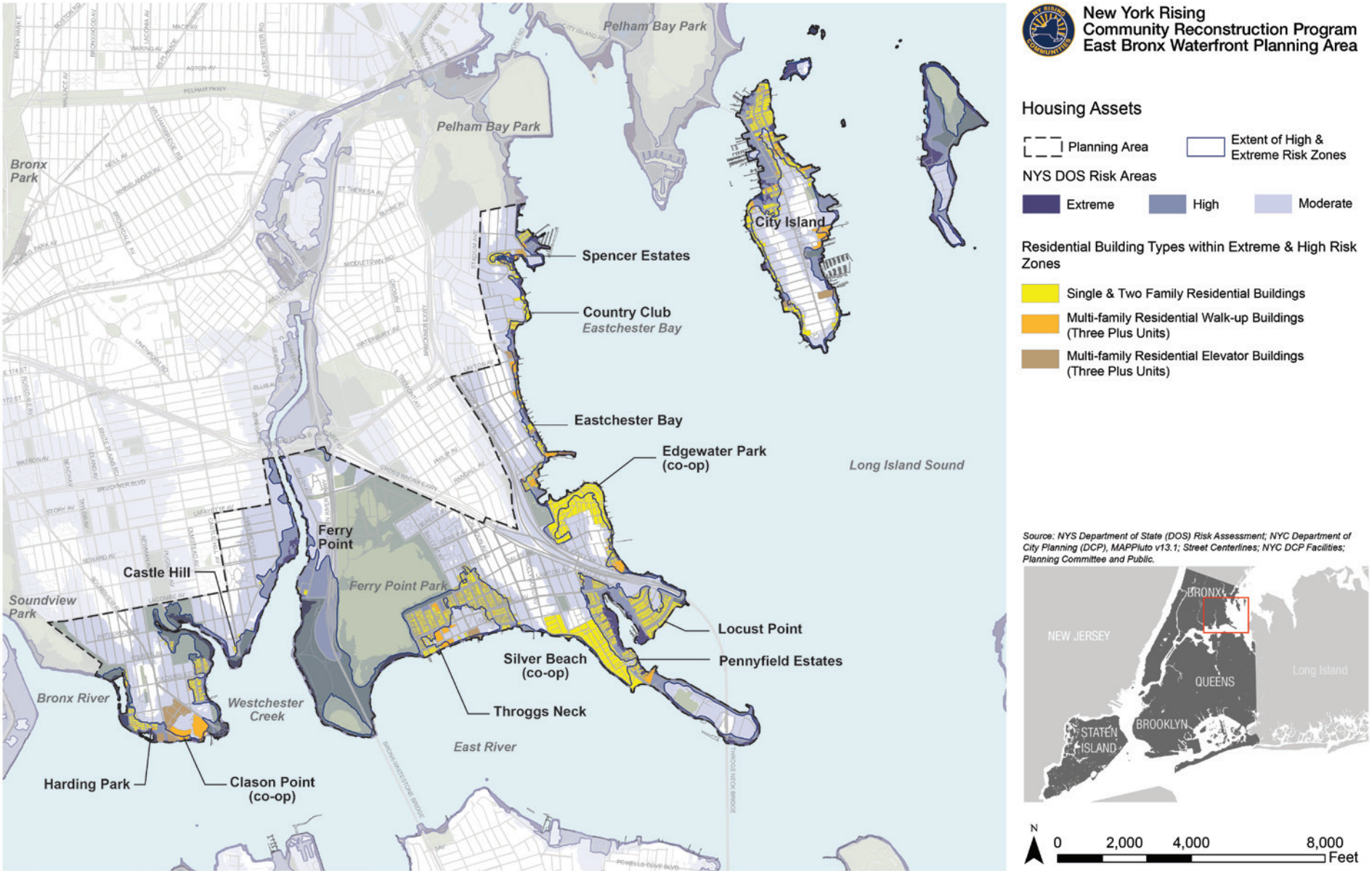
Homes, collectively, are a critical asset to the Planning Area. Residences within the high- and extreme-risk areas are critical assets that have been damaged from past storms and are at risk of damage by future storms.

There are approximately 2,738 residential buildings either partially or entirely within the high- and extreme-risk areas, the majority of which are one- and two-family residences abutting the waterfront. More than 65% of the homes in the Planning Area are either single- or two-family residences.

While there are two large New York City Housing Authority housing complexes in Throggs Neck and Castle Hill, neither is in the high- or extreme-risk areas. There are several senior residents throughout the Planning Area, with more planned on City Island.

Typical housing stock in the Ferry Point neighborhood

Figure II–4: Housing Assets Map



Infrastructure Assets

The Planning Area is located on a series of peninsulas and islands, and thus the Community relies heavily on major transportation infrastructure such as highways and bridges to travel between neighborhoods. The Community is connected to neighboring Queens via the Metropolitan Transportation Authority Bronx-Whitestone and Throgs Neck Bridges. Built in 1939 and 1961, respectively, they are among the longest-span suspension bridges in the world and are key southern vehicular access points in the East Bronx. The Planning Area is threaded together by the Cross Bronx Expressway (I-95), the Throgs Neck Expressway (I-695), I-295, and the Hutchinson River Parkway (I-687). City Island's single physical connection to the mainland is the City Island Bridge. The bridge is currently being redesigned by the New York City Department of Transportation, and is scheduled to be reconstructed by 2017. A temporary bridge structure will be constructed by the end of 2014 and will be in use during construction of the new bridge.

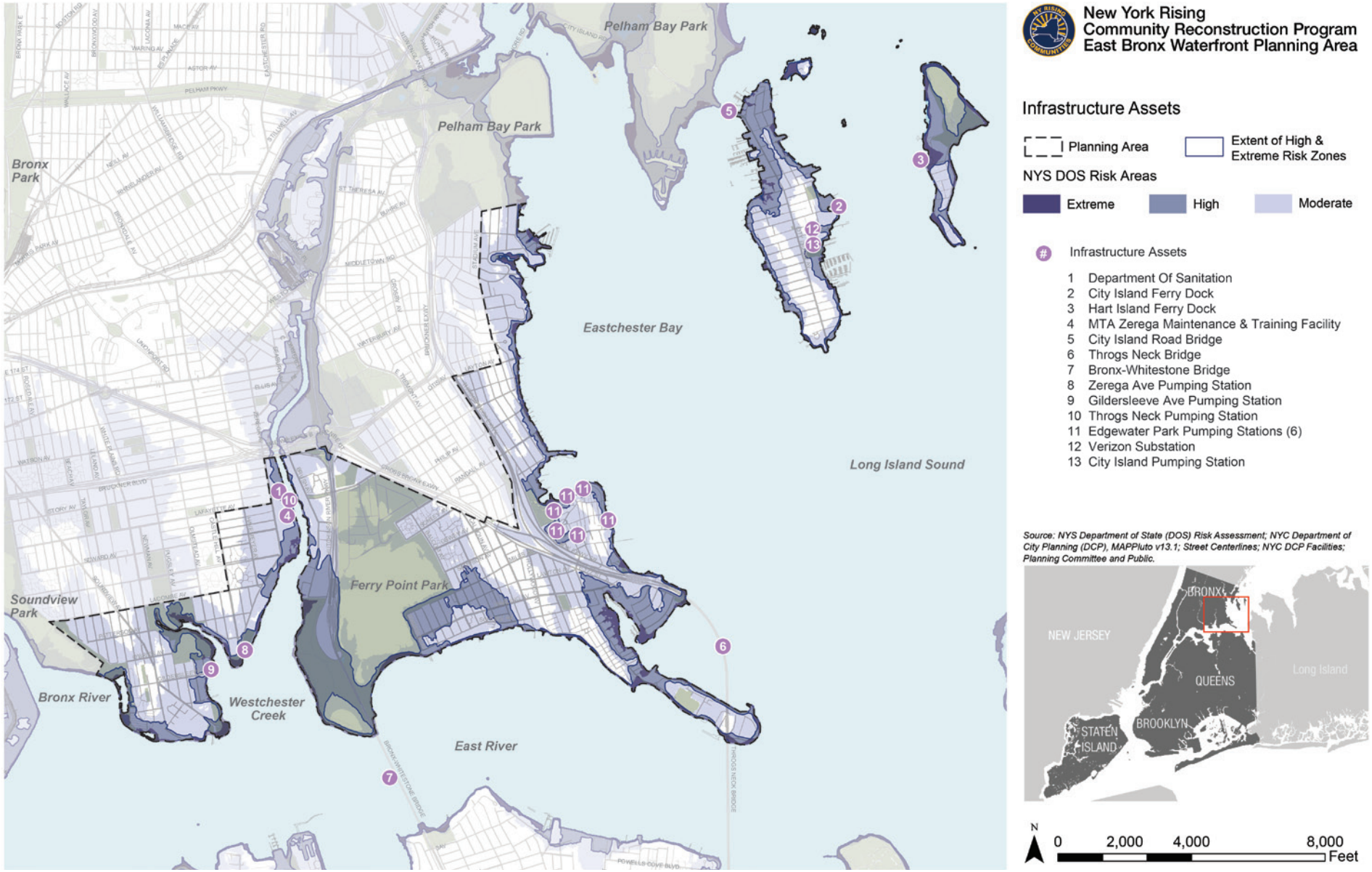
The Planning Area is served by eight local bus lines (Bx8, Bx22, Bx24, Bx27, Bx29, Bx36, Bx39, Bx40) and two express bus lines (BxM8 and BxM9), which provide service to Midtown Manhattan. The local bus network provides a transfer to the northern terminus of the 6 Train at the Pelham Bay Park Station, and is routed along Westchester Avenue, north of the Planning Area.

The homes in the Planning Area are connected to the energy grid via overhead electrical power lines. These power lines were severely damaged by falling trees during Superstorm Sandy and caused widespread power outages following the storm.

The majority of the Planning Area is served by a combined sanitary and stormwater sewer system. In this type of system, sanitary wastewater and stormwater runoff is collected into a single system and transported to the Hunts Point Wastewater Treatment Plant. While the plant is outside of the Planning Area, it is critical to the functionality of the sewer and stormwater system. There are some areas, such as Ferry Point and City Island, where stormwater runoff is not captured in the sewer system, but rather discharges directly into neighboring water bodies.

There are four New York City Department of Environmental Protection (NYC DEP) pumping stations within the Planning Area, and six private pumping stations in the Edgewater Park Cooperative. The pumping stations are critical in transporting wastewater and stormwater from low-lying areas to treatment plants. NYC DEP identifies three of its pumping stations as potentially at risk from future storms. Both the Zerega Avenue and Throgs Neck pump stations experienced flooding during Superstorm Sandy, with Throgs Neck experiencing significant flooding and having to halt operations. The Gildersleeve Avenue Station was not affected by Superstorm Sandy.

Figure II–5: Infrastructure Assets Map



Natural and Cultural Resources Assets

Cultural assets include community centers and churches, and provide critical community and capacity building functions. They may also act as centers for gathering and communication, provide skill training to residents on a day-to-day basis, and community support during and after storm events.

There is a diverse collection of community organizations, youth engagement clubs, and recreational facilities in the Planning Area.

In addition to cultural resources, there are a variety of parks and open spaces throughout the Planning Area. The 413-acre Ferry Point Park is the largest public park in the Planning Area. The park features baseball fields, soccer and football fields, basketball courts, children play areas, and pedestrian paths. A new golf course and a waterfront promenade are under construction.

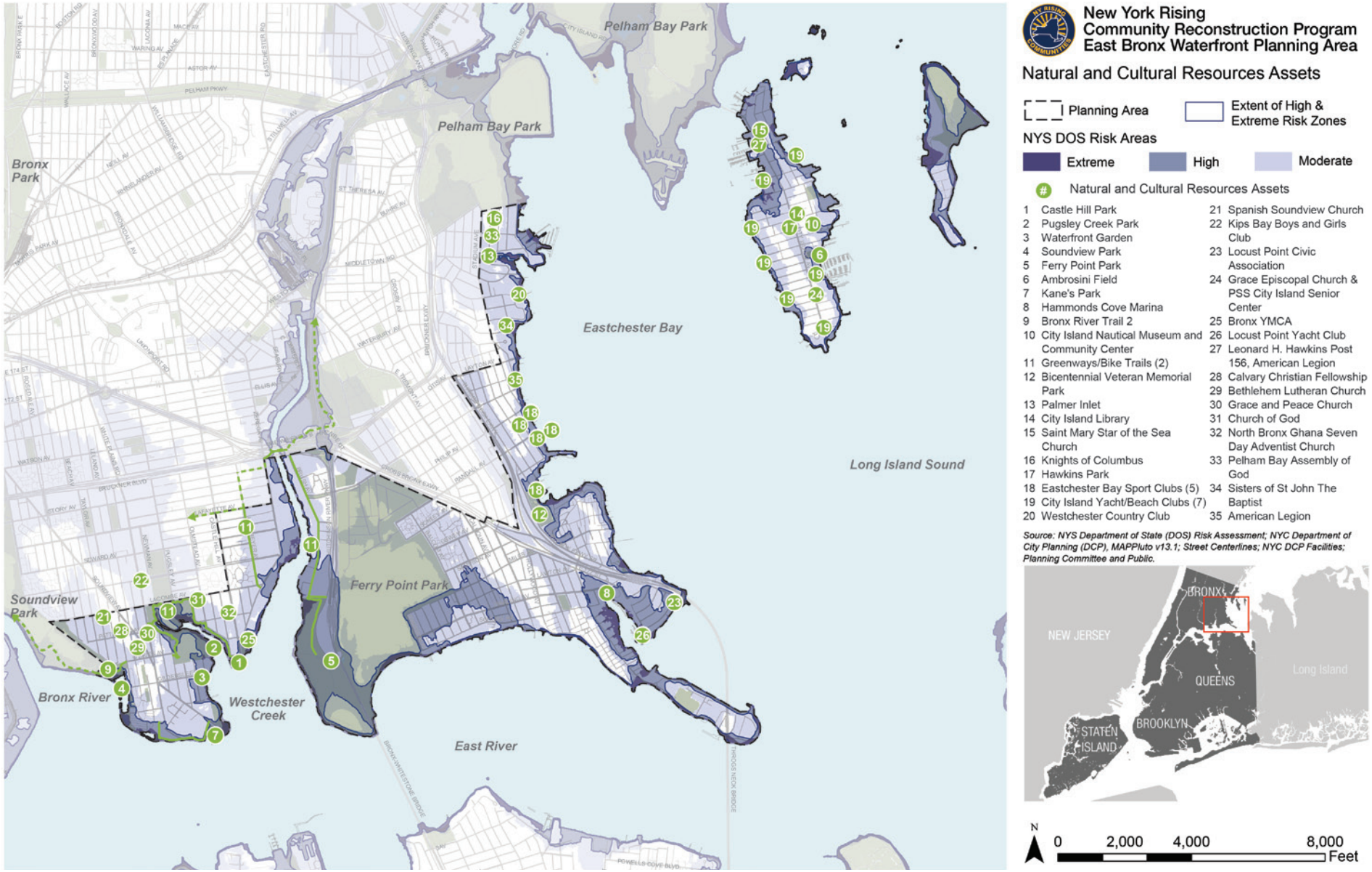
Soundview Park is located at the western edge of the Planning Area. The park has been the focus of the Bronx River Restoration Project and home to a successful pilot oyster restoration program being coordinated by the Hudson River Foundation in partnership with multiple organizations and agencies. The Planning Area has nine additional recreational areas: Castle Hill Park, Pugsley Creek Park, Waterfront Garden, Kane's Park, and two bike/greenways; adjacent to Edgewater Park is Bicentennial Veteran Memorial Park; and in City Island is Ambrosini Field.

Kane's Park

Just north of the Planning Area is Pelham Bay Park, which is the largest park in New York City. The park includes recreational amenities such as horseback riding trails, hiking trails, Orchard Beach, the Bartow-Pell Mansion, two golf courses, and numerous active-use recreation spaces.

Surrounding water bodies, including wetlands, mudflats, rivers, and creeks, are also important natural resource assets because they provide critical recreational, economic, transportation, and tourism benefits to the broader community. Eastchester Bay, Westchester Creek, Long Island Sound, Pugsley Creek, and Pelham Bay provide ecosystem services and support water-based recreation.

Figure II–6: Natural and Cultural Resources Assets Map



Assessment of Risk to Assets and Systems

The assessment of risk to community assets informs the evaluation of strategies and prioritizes resiliency projects. The assets of the Planning Area that are in flood hazard areas (risk areas) are at risk from future storm events. The various water bodies surrounding the Planning Area, including the Bronx River, Pugsley Creek, Westchester Creek, the East River, Eastchester Bay, and Long Island Sound, are sources of surge and wave action and were entry points for water inundation during Superstorm Sandy. In addition, the bordering coastlines remain exposed to coastal flooding from future storms and sea-level rise.

While the level of threat from future flooding varies across the Community, no neighborhood is immune. While portions of the Community are upland from water bodies and located within the moderate-risk area, much of the waterfront and some low-lying inland areas are located within either the high- or extreme-risk areas. These waterfront and low-lying areas remain at high risk of damage from future coastal hazards caused by water inundation from surge or wastewater and stormwater backup.

In addition to physical factors, there are many issues with respect to community planning and capacity building that exist within the Planning Area and increase vulnerability of residents and community assets during a storm event. The lack of a comprehensive emergency preparedness plan, as well as unclear or incomplete information about emergency response procedures, resources, and evacuation plans hinders the Community's ability to respond effectively to and recover from a disaster.

Health and Social Services Assets at Risk

The Lamp Ministries is the only Health and Social Services asset within the NYS DOS extreme-risk area. Several assets are in the high-risk area, including SUNY Maritime College, PS 175 City Island, Pilot Cove Manor Senior Center, Villa Maria Academy Private Elementary School, NYS "Day Hub" Center, Providence Rest senior facility, and Archimedes Academy for Math, Science and Technology. The ability of these assets to withstand damage from future storms will be crucial to long-term resiliency since they provide vital services leading up to, during, and after storm events.

Economic Development Assets at Risk

Sections of City Island Avenue, the main commercial corridor in City Island, are located in the extreme- and high-risk areas. The restaurants are situated along the waterfront, making them particularly vulnerable to damage from future storm events. These businesses are a key tourist attraction and support the local economy on City Island, so it is imperative that these assets are protected. Several of the industrial buildings that line Westchester Creek, along Zerega Avenue and Brush Avenue, are in the high-risk area. Given the proximity to the water, all of these assets remain at risk of damage from storm surge. In addition, commercial marinas along the coastal edge are an important economic generator in the Planning Area and remain at risk.

Housing Assets at Risk

Many of the one- and two-family residences that line the coastlines are within the extreme- and high-risk zones. During Superstorm Sandy, the residential neighborhoods proximate to the water and the homes in low-lying areas, such as in Throggs Neck, Edgewater Park, Silver Beach, Locust Point and City Island, experienced the greatest amount of flooding. Many of these homes are of brick construction and therefore difficult to elevate. Many of these homes will remain unprotected in the foreseeable future due in part to the technical and financial challenges of flood proofing and elevating the structures' finished floors above the Base Flood Elevation.

Assessing Risk

Risk, in this context, is the potential for an asset to be damaged or destroyed in a future storm event. The assessment of risks to an asset or a system of assets in the Planning Area produced important information that informed the evaluation of needs and opportunities and helped guide the Planning Committee's decisions with regard to selecting strategies and projects that best address the resiliency needs of the Planning Area. NYS Department of State (NYS DOS) developed a risk assessment tool aimed at assessing flood risk to community recovery functions to support this process. The tool assigns each asset a risk score by evaluating three storm-related factors:

Hazard: the likelihood and magnitude of future storm events.

Exposure: the local topographic and shoreline conditions that may increase or decrease the impact of coastal hazards.

Vulnerability: the capacity of an asset to recover after a storm, taking into account its material strength relative to the coastal hazard, as well as its regenerative capacity.

Hazard, exposure, and vulnerability determine the risk that an asset could be damaged or destroyed by a coastal storm event. This analysis identifies which assets within the Community are most at risk from future storms in comparison to other assets. Furthermore, it allows potential projects to be evaluated by their capacity to reduce risks to assets.

Left, View of Whitestone Bridge; Middle, Damage to a seawall in City Island, *Marcel Negret, Community Board 10;* Right, EMS Station 3 in Soundview

Infrastructure Systems Assets at Risk

The Planning Area has several key transportation infrastructure assets that are located in the extreme-risk area, including the City Island Bridge, Throgs Neck Bridge, and Bronx-Whitestone Bridge. The vulnerability of the roadway network throughout the Planning Area was identified as a critical issue since flooding during Superstorm Sandy and heavy storms inundated low-lying local streets and arterial roadways, isolating neighborhoods and limiting emergency vehicle access. The risk of flooding, in conjunction with limited vehicular roadway redundancy, creates a significant vulnerability in the local transportation system. In addition to low-lying roadways, many streets that terminate at the coastal edge (i.e., street ends) in the Planning Area are situated below the 100-year floodplain, making the surrounding neighborhoods vulnerable to storm surge and flooding.

The wastewater and stormwater sewer systems also remain at risk since drainage is a major and longstanding issue within the Community. The Gildersleeve Avenue pumping station is located in the extreme-risk area and the Zerega Avenue and Throgs Neck pumping stations are located in the high-risk zone. The Throgs Neck and Zerega Avenue pumping stations were damaged during Superstorm Sandy. The Throgs Neck pumping station halted operation during Superstorm Sandy because of loss of power. All three stations have critical components that are situated below the base flood elevation plus anticipated sea-level rise of 30 inches, increasing their vulnerability. The NYC DEP Wastewater Resiliency Plan recommends adaptation strategies for each facility that would reduce risk of loss of functionality during future storm events.[1]

The Edgewater Park Co-op has six private pumping stations that surround the Community—several along Eastchester Bay—that are located in the high-risk zones. The pumping stations provide critical functions in preventing sewer back-ups and are at some risk of damage in the event of sea-level rise and increased storm severity.

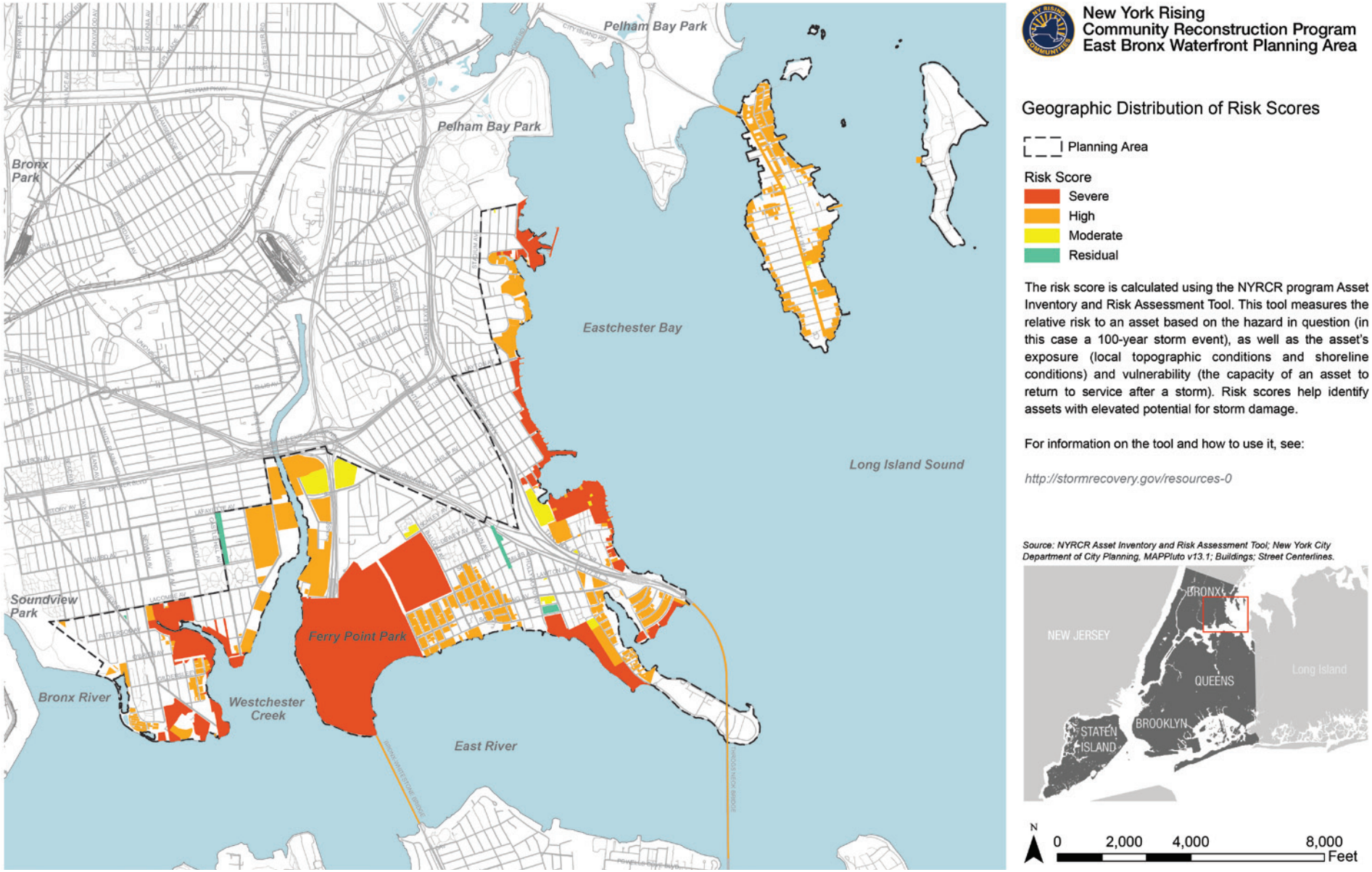
Some neighborhoods in the Planning Area experienced power outages leading up to, during, and following Superstorm Sandy caused by damage to overhead power lines. The vulnerability of these lines to wind damage and the lack of alternative backup power sources significantly decrease the Community's capacity to withstand and recover from future storm events.

Natural and Cultural Resources

There are natural and cultural assets located in the extreme- and high-risk areas, and some are exposed to future storm surge. These include Castle Hill Park, Edgewater Park, Ferry Point Park, Hammonds Cove Marina, Pugsley Creek Park, Pelham Bay Park, Soundview Park, Kane's Park, Bicentennial Veteran Memorial Park, and Palmer Inlet. The greenways and bikeways that traverse Ferry Point Park, Pugsley Creek Park, Soundview Park and Castle Hill Park are located in the high-risk area. Several of the parks and coastal wetlands serve as resilient natural buffers between the Community and the water. However, sea-level rise and surge projections may no longer be able to sufficiently buffer shoreline communities.

Many of the cultural and community facilities within the Planning Area are located in the extreme- and high-risk areas. Given their close proximity to the coastline and building configuration, these community facilities are at risk of flooding from future storm events.

Figure II–7: Geographic Distribution of Risk Scores



Assessment of Needs and Opportunities

A fundamental step in the NYRCR planning process is the identification of needs and opportunities. These needs and opportunities, which consider community assets, critical issues, vulnerability, and risk, are informed by the firsthand experiences of residents. The Community recognizes that while true resiliency is a long-term objective, there are actions that can be taken now to set the blueprint for a resilient future. The Community also realizes that resiliency planning must take into account all potential future disaster events and climate change impacts.

Needs are safety and resiliency measures identified by the Community that will help minimize potential impacts associated with climate change.

Opportunities are potential options for addressing resiliency goals and objectives through leveraging underutilized assets available within the Community.

The Community is focused on short-term solutions and is looking to address its most-immediate needs. At the same time, the Community recognizes that the vulnerability of its low-lying neighborhoods to rising sea level is a significant long-term issue and that a plan of action is needed to increase resilience. The Community is looking to capitalize on opportunities by implementing innovative and sustainable strategies that collectively serve as a plan of action to achieve long-term community resiliency. While there are multiple diverse neighborhoods with specific unique challenges, the Community recognizes that a comprehensive strategy will help all neighborhoods achieve their resiliency goals.

Each need has one or more corresponding community Recovery Support Functions and potential opportunities that may address the Community's resiliency goals and objectives. For neighborhoods affected by major storm events, needs and opportunities may focus on rebuilding community capacity, building or rehabilitating infrastructure, and piloting innovative coastal protection measures.

Although Superstorm Sandy did not cause widespread structural damage to homes and infrastructure in the Planning Area, it highlighted the need for a more robust, centralized communication network among neighborhoods. In addition, there was a lack of coordinated emergency response and storm recovery resources to assist residents in overcoming challenges posed by power outages and flooding following Superstorm Sandy. A focus in the Planning Area is centered on better-preparing its neighborhoods for future storm events through improved communication, public education, technical assistance and emergency preparedness.

The coastal edge is varied, both in ownership and in condition and there is no single obvious protection solution. Critical power and roadway infrastructure is vulnerable to storm impacts and flooding, cutting off communities and leaving them without power. Localized flooding from heavy rain events is also problematic, limiting access and damaging properties and homes. There is a need to protect against sea-level rise and storm events by addressing the edge and critical infrastructure that supports the Community.

At the heart of many of these communities are community centers, which have often doubled as recovery centers in times of crisis. Many of these facilities are vulnerable and need to be better protected against future storms and sea-level rise. An additional underlying concern is that the lingering impacts from future storms will increase costs to businesses and homeowners, which will create economic hardship for the Community. The protection of economic and community resources is seen as essential to the preservation of community.

Building upon a desire for stronger communication and the protection of the edge and the critical infrastructure that supports the Community, the Planning Committee and members of the Community identified the following nine needs relating to resiliency:

- A protected coastal edge
- A more diverse power generation system
- Resiliency measures that address localized flooding along key access routes
- Natural stormwater management strategies to reduce inland flooding from heavy rain and storm events and reduce impervious surface area
- Housing that is more resistant to flooding
- Improved communication networks and education programs
- Suitable development in flood-prone locations
- Multiple storm recovery facilities in central locations
- A stable local economy following storm-related events

Vulnerable location along Pennyfield Avenue, which is the only access road to Throggs Neck peninsula.

A Protected Coastal Edge

Needs

The protection of the Community from future flooding and wave action is a critical need. The Planning Area has approximately 22 miles of coastline that contain natural and man-made features. Many sections protected with sea walls have deteriorated and are in need of repair. The natural features found along the coastline provide some flood protection but have low-lying areas that allow floodwater to flow into surrounding neighborhoods. Most of the vulnerable coastal edge throughout this region lies in private ownership. Organizing multiple private owners to raise their property will be a challenge. Additionally, much of the low-lying areas are not connected to high ground, necessitating lengthy and expensive protection strategies in areas where there are relatively low residential development densities. A comprehensive coastal protection strategy that strengthens the varied waterfront edge conditions to mitigate the hazards of future storms and rising sea levels is an imperative resiliency objective for the Community.

Opportunities

- **Enhance existing sections of the coastal edge to serve as protective barriers.** Considerable portions of the coastal edge are composed of wetlands and other natural features that provide some coastal protection. The wetlands and tidal flats along the coastal edge and western section of City Island, wetlands along Westchester Creek, and the breakwater on the shoreline of Harding Park serve as good examples of existing natural features that can be leveraged.

- **Utilize ongoing or potential local edge restoration efforts to mitigate future storm surge.** The successful oyster reef restoration at Soundview Park could be used as a model for future restoration efforts. Increasing the natural habit along the shoreline can add to the resiliency of the Community by reducing damage by waves as well as providing significant co-benefits. Oysters filter large quantities of water, which improves the water quality and provides habitat for other animals.

- **Focus on publicly owned coastal lands to pilot more comprehensive edge protection measures.** The dozens of publicly owned street ends that have coastal frontage provide an opportunity for coastal protection and, potentially, improved public waterfront access.

Top, Beach in City Island; Middle, Waterfront in Edgewater Park; Bottom, Vulnerable edge in Harding Park

A More Diverse Power Generation System

Needs

During Superstorm Sandy, high-velocity winds toppled trees, which in turn damaged overhead power lines. The Community suffered power outages that lasted over a week, and these outages were not only isolated to areas near the coastline.

Neighborhoods such as Harding Park experience more frequent power outages caused by above ground power lines. The power lines and control panels located along the coast that are vital to the operation of pumping stations remain vulnerable to future storm events. In addition, the power distribution system will face increasing strain caused by the effects of climate change such as heat waves, high winds, and more frequent storms.

The Community needs a redundant and more diverse, local power generation system that supplies power to individual homes, critical infrastructure and essential community facilities in the event that the power distribution system is damaged. Protection of these electrical assets during storms is critical.

Gildersleeve Avenue Pumping Station, located on a street end in Clason Point

Opportunities

- **Utilize green power technologies.** Utilizing green power generation technologies, such as solar or wind, could reduce the demand on the system and mitigate power failures.

- **Obtain funding for alternative energy systems.** Grants and incentive programs for alternative energy systems, such as solar power and microgrids, are available through the New York State Energy Research and Development Authority and other sources.

- **Harden power sources to protect vital water and sewer infrastructure.** The ability to harden or relocate power supply would be a low-cost option for protecting larger water and sewer infrastructure.

Resiliency Measures That Address Localized Flooding Along Key Access Routes

Needs

Flooding during Superstorm Sandy demonstrated the vulnerability of neighborhoods when local access roads remained flooded days after the storm event, leaving residents isolated. Frequent flooding of low-lying areas caused by poor drainage is a prevalent issue in the Community. Addressing localized flooding could take the form of building new infrastructure to increasing stormwater capacity by limiting stormwater runoff from homes.

Opportunities

- **Build off of existing programs designed to raise coastal edge.** The City of New York is looking to raise bulkheads and shorelines around the city in coastal neighborhoods. Roadways along the coastal edge that provide access to otherwise isolated communities could become priority locations for resiliency measures.

Top, Side streets in Ferry Point that experience localized flooding; Bottom, Pennyfield Avenue also experiences localized flooding during storm events. *Marcel Negret, Community Board 10.*

Natural Stormwater Management Strategies to Reduce Inland Flooding From Heavy Rain and Storm Events and Reduce Impervious Surface Area

Needs

While Superstorm Sandy exposed the vulnerability of the East Bronx coastline to surge and wave action, the Community also suffers from inland flooding. There are large sections of the Community where houses sit below grade and where nuisance ponding and street flooding are experienced during heavy rain events. The Community is very focused on the potential for natural stormwater management strategies to combat flooding.

Opportunities

- **Obtain available funding through the NYC Department of Educational Protection (NYC DEP) Green Infrastructure program.** The NYC DEP offers a grant program for green infrastructure projects by private property owners who reside in combined sewer areas. The majority of the Planning Area is in the eligible combined sewer area, while Castle Hill is in the priority area.

During storm events, rainwater is directed straight into adjacent waterbodies.

Housing That is More Resistant to Flooding

Needs

The majority of housing stock in the Planning Area is relatively new when compared to other parts of New York City. However, approximately two-thirds of the homes in the Planning Area were built prior to critical building code revisions that led to a comprehensive overhaul of the New York City Building Code in 1968. Housing built prior to this revision is more susceptible to damage because many of these structures were built with combustible materials, and thus are more vulnerable to structural damage during storm surge and flood events.

The Planning Area contains a relatively high percentage of development within the 100-year floodplain, and much of the residential development is not flood-proofed, making it vulnerable to flood damage. For example, a home in Harding Park was lifted from its foundation following a storm surge from Superstorm Sandy. In addition, an entire row of homes in Edgewater Park along the coastal edge were flooded with several feet of water during the storm. These occurrences highlight the need to make housing more resistant to flooding from storm events and, equally important, sea-level rise.

Opportunities

- **Retrofit existing housing stock to conform to current flood-resistant construction standards.** Retrofitting existing housing in the Planning Area to conform to current Local and Federal flood-resistant construction standards is one way to make housing more resistant to flooding and climate change. For example, raising the living areas of the vulnerable housing stock to at least the Base Flood Elevation would make homes more resilient and guard against future flooding. However, this may be technically and financially difficult to achieve due in part to the Community's physical characteristics, such as narrow lots, attached building types, and other prevalent urban site conditions. If raising a home proves to be cost-prohibitive, less-expensive flood-proofing measures may be used.

- **Build upon Local, State, and Federal infrastructure projects and programs.** Partnering with Local, State, and Federal agencies may provide the opportunity to tie in additional projects to larger infrastructure programs currently underway within the Planning Area to introduce new flood mitigation strategies in select residential locations.

- **Leverage the natural edge.** Significant portions of the edge are composed of wetlands, mud flats, deep vegetated edges, and other natural features that provide the opportunity to enhance protection of coastal housing from surge and wave action.

Top, Waterfront home at Pennyfield Estates; Bottom, Waterfront homes at Harding Park.

Improved Communication Networks and Education Programs

Needs

Increasing local capacity to prepare for and react to future disasters is of critical importance to the Community. Planning efforts should address recovery and emergency response at both the individual and neighborhood levels to maximize capacity at a variety of scales. Committee members cited a lack of awareness regarding available resources and assistance before, during, and after Superstorm Sandy as a significant problem, and they expressed a commitment to having stronger coordination among neighborhoods in anticipation of future storms. For example, many local residents do not know the location of the closest Hurricane Evacuation Center. Beyond the lack of information, elderly community members expressed concerns about evacuation protocol and shelter conditions for people with mobility constraints and enhanced health needs.

The Community has expressed a need for a plan that includes all of the New York City Office of Emergency Management (NYC OEM) information on emergency preparedness, identifies local recovery resources, and provides community organizations with a greater capacity to institute sustainability and resiliency measures throughout the Community. The plan should ensure that the Community is prepared to meet the health and social service requirements of all residents. In addition, residents of the Planning Area need public education and awareness programming related to emergency preparedness.

Opportunities

- **Utilize local community-based organizations (CBO) for communication and resident education.** The Planning Area has several CBOs that act as local hubs of communication and community organization. The Community could further leverage and expand existing CBO networks across neighborhoods to improve education and communication linkages across the Planning Area.

- **Involve local residents in emergency planning and response efforts.** Resident participation can range from job training through implementation of resiliency projects to volunteer work in the area of disaster preparedness. This would include participation in NYC OEM Community Emergency Response Team (CERT) Program. CERT members undergo intensive training to increase awareness about emergencies and disasters and provide basic response skills.[2] Harding Park and Community Board 10 have active CERT teams, and the program could be augmented to involve more people across the Planning Area.

Existing New York City emergency notification system

Suitable Development in Flood-Prone Locations

Needs

According to Preliminary Work Maps created by the Federal Emergency Management Agency (FEMA), there are more than 67,700 buildings in New York City within the 100-year floodplain. When taking into account potential changes in coastal storms or projected sea-level rise, the city's floodplain expands considerably and encompasses an even greater number of buildings. The Planning Area represents a small percentage of the total number of buildings in the floodplain; however, it is prudent to develop policy and plans for future development in the Planning Area that work to either stem the increase in the number of principal structures or, more likely, restrict residential development density to sensible levels in the 100- and 500-year floodplain.

The National Flood Insurance Program (NFIP) encourages communities to implement floodplain management programs that go beyond NFIP minimum requirements. A major concern of the Planning Committee and members of the Community is the scale of new residential development in the Planning Area—in terms of building bulk, height, and density. The Planning Area needs a strategic plan for new residential development in the floodplain. Further, this strategic plan would identify housing policy intended to help ensure suitable and sustainable low-impact residential growth in the floodplain.

Opportunities

- **Amend the New York City Zoning Resolution to reflect community concerns for growth in the floodplain.** If a strategic land use and/or resiliency plan is developed and adopted by a City agency for flood-prone areas in the Planning Area, the New York City Zoning Resolution could be amended to address land use planning in the Community. The Zoning Resolution would allow the Community to set forth its land use objectives and solidify them as official legal policy. For example, if limiting height of new residential structures in the floodplain is a primary policy objective in a neighborhood land use plan, the height limitation can be written in as a development regulation in a future amendment to the Zoning Resolution for a particular zoning designation.

- **Utilize existing public resources and information outlets.** The New York City Department of City Planning is available to assist the Community in developing context-sensitive plans, land use and development policy, and potential rezoning strategies.

Multiple Community Resource Facilities in Central Locations

Needs

In the weeks after Superstorm Sandy, Community residents realized that there was no designated location where residents could access medical supplies, food, water, restroom, shower, or other facilities.

The Planning Committee and members of the Community have voiced the need to establish multiple and locally based locations with resource centers that residents can go to after a major event. In addition to providing needed supplies and information following a storm event, these locations should be easily accessible on foot or via a major roadway or arterial highway, and large enough to accommodate the immediate geographic area.

Opportunity

- **Use existing, geographically convenient community facilities to provide for post-emergency needs.** Several key community facilities are centrally located within the Planning Area above the floodplain, easily accessible, constructed of solid masonry, and provide an opportunity to serve as post-storm resource centers.

Providence Rest senior housing

A Stable Local Economy Following Storm-related Events

Needs

Residents and business owners in the Planning Area need access to clear information related to capital and operational improvements that would mitigate future storm damage. About 15% of the Planning Area's housing stock falls within the high- or extreme-risk flood-zone areas. Concentrations of commercial and industrial uses in the Planning Area are also vulnerable to flooding and storm damage. Commercial and industrial uses occupy 18% of the Westchester Creek shoreline,[3] and the area's only "big box" stores—Target and The Home Depot—are within the high-risk area adjacent to the Westchester Creek.

City Island's main commercial corridor contains multiple restaurants and local retail uses that were damaged by flooding during Superstorm Sandy. Owners of these vulnerable businesses require education about improvements and retrofit options that would protect their properties from future storm events.

Homeowners and smaller businesses, particularly the locally owned and operated establishments, may need financial support to undertake resiliency upgrades. With the evolving nature of flood insurance policies and FEMA maps, property owners also need up-to-date information about how changes will affect their policies and how they can best prepare for rate increases.

Businesses along City Island Avenue

Opportunities

- **Access existing New York City resiliency resources.** Non-profit organizations across New York City are working with CBOs to provide information and technical assistance related to recovery and resiliency issues. The Community has the opportunity to connect to these and other related services that focus on providing individualized education for owners about the physical and financial risks of their properties.
- **Create solutions that protect local businesses with Community benefits.** Providing local businesses with resiliency information and resources gives the Community an opportunity to operate during emergencies and to recover faster following a disaster, minimizing potential revenue loss. These sites may also serve as key delivery points for supplies and services, such as food, water, and medication, for residents and other businesses during future storm events.

III. Reconstruction and Resiliency Strategies

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Reconstruction and Resiliency Strategies

The East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Program's Planning Committee (Committee) has identified critical issues, needs, and opportunities that inform strategies for enhancing the physical, environmental, social, and economic resiliency of the East Bronx Waterfront NYRCR Community (Community). Refined through a dialogue with the Community at multiple public engagement events, these strategies address the manner by which the Community intends to prepare for the next severe weather event and recover from the impacts of Superstorm Sandy.

The following strategies outline a comprehensive approach for planning and implementing resiliency initiatives through the NYRCR Program. These strategies provide the framework for the selection of short-term and longer-term projects that will provide a resilient future for the Community. Together, the strategies reflect the Community's comprehensive vision for strengthening and expanding the health, vitality, and sustainability of its neighborhoods. The Community has stated its desire to be better prepared for future storms through infrastructure improvements and community capacity building while preserving its close connection to the water. The diverse neighborhoods have come together to create comprehensive strategies that create a more resilient community.

The Committee and members of the Community crafted the following five resiliency strategies, which guided the development of resiliency projects presented in Section IV, and together, set up a plan of action to achieve key short-term and long-term resiliency objectives for the East Bronx Waterfront NYRCR Planning Area (Planning Area):

- Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures.
- Harden power sources and provide power alternatives for key community facilities.
- Increase local preparedness and capacity for recovery.
- Ensure economic resiliency for property owners and businesses in flood-prone areas through education and technical and financial assistance.
- Improve and increase the capacity of stormwater management infrastructure.

Proposed and Featured Projects

Proposed Projects are projects proposed for funding through a NYRCR Planning Area's allotment of CDBG-DR funding.

Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

Maintain the Community's Close Relationship to the Water by Developing Diverse Coastal Edge Protection Measures

The East Bronx Waterfront has an extensive coastline that varies in condition, type, and ownership. During Superstorm Sandy, many of the homes along the coast were flooded, and in a number of neighborhoods the flooding extended several blocks inland. Long Island Sound did not experience the same significant surge and tidal impact as was experienced by communities along the Atlantic Ocean during Superstorm Sandy. However, the impacts could have been much greater under slightly altered conditions. With rising sea levels and an increase in the frequency and intensity of storm activity, the Committee recognizes that future storms pose a significant risk to the Community. Coastal protection measures that take into account future risks by providing an appropriate level of protection—without compromising the Community's close connection to the water—will be critical to the Community's long-term resiliency.

The low height of the seawall leaves Edgewater Park vulnerable to future storm events

In the long-term, a comprehensive coastal protection plan such as identified in New York City's A Stronger, More Resilient New York (2013) would provide flood risk reduction for a portion or possibly the entire Planning Area, depending on the placement of a Long Island Sound surge barrier. The Committee recognizes that such a strategy is expensive and decades away from implementation.

Targeting specific vulnerable areas that serve as the inundation points into the Community and piloting interventions that can exemplify resilience and protection for the larger community should be the near-term focus. Strategically placed protective measures such as berms, levees, floodwalls or bulkhead reinforcement could be the mechanisms used to protect the edge in the short term. In addition, leveraging existing restoration efforts of natural areas and creating breakwaters or living shorelines would provide ecological benefits and protect against wave action in future storm events. This

Table III–1: STRATEGY: Maintain the Community's Close Relationship to the Water by Developing Diverse Coastal Edge Protection Measures

Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Vulnerable Coastal Edge Protection – Street End Study Study and Pilot Project	This study would examine the many different low-lying street-end conditions that will need to be addressed throughout the East Bronx Waterfront Community and identify possible coastal protection typologies that could be used to protect the street ends. The project would fund up to three pilot projects identified in the study.	Proposed	$1.85 million	Y
Hammond Cove Living Shoreline Restoration	This project would enhance the living shoreline on the west side of Hammond Cove that is threatened by sea-level rise.	Featured	>$20 million	N
Harding Park Edge Protection Study	This project would study potential protection measures along the Bronx and East Rivers to reduce the risk of future flooding caused by coastal storm events.	Featured	$200,000 – $500,000	N
City Island Wetland Restoration & Coastal Protection	This project would create additional waterfront access for the East Bronx Waterfront Community, increase wetland habitat, and improve stormwater storage capabilities while adding a strategic piece to the long-term overall coastal protection strategy needed for City Island.	Featured	$3–5 million	N

layered approach could be replicated across the Planning Area and could provide multiple benefits to the Community. While this strategy would not eliminate risk, it would greatly reduce the future risk that the Community faces from future storm events.

Much of the waterfront is privately owned and there are limited opportunities to tie back to higher ground. Public street-ends often intersect larger sections of private waterfront that is vulnerable to sea-level rise. These complex circumstances will necessitate a combination of building and site-level protection measures coupled with strategic public-realm improvements.

Harden Power Sources and Provide Power Alternatives for Key Community Facilities

Wind damage from Superstorm Sandy was the primary cause of power loss in the Community. High winds toppled trees, which damaged overhead lines, leaving many homes without power, some for more than a week. Power is vital for emergency response, providing basic utilities including lights, water pumps, and refrigeration. Outages interrupt communication systems, shut down pumping facilities, limit access to key facilities, and impede the recovery efforts in the days following a severe storm event. Vulnerable populations, including people with disabilities and senior citizens, are particularly dependent upon power. Senior citizens are vulnerable to excessive periods of heat and cold and depend on power to service elevators, which assist with their mobility needs, and to run critical medical equipment. This strategy addresses the long-term need to improve system-level infrastructure as well as a short-term focus on backup power and alternative sources of energy to ensure a redundant and resilient power supply during and following future events.

Vulnerable Con Edison substation near Castle Hill

Projects that address this need could include installing permanent generators in key community facilities, which would provide backup power sources to allow community organizations to provide services to residents following a severe weather event. The Committee also highlighted the importance of alternative forms of energy generation and distribution in creating redundant energy sources. Alternative forms of power, including solar and wind, generate energy and feed into the existing grid while still functioning in the event of a larger grid failure. Solar panels, for instance, could be installed on the roofs of critical buildings to ensure that these resources are functional if the general power system fails. Microgrids can operate separate portions of the Planning Area and act as a self-sufficient unit if the larger grid were compromised. By incorporating power strategies into multiple projects, the Community ensures a greater diversity of power choices that can reinforce the redundancy and resiliency of the power system.

Table III–2: STRATEGY: Harden Power Panels and Provide Alternative Power Sources for Key Community Facilities

Project Name	Description	Project Category	Estimated Cost	Regional Project
Locust Point Civic Association Resource Center and Resiliency Improvements	This project would provide funds for resiliency improvements of the Locust Point Civic Association Center, a key community facility in Locust Point.	Proposed	$700,000	N
North Tower Firehouse Resource Center and Resiliency Improvements	This project would provide funding for resiliency improvements to the North Tower Firehouse to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.	Proposed	$1 million	N
Edgewater Park Pumping System Hardening	This project would harden the pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.	Proposed	$150,000	N

Increase Local Preparedness and Capacity for Recovery

Superstorm Sandy revealed gaps in coordination, response, and capacity for recovery, which were particularly evident in the neighborhoods that make up the East Bronx Waterfront. This strategy aims to ensure that the Community has the capacity to provide critical services and resources in case of an emergency.

East Bronx Waterfront Planning Committee meeting

Significant steps toward local recovery include strengthening social networks, providing critical emergency information to residents, and designating safe spaces to serve as communication and resource centers. The Community wants to enhance local response capabilities and strengthen social resiliency in the short term and maintain high levels of preparedness in the long-term and build capacity within the Community to take strides to becoming more resilient.

The Committee identified multiple problems with the existing emergency plans. Residents remain confused about the location of New York City-designated hurricane shelters and coastal evacuation routes. Committee members characterized the aftermath of Superstorm Sandy as an uncoordinated relief effort with little local knowledge on how to obtain assistance. Without clearly identified community spaces to function in recovery efforts, residents did not know where to get information or emergency supplies after the storm. Committee and Community members also mentioned that power outages and flooding isolated residents living in neighborhoods with single-access entry/exit roads. Isolation is a particular concern for vulnerable populations such as senior citizens, and the Committee emphasized the need to identify and protect these individuals.
Increased local preparedness and community capacity for recovery can help meet the objectives described in the Community's vision statement by better preparing residents in the event of an emergency and creating an enhanced communication network between communities. While post-Superstorm Sandy recovery efforts were not coordinated locally, the Committee identified assets that could serve as resources to the Community in the aftermath of an extreme event.

Resiliency improvements, whether physical or social, could activate these community resources to better serve residents year-round. Additionally, a recovery plan would be an opportunity to leverage local knowledge of community-based organizations and members of the Community. Engaging these groups would build knowledge and social networks that go beyond emergency preparedness to improve communication between communities more generally.

Table III–3: STRATEGY: Increase Local Preparedness and Capacity for Recovery

Project Name	Description	Project Category	Estimated Cost	Regional Project
Community Recovery Plan	This project would create a local community recovery plan to enhance coordination with existing New York City resources, educate communities about the effects of climate change, and provide access to information about post-disaster resource services.	Proposed	$325,000	Y
Locust Point Civic Association Resource Center and Resiliency Improvements	This project would provide funds for resiliency improvements of the Locust Point Civic Association Center, a key community facility in Locust Point.	Proposed	$700,000	N
North Tower Firehouse Resource Center and Resiliency Improvements	This project would provide funding for resiliency improvements to the North Tower Firehouse to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.	Proposed	$1 million	N
Community Facility Resiliency Capital Fund	This project would fund resiliency improvements for critical community buildings and facilities that serve vulnerable populations. Resiliency measures could include flood-proofing, raising mechanical and electrical equipment, and the purchase and installation of backup generators.	Featured	$1 million	Y

Ensure Economic Resiliency for Businesses and Property Owners in Flood-Prone Areas

Economic stability must be tied to resiliency efforts in the Community. Creating a strategy to help homeowners and business owners recover quickly following an emergency benefits the whole Planning Area because these important stakeholders are critical participants in efforts to restore their neighborhoods. The key to economic resiliency lies in anticipating a disaster before it strikes. Properties, buildings and operations that were damaged, as well as those at risk of future flooding, must be strengthened to avoid future economic losses. Unfortunately, the capital to make improvements and the rising costs of maintaining floodplain properties are often barriers to thorough preparation. In spite of these challenges, the Committee recognizes that economic resiliency for property owners is an important part of a financially self-sufficient Community.

The Planning Area has a significant number of property owners who need to take the necessary steps to make their properties more resilient. Of the existing housing stock, more than half are owner occupied, and small, local businesses comprise a majority of the economic assets along the one of the most vulnerable corridors in the Community—City Island Avenue. The Community's "big box" stores—The Home Depot and the retail establishments in the recently opened Throggs Neck Shopping Center—are located adjacent to the Westchester Creek just outside of the 100-year floodplain. Committee members and the public emphasized the need to protect these important housing and economic assets from future storm events. In addition, along the waterfront in City Island, many yacht clubs and marinas suffered damage from Superstorm Sandy and are struggling to pay flood insurance, further burdening them financially. While the desire is strong to make resiliency improvements on existing buildings, residents had serious concerns about costs.

Business at Locust Point

Many property owners in the Community are facing rising insurance premiums and difficult decisions about how to physically adapt structures as they continue to pay for the damage from Superstorm Sandy. Residents talked about struggling to pay for costs that flood insurance did not cover, including landscaping, basement repairs, and replacement of bulkheads for waterfront properties. Additionally,

Table III–4: STRATEGY: Ensure Economic Resiliency for Businesses and Property Owners in Flood-Prone Areas

Project Name	Description	Project Category	Estimated Cost	Regional Project
Westchester Creek Waterfront Study	This project would provide funding for a study to re-envision the Westchester Creek waterfront. Waterfront access is limited along the Creek but the many underutilized lots create an opportunity to transform Westchester Creek into a resilient, accessible community asset.	Proposed	$200,000 - $400,000	Y
Building Flood Audit Program	This project would provide technical assistance to homeowners who want to retrofit their buildings to mitigate future storm damage.	Featured	$750,000	Y

the increased burden of flood and homeowner's insurance is a serious and widespread concern in the Planning Area.

A healthy local economy can both retain current residents and attract outside investment to catalyze local economic growth. The Committee and Community expressed a need for a stable local economy even in the aftermath of storm-related events. Housing and economic assets must be hardened so that people return quickly to their homes and businesses, minimizing the potential for lost revenue. The Planning Area contains active and engaged residents who are interested in making resiliency improvements to their homes and businesses; however, residents lack the technical and financial resources to do so. New York City has existing resiliency programs, such as EmPower New York and Learning Collaborative for Resilience that could be adapted to the local context of the Community, combining technical assistance for storm-related design improvements with access to financial resources and education.

Applying precedent resiliency programs to the local geography would create an opportunity to leverage the existing capacity of community-based organizations to administer assistance. Additionally, hardening crucial businesses, such as banks, grocery stores, and gas stations, in anticipation of future emergency events would be an opportunity to help the whole Community after an emergency since these assets provide critical supplies during recovery. Keeping these businesses operating during an emergency helps the whole Planning Area recover more quickly.

Improve and Increase the Capacity of Stormwater Management Infrastructure

This strategy addresses the need to improve the infrastructure systems—at the local and systemwide levels—that manage stormwater within the Planning Area. Following Superstorm Sandy and during more frequent storm events, the Planning Area experiences instances of stormwater flooding in low-lying areas. The flooding isolates neighborhoods that have only one or two access roads that, when flooded, trap residents and block emergency access. Both the Committee and the Community have expressed a strong desire to address their stormwater management needs.

The Committee prioritized targeted implementation measures that augment existing efforts, focusing on specific areas within the Community. In the long-term, the Committee will make recommendations to the appropriate government organizations on preferred upgrades and continued maintenance to the existing infrastructure. In the short term, the Committee prioritized implementing water management strategies at targeted locations that will increase stormwater capture and reduce the volume of water that may be infiltrating the wastewater sewer system.

Potential targeted implementation measures that augment the capacity and effectiveness of the existing sewer system include green infrastructure strategies, wetlands preservation, private-property enhancements, and leveraging existing open space and parkland. Green infrastructure measures, such as bioswales, rain barrels, permeable paving, storage tanks, and wetlands preservation, can capture water prior to entering the system and reduce the amount of rainwater that can cause flooding at low points in the Community. The Community can leverage the ongoing New York City Department of Environmental Protection Green Infrastructure Grant Program to improve the stormwater management in the Planning Area.

Existing combined sewer outflow outfall in Planning Area

Table III–5: STRATEGY: Improve and Increase the Capacity of Stormwater Management Infrastructure

Project Name	Description	Project Category	Estimated Cost	Regional Project
Edgewater Park Pumping System Hardening	This project would harden the pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.	Proposed	$150,000	N
Ferry Point Local Street Improvement Project	This project would repave and regrade up to three local streets in the Ferry Point neighborhood. A similar green infrastructure approach to roadway paving could be replicated in similar neighborhoods with streets where the mapped width exceeds the built width in the East Bronx Waterfront and throughout New York City.	Featured	$375,000–$2 million+	N

IV. Implementation—Project Profiles

HARDING PARK EDGE PROTECTION STUDY
WESTCHESTER CREEK WATERFRONT STUDY
FERRY POINT LOCAL STREET IMPROVEMENT
NORTH TOWER FIREHOUSE RESOURCE CENTER & RESILIENCY IMPROVEMENTS
HAMMOND COVE LIVING SHORELINE RESTORATION
LOCUST POINT CIVIC ASSOCIATION RESOURCE CENTER & RESILIENCY IMPROVEMENTS
CITY ISLAND WETLAND RESTORATION & COASTAL PROTECTION

Projects Overview

Guided by its resiliency strategies, the East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) focused on creating a list of sustainable, implementable, and replicable near-term projects that would set the East Bronx Waterfront NYRCR Planning Area (Planning Area) on a path toward a resilient future. The State of New York has allotted the Planning Area $3 million in Community Development Block Grant – Disaster Recovery dollars to fund eligible projects. Understanding that this funding cannot solve for all challenges, the Committee focused on projects that have a high likelihood of implementation in the short term, selecting seven projects that could most effectively represent the initial steps of an inclusive comprehensive long-term resiliency strategy for the East Bronx Waterfront.

Recognizing that resiliency involves education, planning, and community capacity building, the Committee is looking to build off of this initial community process with a focused action plan that educates residents on climate change, connects neighborhoods in times of need, and provides individual neighborhoods with the capacity to recover from storms and implement resiliency measures. Critical to resiliency is the ability for each neighborhood to have a central resource center that can serve as a refuge for people in need after storm events. The Planning Area will pilot resiliency improvements at two key community centers in Locust Point and Edgewater Park.

The East Bronx Waterfront coastal edge is primarily privately owned and generally low-lying with limited opportunity to tie-back to high ground. Protection will need to take many forms and will require collaborative approaches between the public and individual homeowners and businesses. As sea level rises, the problem will become more acute. The Committee is looking to pilot protection by studying low-lying public street-ends in order to develop a series of innovative measures that can be used as models for both public and private coastal protection.

As is the case in many New York communities, much of the infrastructure is aging and therefore ill-suited to protect against the effects of climate change. Power and drainage are two themes that were heard consistently throughout the outreach. A power protection measure in Edgewater Park to ensure that their water pumping system remains in operation during storms and the regrading of local roads in Ferry Point to mitigate ponding and flooding top the list of infrastructure modifications to increase resiliency.

Resiliency extends beyond infrastructure. A strong economy that attracts new investment and development is just as important to the future viability of the East Bronx Waterfront as physical protection measures. While Westchester Creek represents a significant coastal edge right in the center of the East Bronx, the Creek also provides an opportunity to re-imagine the relationship between the water and its adjacent neighborhoods. A study to unlock the potential of Westchester Creek while protecting the edge rounds out the resiliency projects proposed for the East Bronx Waterfront.

Superstorm Sandy made us all realize that to counter the threats of climate change, including sea-level rise and increased storm frequency and intensity, we must work together as a community. In molding a holistic resiliency strategy for the East Bronx, the Committee has developed a plan to be implemented across all neighborhoods, supported by pilot projects that can be replicated throughout the Planning Area and the region.

Project List

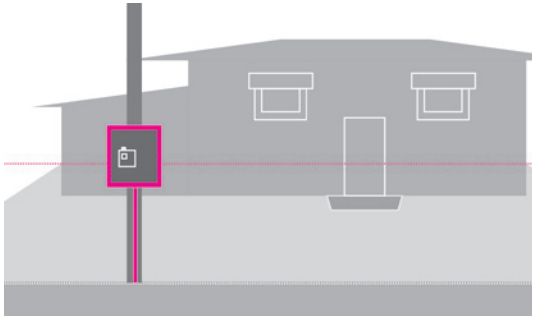
IV–4
Community Recovery Plan

IV–8
Locust Point Civic Association Resource Center and Resiliency Improvements

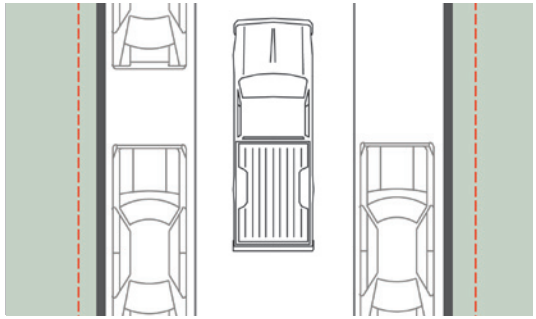
IV–12
North Tower Firehouse Resource Center and Resiliency Improvements

IV–16
Vulnerable Coastal Edge Protection—Street-End Study and Pilot Project

IV–24
Edgewater Park Pumping System Hardening



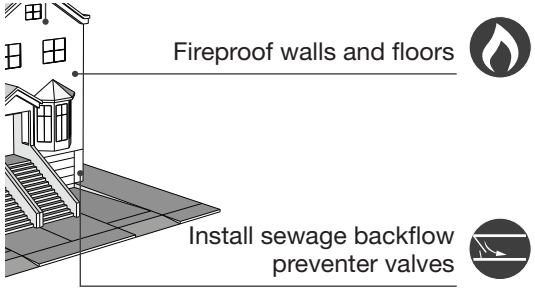
IV–26
Ferry Point Local Street Improvement Project



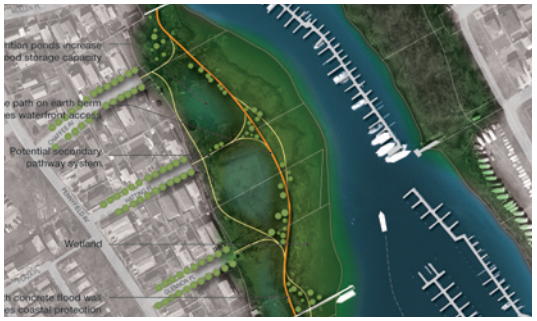
IV–32
Westchester Creek Waterfront Study

IV–38
Community Facility Resiliency Capital Fund

IV–42
Building Flood Audit Program

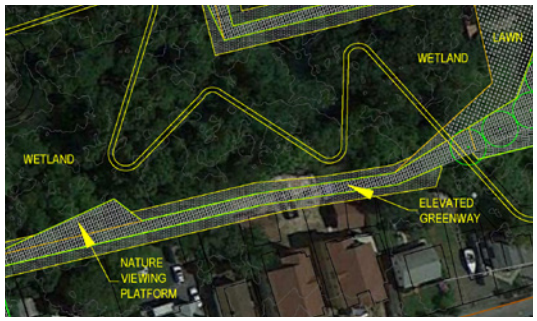


IV–46
Hammond Cove Living Shoreline Restoration



IV–52
Harding Park Edge Protection Study

IV–56
City Island Wetland Restoration & Coastal Protection



Community Recovery Plan

Proposed Project

STRATEGY:
Increase local preparedness and capacity for recovery

Recovery Support Functions

Health & Social Services

Community Planning

Economic Development

Housing

Cost

$325,000

Timeline (in years)

0 1 2 3

This project would create a local community recovery plan to enhance coordination with existing New York City resources, educate communities about the effects of climate change, and provide access to information about post-disaster resource services.

Project Description

Creation of a local recovery plan would educate residents about emergency management efforts in place for the community and foster more effective communication among neighborhoods and between these neighborhoods and the City of New York. In the hours and days following Superstorm Sandy, many residents were unaware of the location of resources and services available to the community. The East Bronx Waterfront Planning Committee (Committee) feels that a place-based, regional plan is a particularly valuable way to advance longer-term recovery by tying together the needs of the multiple neighborhoods and working collectively toward building a more resilient community. The plan would serve as a tool to identify resources and disseminate information to residents.

The goal of the plan is to identify appropriate community stakeholders to assist in the development of a plan that fits the East Bronx Waterfront's needs and fills current gaps in emergency recovery information. The project could support the hiring of staff to work with community members as they shape recovery strategies for the region. Staff could consist of a community coordinator based out of a local community-based organization (CBO), or a team of experts who would support the community through the development and planning process. The primary responsibility of the staff would be to coordinate with stakeholders, produce a plan, and implement a framework to disseminate emergency information and resiliency strategies to residents through year-round programming.

The local recovery plan would be consistent with policies of the New York City Office of Emergency Management (NYC OEM) and other public agencies involved in disaster-related operations. The result of this project could be a concise, graphic-intensive manual that would be easily understood by community members

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Ready

Left, Example of NYC OEM material to be included in plan; Right, The image is a graphical representation of what a Community Recovery Plan document cover may look like, and is for illustrative purposes only.

and distributed by existing civic associations, homeowner's associations, religious organizations, and other community groups in the East Bronx Waterfront Planning Area (Planning Area). Staff could also work with Bronx Community Boards 9 and 10 to develop complementary web-based information that would be maintained by the Community Boards in the long term. Based on discussions with the Planning Committee, elements of the local plan and web information should include the following:

- Information on existing emergency preparedness resources and City plans
- City evacuation protocol
- Designated roles and responsibilities of various agencies and community organizations during and after a disaster
- Identification of locations in the Planning Area that could be used as resource centers for distribution of food, water, and information following emergency event
- Communication strategy for neighborhood collaboration following a disaster
- Best practices in individual/family preparation
- Identification of resources for vulnerable populations
- Strategies that could be implemented throughout the Community to increase awareness and foster greater resiliency

Community stakeholders and the staff team would outreach to local organizations (e.g., Civic Associations, Community Boards, Block Associations, etc.) and volunteer groups to bolster emergency preparedness efforts and raise awareness about disaster recovery needs. The team would work with New York State and New York City agencies to organize emergency preparedness informational sessions at public meetings and community events throughout the Planning Area, including education on emergency planning, recovery resources, and basic building-level resiliency measures.

Cost Estimate

$325,000

The project would allocate approximately $325,000 toward the creation of a community recovery plan. Of this amount, approximately $225,000 would support the salary and benefits of 1.5 full-time equivalent staff members for 2 years. The remainder would cover material expenses for outreach, visioning, community capacity building and creation of a local plan, plus funding for community programming.

Benefit/Co-benefits

Health and Social Benefits

A community recovery plan would inform needed emergency preparation efforts and ensure coordination of critical health and social services following a storm event. Ongoing training and preparedness events would increase social resiliency and connectedness across neighborhoods throughout the Planning Area. Vulnerable populations would particularly benefit from outreach efforts and a specific, pre-determined network of identified resources for disaster recovery.

Economic Benefits

Yielding modest economic benefits, the project would support a staff team for 2 years. The local plan and preparedness programming would aim to build community capacity and clearly define roles to aid in disaster response, effectively leveraging local resources while reducing the amount of time emergency responders would spend on coordination efforts.

Cost Benefit Analysis

This project would be an inexpensive, short-term non-structural mitigation effort that aims to inform individual behavior of Planning Area

residents to decrease community risk. A local plan would delineate strategies to reduce loss of life, prevention of injuries, protection of personal property, and avoidance of adverse economic impact due to storm events. The project would support a 1.5 full-time equivalent coordinator position[1] or consulting team for equivalent cost who would be charged with creating the plan and building local capacity in emergency preparedness, a major benefit that addresses the need for better disaster education. Additionally, creation of a local recovery plan may have a net-positive impact by incrementally reducing local government spending, which could then be reallotted to other initiatives in the Planning Area.

The project would expend costs to employ staff, preferably through an existing community organization or educational institution, support material creation of the plan, and fund educational programming. Targeted outreach to the East Bronx Waterfront neighborhoods would ensure that all stakeholders have access to the plan and to preparedness education opportunities. The project should not negatively impact any groups.

Anticipated Risk Reduction

A local plan and community programming would reduce risk by providing clear information consistent with New York City policies regarding emergency planning, evacuation, and recovery. Planning efforts would be particularly beneficial to vulnerable populations by identifying resources and mobilization following an emergency event.

Timeframe

The project would take up to a year to fully implement. Local stakeholders who would work to develop plan priorities must be identified and staff members must be hired. Subsequently, the team would begin outreach to local organization to schedule programming and obtain feedback on recovery needs. The final plan should be created within 2 years of project initiation.

Regulatory Requirements

It is anticipated that a regulatory review is not required for execution of the project. NYC OEM and New York State Department of Homeland Security and Emergency Services should be consulted during the creation of a local plan to ensure coordination with citywide emergency preparedness efforts.

Jurisdiction

The project would fall under jurisdiction of the City of New York.

Locust Point Civic Association Resource Center and Resiliency Improvements

Proposed Project

STRATEGY:
Increase local preparedness and capacity for recovery

Recovery Support Functions

Health & Social Services

Community Planning

Cost

$700,000

Timeline (in years)

0 1 2 3

This project would provide funds for flood-proofing of the Locust Point Civic Association Center (the Center), a key community facility in Locust Point.

Project Description

The Locust Point Civic Association is the primary community organization in Locust Point. The Civic Association's building, which has served as the main community gathering center in the wake of past storm events, was flooded and badly damaged during Superstorm Sandy. In addition to serving in storm recovery, the facility provides a playground space, hosts classes for residents, and acts as the meeting place for the Civic Association. The property is owned by the City of New York and managed by the New York City Department of Citywide Administrative Services (DCAS). The facility is rented by the Locust Point Civic Association, and has been rented by the Civic Association for the purposes of housing a community center for more than 30 years. The property is within an extreme-risk zone, which makes the building vulnerable to future flooding and storm surge.

The project would include resiliency improvements to ensure continued use of the building following future storm events. Renovations and improvements would include installing a natural gas connection, elevating mechanicals, installing flood door and window barriers, applying interior and exterior waterproof coating, and installing sewer check valves. Additional resiliency measures may include installing a fixed backup generator and hardening mechanical and electrical systems.

Improving resiliency of the structure would allow the Locust Point Civic Association to effectively serve the East Bronx Waterfront Community (Community) after emergency events. The Center would leverage its strong, existing connection to area residents and continue to function as a day-to-day community space. Federal agencies and other local and regional emergency, health and human services organizations could use the Center as a staging area to provide services after future emergency events. The building could also serve as an official heating and cooling center for vulnerable populations in the East Bronx Waterfront Planning Area (Planning Area) if a new backup generator is installed.

Current Locust Point Civic Center

Current Locust Point Civic Center

The Civic Association is the sole tenant and has been serving the neighborhood for over 30 years, and it is the anchor of the Community. The East Bronx Waterfront Planning Committee (Committee) and residents feel very strongly that the Civic Association should continue to serve the Community after improvements are made to the building.

Cost Estimate

$700,000

The project cost would include installing a natural gas connection, elevating mechanicals, installing check valves and flood door barriers, applying interior and exterior waterproof coating to the structure walls, supplies and materials, construction costs, general contractor overhead and profit, and would take into account general construction contingencies. Additional improvements could include installing a backup generator and elevating/hardening mechanical equipment.

This cost estimate is based on engineer experience related with projects of similar scope and scale. Exact costs would depend on a finalized scope and a detailed engineering assessment of the structure.

Benefit/Co-benefits

Health and Social Benefits

The project would rehabilitate and harden an existing, heavily utilized community space. Residents would have a safe place to go after an emergency event for supplies and information. Responders and agencies involved in disaster relief would have a designated location for outreach to community members. The building also serves as headquarters to the Locust Point Civic Association and hosts a multitude of events for all ages throughout the year. Upgrades would ensure continuation of regular community programming by mitigating the impacts of flooding, power outages, and other storm damage.

Economic Benefits

Elevation and resiliency improvements would generate a small number of temporary

construction jobs. Hardening the Center may also incrementally reduce local government spending. Since emergency response would be centralized in one place, the Center could lessen costs of coordination and emergency response and recovery in the future.

Cost Benefit Analysis

The Locust Point Civic Association is an integral part of the East Bronx Waterfront Community, and the project has strong support from the neighborhood. The building is programmed with community events nearly every night of the week and also provides meeting space to local groups. The facility has been an effective nexus of recovery efforts in the past because it is the traditional gathering place for Locust Point residents. More than 10,000 people live within a mile of the building,[1] and Locust Point's location at the juncture of Cross Bronx Expressway and Throgs Neck Expressway makes it highly accessible to the rest of the Planning Area.

The project would greatly reduce the impact of flooding from future storms. This would directly benefit the City of New York, which owns the building and is responsible for maintenance. Upgrades could prevent lost rental revenue and construction costs to repair damage. The project may also reduce costs of other government responders by providing a designated center to efficiently coordinate recovery efforts while leveraging the Civic Association's connection to the Community.

The building provides a physical home for the Locust Point Civic Association, which is an important community entity. The loss of the building could erode the function and purpose of the Locust Point Civic Association, which would lessen the sense of community that exists in Locust Point.

The project would support only minimal direct and indirect, and induced full-time equivalent construction jobs during the construction period.[2] The main cost of the project would be related to design and construction, including materials, general contractor overhead, and profit. The Locust Point Civic Association and other groups may have to suspend events during the construction period, but they would benefit in the long term by making the building more resilient.

Anticipated Risk Reduction

Most of the residents in Locust Point live in vulnerable single-family houses in the flood plain. Hardening the Center would provide a safe, well-known location to access resources following a disaster, thus reducing the risk to this important community asset and the residents in the surrounding neighborhood. It is particularly important to have a designated recovery area in this neighborhood where residents are likely to suffer from the impacts of flooding and storm surge.

Timeframe

The project would take up to 2 years to complete construction. The timeline will depend on the site conditions and scope of required upgrades.

Regulatory requirements

It is anticipated that no regulatory review would be needed for the execution of this project. New York City Department of Buildings permits and other agency approvals might be required in the case of elevation and substantial renovations, but the extent of reviews would depend on final scope.

Jurisdiction

The proposed project would fall under the jurisdiction of the City of New York.

North Tower Firehouse Resource Center and Resiliency Improvements

Proposed Project

STRATEGY:
Increase local preparedness and capacity for recovery

Recovery Support Functions

Health & Social Services

Community Planning

Cost

$1 MILLION

Timeline (in years)

0 1 2 3

This project would provide funding for resiliency improvements to the North Tower Firehouse (the firehouse) to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.

Project Description

The North Tower Firehouse has a long history of serving the East Bronx Waterfront Community (the Community) during emergency events. Constructed in the mid-19th century, the building was originally used as a general store and later became the home of the Edgewater Park Volunteer Fire Department (the fire department). The fire department dates back to the late 1920s and has historically attracted the volunteer services of mostly Edgewater residents. During World War II, the fire department served as a Civil Defense Unit for response to air raids, and the company purchased the siren atop the building as a community warning system. Following Hurricane Donna, which devastated Danbury, CT, in 1960, the fire department provided the largest group of emergency workers from any New York City organization to aid in recovery and clean-up efforts.[1]

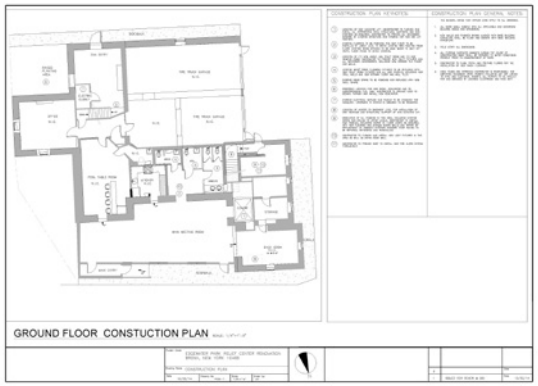
The fire department has also been heavily engaged in responding to more recent disasters. The building is located on high ground and was not impacted by Superstorm Sandy, making the building an ideal location for a resource center. The Federal Emergency Management Agency (FEMA) used Edgewater's firehouse as a disaster recovery center following Superstorm Sandy. The proposed project includes rehabilitating and hardening the structure so that the firehouse could adequately withstand storm events and support the Community after storm events.

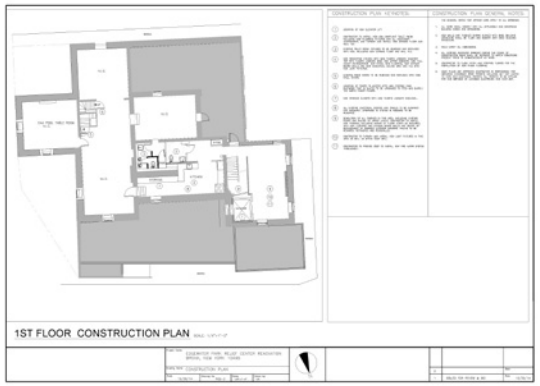
The project would include upgrades and rehabilitation to the following:

- Emergency power – A new generator and fuel tank would prevent loss of power in an emergency so that the firehouse could effectively serve as a staging area to coordinate disaster relief and recovery efforts.

- Upgrade electrical systems – The project would upgrade the dated electrical systems to ensure safety and maximize the capability of the facility to serve the Community in an emergency.

Current North Tower Firehouse Building





Proposed ground floor and first floor renovations plan for resource center. *Edgewater Park Owner's Cooperative.*

- Install an Americans with Disabilities Act (ADA) platform lift – The lift would make the two-story firehouse accessible to people utilizing wheelchairs and those who cannot climb stairs.

- Improve exterior and interior lighting – Improvements would include new interior and exterior lighting around the facility so that the facility would be a safe and usable space for emergency personnel and residents after an emergency.

- Harden roof, walls, and windows – The project would renovate the building envelope to ensure that the structure could withstand high winds and flooding during storm events.

Cost Estimate

$1,000,000

The project cost would include design and engineering, materials, construction costs, general contractor overhead and profit, and general requirements, and would take into account general construction contingencies. This cost estimate is based on engineer experience with projects of similar scope and scale. Exact costs would depend on a finalized scope and could vary as the project is further developed and refined.

Benefit/Co-benefits

Health and Social Benefits

The primary benefit of the project would be the creation of a reinforced building to serve the Community in the event of a disaster. The firehouse would also provide a space with sufficient size to organize and distribute goods, services, and programs during times of needed relief. By providing a hardened facility at the highest elevation in Edgewater Park, the firehouse would reduce health and safety risks for residents, including vulnerable populations. Additionally, the firehouse provides meeting space for the Edgewater Athletic Association. Rehabilitation would improve the building for these day-to-day community uses.

Economic Benefits

Hardening of the firehouse would generate a limited number of temporary construction jobs and may have a net-positive impact on local government spending. The project would harness local capacity of the fire department and provide a designated area for staging following emergency events. The firehouse would offer emergency responders and organizations involved in disaster relief with a set place from which to operate, minimizing time and coordination problems following an emergency.

Cost Benefit Analysis

The substantial benefits to the Community would justify the cost of improvements to the firehouse, which has served as a recovery center following past storm events because it is a locally well-known community center located within walking distance of a large number of Planning Area residents. Almost 28,700 people live within a mile of the building, 16% of whom are vulnerable seniors over the age of 65.[2] The rehabilitation of the building would ensure continued operation following loss of power or other storm-related impacts, and upgrade the building to make it ADA accessible, allowing it to better serve seniors and persons with disabilities who may need extra support during recovery.

The project would support 10 direct and 6 indirect and induced full-time equivalent construction jobs during the construction period.[3] Direct costs would include design and engineering, supplies and materials, construction costs, and general contractor overhead and profit. The strong leadership of Edgewater Park Owners Cooperative and the relatively short construction time would ensure that the project would be carried out with low negative impact to neighboring residents.

The improvements funded through this project may periodically require low-cost maintenance, but they have the potential to remain in good working condition for decades. The benefits of having an accessible community recovery center that serves the Community year-round would outweigh the costs of improvements.

Anticipated Risk Reduction

Resiliency improvements to the firehouse would have a high impact on reducing risk to the population by creating a safe and reliable recovery gathering place with the existing on-site staffing capacity of the fire department. Hardening the building would enable the firehouse to continue as a space that is open to the public and accessible following disasters thus reducing the risk to this important community asset and the residents in the surrounding neighborhood. In addition it will provide a location where residents could find help and learn about recovery resources.

Timeframe

It is anticipated that the project would take up to 2 years to complete construction. Timeline will depend on site conditions and scope of required upgrades.

Regulatory Requirements

It is anticipated that no regulatory review would be needed for the execution of this project. Depending on the scale of the renovation, New York City Department of Buildings permits and other agency approvals might be required.

Jurisdiction

The proposed project would fall within the property of the Edgewater Park Cooperative and within the jurisdiction of the City of New York.

Vulnerable Coastal Edge Protection—Street-End Study and Pilot Project

Proposed Project

STRATEGY:
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures

Recovery Support Functions

Natural & Cultural Resources

Infrastructure

Cost

$1.85 MILLION

Timeline (in years)

0 2 4 6

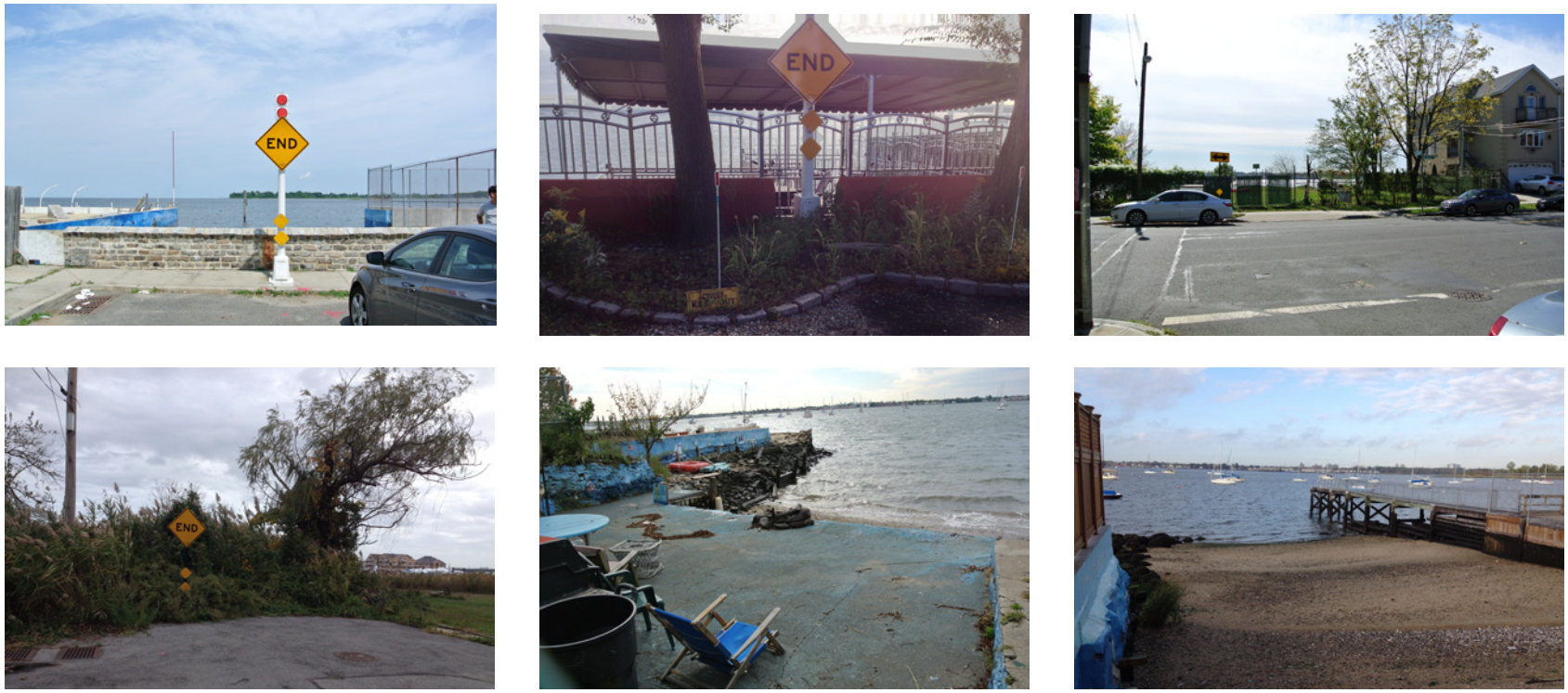
This study would examine the many different low-lying street-end conditions that will need to be addressed throughout the East Bronx Waterfront Community (Community) and identify possible coastal protection typologies that could be used to protect the street ends. Protecting street ends, in combination with treatments along private properties, will help to protect low-lying waterfront neighborhoods while presenting opportunities for increased public access and amenities. The project would fund up to three pilot projects identified in the study.

Project Description

Vulnerable street ends present opportunities to combine community waterfront access with flood-risk reduction by constructing coastal protection features and creating additional waterfront access. During Superstorm Sandy, the street ends, in addition to low-lying private property, were entry points for the flooding. Through the East Bronx Waterfront, there are 73 street ends that lie in flood-prone locations, increasing the likelihood of flooding on nearby streets and properties; 53 of the street ends are entirely publicly owned. Protecting street ends, in combination with treatments along private properties, may help to protect low-lying waterfront neighborhoods. The Community contains many examples of low-lying street-end conditions that will need to be addressed as part of shared public–private protection strategies. This project would develop a study to determine the cost and feasibility of coastal protection measures at the street ends to protect the Community against sea-level rise and target to protect up to a 100-year storm where feasible. The scope of this study would include the following:

- Existing condition analysis – The purpose of this task would be to identify the ownership and condition of street-end locations throughout the East Bronx Waterfront Planning Area (the Planning Area). It would also build upon existing efforts by the City of New York to analyze the potential impact from sea-level rise.

Figure IV–1: Conceptual Illustration of Street-end Protection Typology Example—Seawall Integrated into Pier and Overlook



Existing Street-end Conditions. Clockwise (starting from upper left), Publicly owned street-end; Privately owned street-end; Publicly inaccessible street-end location; Unmaintained street-end; Street-end maintained by individual or community group; Public beach at street end.

- Develop street-end protection typologies – This task would design typical street-end protection typologies that are scalable and applicable to multiple street ends in the Planning Area.
- Develop and apply prioritization methodology – This task would develop a decision support model to prioritize street ends that address risks to the surrounding assets in a cost effective way and strike an appropriate balance among multiple decision criteria.
- Final Recommendations – This task would organize and synthesize the approach used to create a prioritized list of implementable street-end interventions.

In addition to the study, the East Bronx Planning Committee (Committee) has allotted

Figure IV–2: Vulnerable Street-End Locations

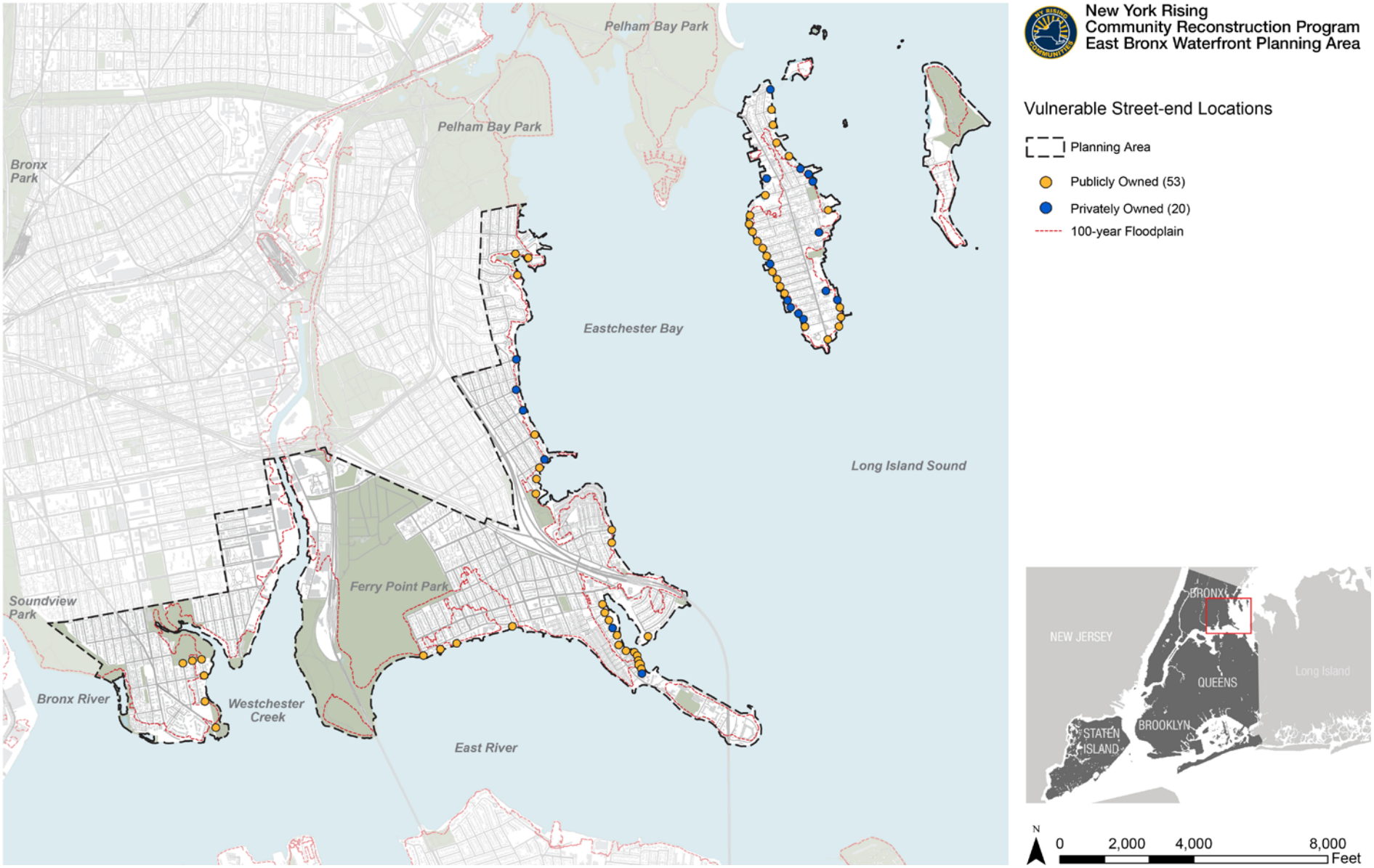


Figure IV–3: Drawing of Street-End Protection Typology Example—Seawall Integrated Into Pier and Overlook

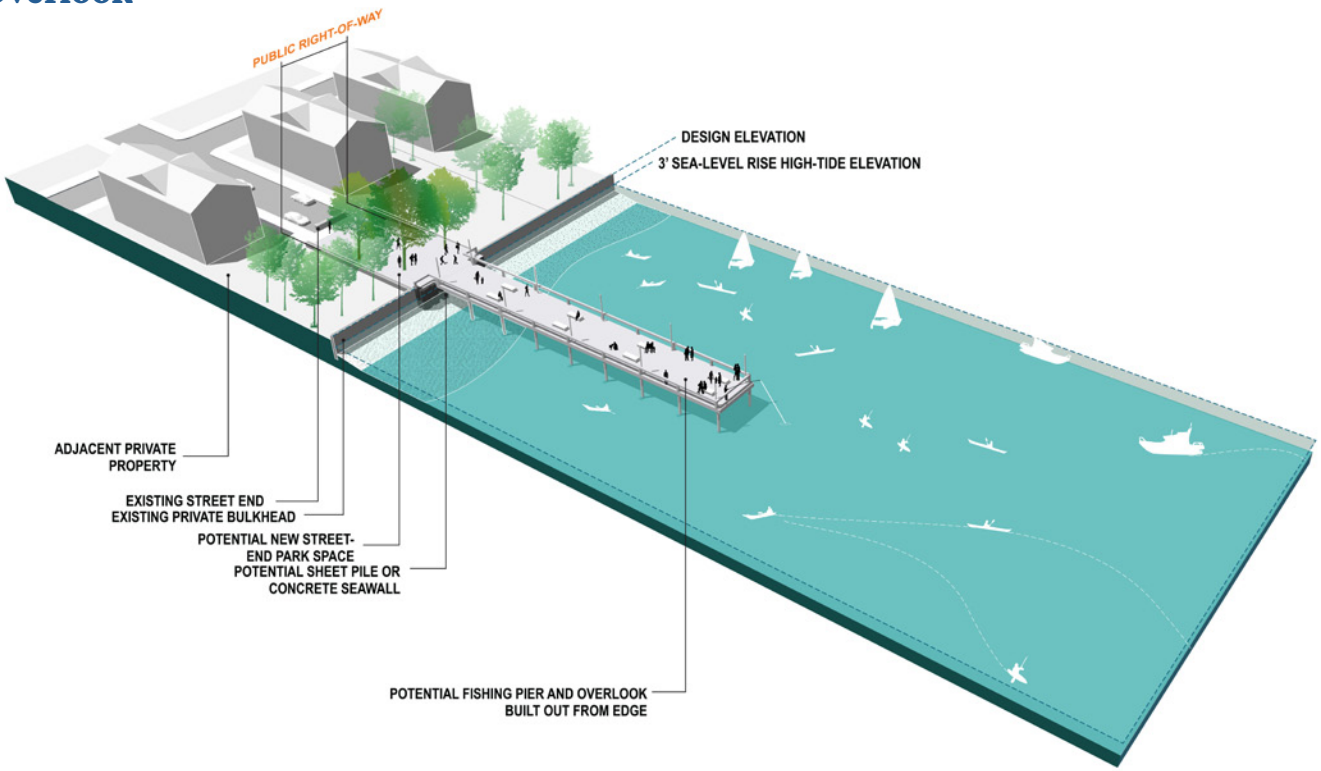


Figure IV–4: Cross Section of Street-end Protection Typology Example—Seawall Integrated Into Pier and Overlook

a significant amount of money to ensure up to three pilot projects that would be developed in the Community's most vulnerable neighborhoods. The Committee identified City Island, Throggs Neck, and Country Club as the neighborhoods that should be prioritized. The pilot projects would be sensitive to the specific context of the neighborhoods and would be developed with guidance from the Community.

There is a high concentration of street ends in City Island, where a significant portion of the northern end of the island lies within the future 100-year floodplain. The Committee would want to see a minimum of one of the pilot programs occur in this area in order to illustrate to the residents and businesses on City Island the extent to which protection measures would be needed to combat future sea-level rise and surge impacts.

The street-end reconstruction could establish precedents for treatments throughout the Community, New York City, and the entire region.

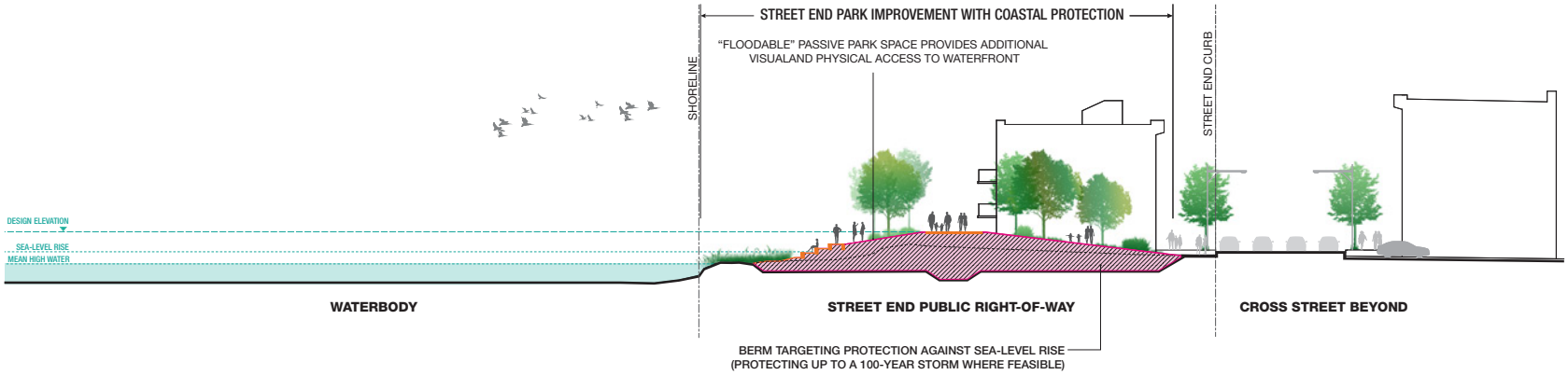
Cost Estimate

Study: $400,000

Pilot Projects: $1,450,000

The estimated cost covers the scope of analysis described previously and does not include physical construction costs. This conceptual-level cost estimate is based on planner and engineer experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined. The Committee has allotted $1,450,000 for up to three pilot projects with the intention that this significant commitment of funds would leverage

Figure IV–5: Cross Section of Street-End Protection Typology Example—Berm



additional funding from agencies (to be determined) that would contribute the remaining funds to construct and manage these projects, and follow through with the construction of the coastal protection measures on street ends throughout the Planning Area.

Benefits/Co-benefits

Environmental Benefits

The restoration would increase ecosystem function in the area by restoring and enhancing damaged street ends. In the long term, the project would also provide the surrounding Community with passive recreational open space.

Health and Social Benefits

Open space improvements for all users contribute to the overall physical and mental health of the Community. This project could lead to additional public access that would create new passive recreational uses such as fishing.

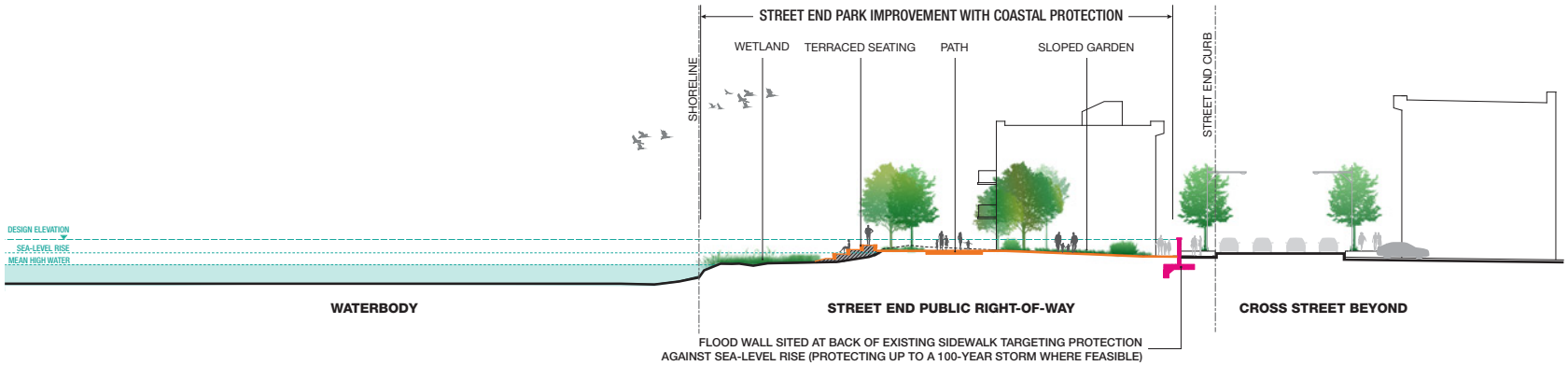
Economic Benefits

This study could lead to the construction of a coastal protection strategy for the Planning Area, which would help minimize economic losses, including losses to facilities, homes, and businesses adjacent to vulnerable streets ends. Addressing the neighborhood's flood risk will be critical to addressing the rising costs of repairs following storm events and ensuring long-term economic stability for residents.

Cost-Benefit Analysis

The proposed project has high potential to set the stage for completion of a comprehensive coastal protection strategy for the Planning Area and other areas in New York City. The future projects could result in a wide range of benefits, including risk-reduction benefits for residents and business owners, as well as environmental benefits.

Figure IV–6: Cross Section of Street-End Protection Typology Example—Flood Wall



While such a study cannot be evaluated on physical risk reduction, the need for such an investment can be evaluated based on the magnitude of the risk to the Community. In the Planning Area, within the 100-year floodplain there are currently:

- 73 street ends that are vulnerable in future storms
- 4,072 buildings, representing 8,953,319 square feet of floor area
- 5,571 residential units, many of which are masonry or brick construction and/or have basements, making them difficult to elevate, and causing building level flood adaptation to be a challenge

The potential far-reaching benefits would justify the cost of the proposed study, which would be a necessary precursor to implementation of the pilot and future street-end projects.

Risk Reduction

The study itself would not reduce risk to the Community's assets and population, but would provide an opportunity to assess the feasibility of mitigation strategies through construction of berms and grey infrastructure that would reduce the risk of habitual and hurricane-related flooding. In addition, if individual homeowners raise their bulkheads but the public street ends are not protected then the flood risk remains to those neighborhoods.

While the type and scale of interventions would vary and would be developed and refined through design and engineering, it is important to note, that a complete, interconnected suite of protection measures would need to be constructed to provide portions of the Planning Area with protection from future storm surge events. Without such an interconnected system, the area would remain vulnerable to flooding through remaining low points, even potentially during lesser storms.

Timeframe

The timeframe for completion of the study would be 9 to 12 months from the commencement of the study. The pilot project would be completed 2–3 years once commenced. If the pilot project extended into the water, the pilot project would likely take an additional 3–5 years.

Regulatory Requirements

Street ends may fall under New York City Department of Transportation (NYC DOT) jurisdiction; however, they could also fall under the New York City Department of Parks and Recreation (NYC DPR). Involved agencies would be the NYC DPR, NYC DOT, and New York City Department of Environmental Protection. The protection measure would need to go through an environmental review process. This may also involve the New York State Department of Environmental Conservation, U.S. Army Corp of Engineers, Coastal Zone Management consistency concurrence, and New York State Department of State, depending on the extent of the development of the pier amenity.

Jurisdiction

The project would be under the jurisdiction of the City of New York.

Edgewater Park Pumping System Hardening

Proposed Project

STRATEGY:
Improve and increase the capacity of stormwater management infrastructure

Recovery Support Functions

Infrastructure

Cost

$150,000

Timeline (in years)

0 1 2 3

This project would harden the sewage pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.

Project Description

The Edgewater Park Cooperative has a private pumping system that pumps stormwater and sanitary water out of the cooperative and into the New York City Department of Environmental Protection system. Three of the six pumping stations sit directly behind the seawall on the edge of the property and two additional ones are set in low-lying areas prone to inundation from a significant storm event. The system is vulnerable during storm events because the control panels sit below the Base Flood Elevation (BFE) and the electrical panels and wiring are not appropriately hardened to withstand floodwaters. During Superstorm Sandy, the panels become flooded and the system ceased to operate, thus causing backups in the streets and in individual homes. This project would harden the system by raising the control panels and protecting the wiring system from floodwaters.

Cost Estimate

$150,000

The cost estimate is based on engineer experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined. Costs do not include a redundant energy supply if the larger electrical system in the Cooperative goes down. A redundant power supply should be considered as part of a larger resiliency strategy.

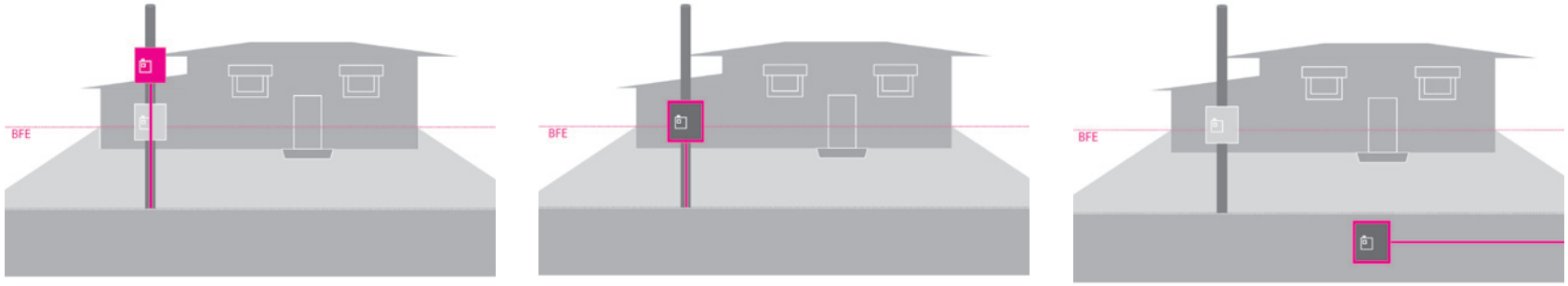
Benefit/Co-benefits

Economic benefits

Within the Edgewater Park Cooperatives, there are 965 residents living in 278 homes that lie within the future 100-year floodplain. Low-lying homes are the most likely to benefit directly from a hardened pumping system. However, since all 615 homes run off the system, whenever the system goes down, there is a risk of pervasive backup throughout the network. Hardening the system would relieve the potential for backups throughout the Cooperative.

Environmental Benefits

Having the system operate during storm conditions would minimize the potential for stormwater



The three options to harden the pumping system: lift, harden, and submerge & waterproof.

and sewage to backup through the larger sewer system and out into the Long Island Sound along with tidal flush, which would compromise the local water quality in the short term.

Cost-Benefit Analysis

Without the project, the 615 homes in the Edgewater Park Co-op would continue to be at risk to sanitary and stormwater system backups during future storms. While protection measures associated with the project would protect those homes, the 100-year floodplain extends well beyond the boundaries of the Cooperative, so this would be a protection measure isolated to a distinct connected piece of infrastructure within a larger low-lying community of homes.

Risk Reduction

Although the project would not protect the area from storm surge, it would lessen the impacts from more frequent storm and heavy rain events. The project would reduce the flooding damage to residents' basements and ground floors that experience damage from backups within homes when the system shuts down. The protection of pumping system would have only minimal protection and would not protect against the 100-year flood condition.

Timeframe

It is anticipated that construction of the project would be completed within 1 year.

Regulatory Requirements

It is anticipated that no regulatory review would be needed for the execution of this project.

Jurisdiction

The proposed project would fall within the property of the Edgewater Park Cooperative and within the jurisdiction of the City of New York.

Ferry Point Local Street Improvement Project

Featured Project

STRATEGY:
Improve and increase the capacity of stormwater management infrastructure

Recovery Support Functions

Natural & Cultural Resources

Infrastructure

Cost

$375,000–$2 MILLION

Timeline (in years)

0 1 2 3

This project would repave and regrade up to three local streets in the Ferry Point neighborhood. A similar green infrastructure approach to roadway paving could be replicated in similar neighborhoods with streets where the mapped width exceeds the built width in the East Bronx Waterfront and throughout New York City.

Project Description

The three east-west cross streets in the Ferry Point neighborhood are extremely flat. The lack of grade change coupled with the fact that many of the addresses lack curbs, makes for ponding conditions and curtails water flow to street end catch basins. During heavy storm events, the streets flood, cutting off access, and area homes experience basement flooding. During Superstorm Sandy, the neighborhood was isolated when the flooding along local streets cut off access.

This project would develop a roadway drainage strategy for Wenner Place, Rohr Place, and Senger Place in the Ferry Point neighborhood that would be compatible with the local street context. The current streets do not conform to New York City Department of Transportation (NYC DOT) standards because of right-of-way encroachment from pre-existing residential uses. This green infrastructure strategy would strike a balance between repaving requirements and current built roadway conditions by grading mid-block and adding curbs to promote drainage within current built roadway widths. The East Bronx Waterfront Community (the Community) would work with NYC DOT to develop a design that would be acceptable to both parties.

The elements of the street reconstruction would include the following:

- Repave and re-grade the street bed
- Install curbs
- Install new catch basins at the street ends (where needed)
- Possibly construct sidewalks

Figure IV–7: Ferry Point Proposed Drainage Strategies

The reconstruction of the streets with proper grading and curbs would allow the water to flow into the New York City stormwater system rather than pond on the streets or flow into private residences.

Cost Estimate

$375,000: Allotted

$2,000,000 + : Total Cost

The East Bronx Waterfront Planning Committee (Committee) has allotted $375,000 to the project with the intention that this significant commitment of funds would leverage additional funding from New York City agencies that would contribute the remaining funds to construct this project.

The total coast is a conceptual-level estimate that is based upon engineer experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined. Additional costs for the installation of catch basins would be incurred by New York City Department of Environmental Protection (NYC DEP), where needed, to ensure proper drainage at street ends in coordination with NYC DOT.

The reconstruction would need to be coordinated to connect to existing curb and sidewalk conditions in place on all three blocks, creating a somewhat discontinuous street condition within the neighborhood. If sidewalks are not incorporated, pedestrian mobility and safety along the streets could be compromised.

Benefit/Co-benefits

Economic Benefits

This project would benefit residents, who currently have to use their own funds and resources to address direct stormwater runoff from the streets into their properties.

Environmental Benefits

The repaving would create neighborhood continuity in this three-block residential hamlet, organize travel lanes and parking, and enhance the look of the Community.

Cost-Benefit Analysis

Street reconstruction projects are often a typical element in the annual capital budget for New York City. This particular Community has not seen repaving or re-grading because the mapped right-of-way exceeds the built right-of-way, and Community residents have been concerned about having the built roadway encroach more closely on small front- and side-yard conditions. By working out a compromise solution and incentivizing the responsible capital agencies to take on a non-conforming project, a long-standing reconstruction desire can be achieved.

Risk Reduction

The project would lessen the impacts from heavy rain and storm events. With limited accessibility in and out of this neighborhood, ponding and flooding can create hardship and even basement flooding to the 35 homes that line these streets during heavy rain and flooding events. The reconstructed streets would reduce the risk of homes becoming inaccessible from flooding, enhance mobility, and improve access for first responders.

Timeframe

It is anticipated that construction of the project would be completed within 1 to 2 years.

Regulatory Requirements

The project would require review and approval of NYC DEP and NYC DOT with the possibility of design and construction by the New York City Department of Design and Construction.

Jurisdiction

The project would be in the jurisdiction of the City of New York.

Figure IV–8: Roadway Drainage Improvement Design Profile and Plan

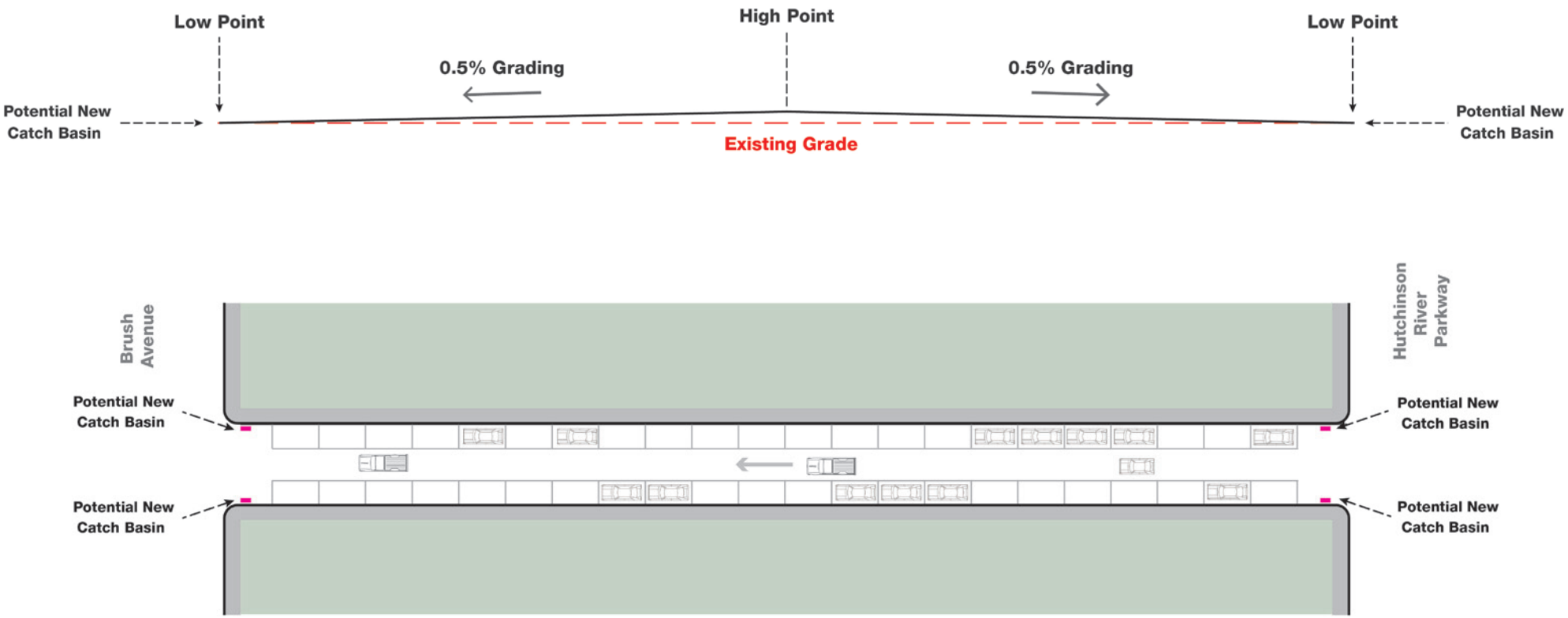


Figure IV–9: Proposed Roadway Design Option 1—New Curbs without Sidewalks

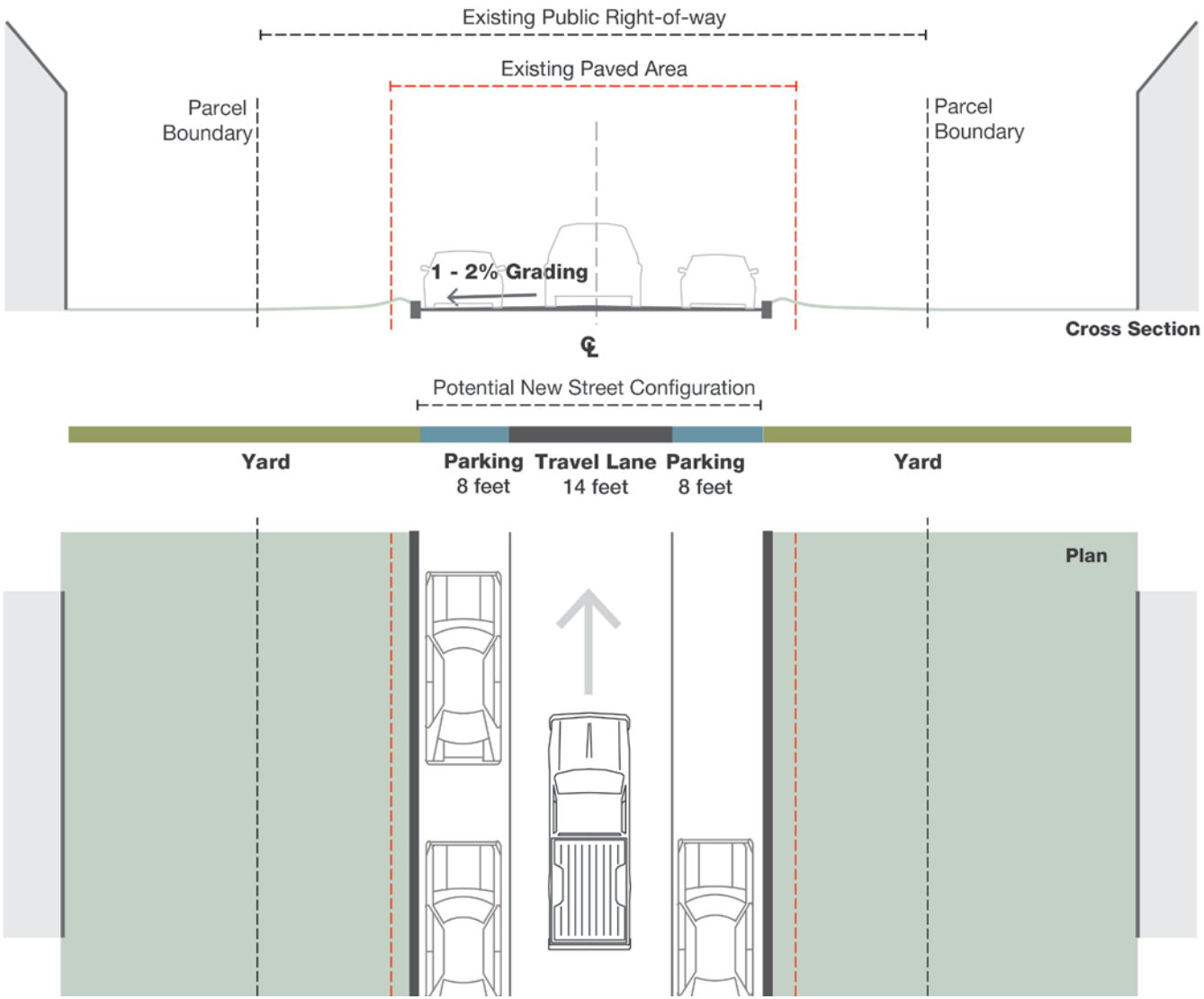
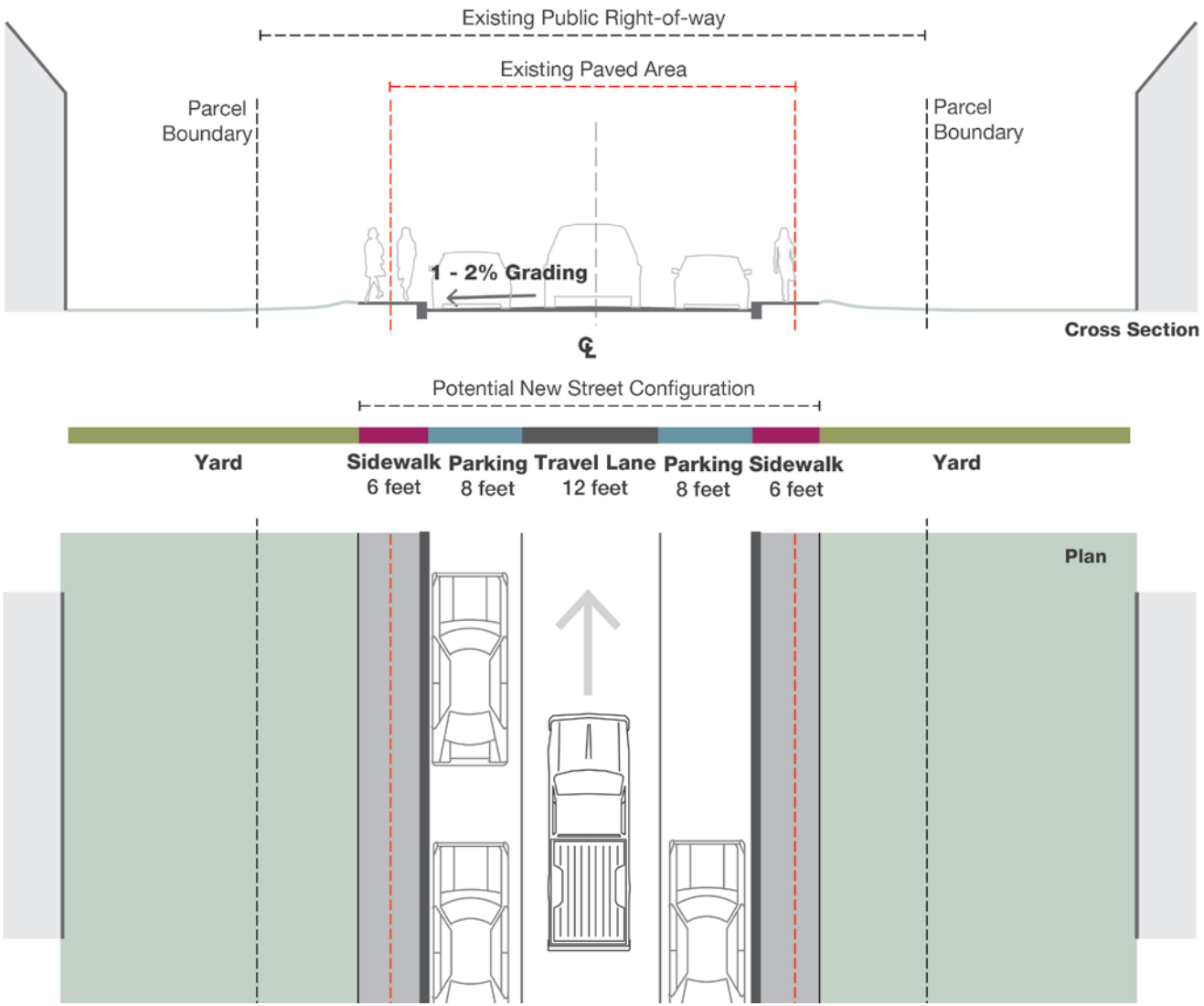


Figure IV–10: Proposed Roadway Design Option 2—New Curbs with Sidewalks



Westchester Creek Waterfront Study

Proposed Project

STRATEGY:
Ensure economic resiliency for businesses and property owners in flood-prone areas

Recovery Support Functions

Community Planning

Natural & Cultural Resources

Economic Development

Cost

$200,000–$400,000

Timeline (in years)

0 1 2 3

This project would provide funding for a study to re-envision the Westchester Creek waterfront. Waterfront access is limited along the creek but the many underutilized lots create an opportunity to transform Westchester Creek into a resilient, accessible community asset.

Project Description

The Westchester Creek waterfront has industrial uses on both sides that prohibit waterfront access to Westchester Creek. The East Bronx Waterfront Community (Community) has expressed a desire to transform the area and to reconnect the Community to the waterfront. During Superstorm Sandy, the shoreline of the Creek was an entry point to storm surge into the surrounding neighborhoods. The project is the development of a plan that could establish new active and passive recreational open space and public access for the Westchester Creek waterfront (between the East River north to the Cross Bronx Expressway).

The plan would have the following elements:

- Identify and address local areas that are prone to flooding.
- Identify areas where land use turnover could address the lack of pervious surface along the Creek.
- Design future public amenities that create waterfront access and establish a multi-use path to connect to existing parkland.
- Create a better sense of place by reconnecting neighborhoods to the waterfront and reestablishing connections to neighboring areas.

Cost Estimate

$200,000: Allotted
$400,000: Total Cost

The East Bronx Waterfront Planning Committee (Committee) allotted $200,000 to the study with the intention that this significant commitment of funds would leverage additional funding from local partners that would contribute the remaining funds. The total cost of the study includes the following tasks:

- Existing condition analysis – The purpose of this task would be to provide a baseline understanding of the Community context

Figure IV–11: Potential Pilot Proposal—Brush Avenue Complete Street Conceptual Rendering

and existing physical and socioeconomic conditions of the Westchester Creek waterfront study area. It would also build upon information developed by ongoing studies and serve as a springboard for future vision and policy formation.

- Community vision for Westchester Creek – This task would develop design, infrastructure, and land use planning concepts that would help guide the future development and improvement of the Westchester Creek study area over a 50-year planning horizon.

- Final Recommendations – Based on the feedback from the client, Committee, and members of the public, the consultant team would craft a set of final recommendations related to land use, urban design, connectivity, recreation, and resiliency.

- Implementation schedule – Provide an overview of early action items and a longer-term implementation schedule, assign priorities, and identify responsible parties to begin carrying out the main objectives of the Vision Plan.

The conceptual-level cost estimate is based on projects of similar scope and scale, and would likely vary as the project is further developed and refined. The scope would be scalable based on the final amount contributed by local partners.

Benefits/Co-benefits

Environmental Benefits

The plan would be the first step in transforming the Westchester Creek waterfront. The potential to increase parkland and pervious surfaces surrounding the creek would translate in better water quality by filtering the stormwater before it discharges directly into the creek. There are potentially 40 lots and over 3.8 million square feet of underutilized land adjacent to the creek. The plan could significantly increase ecosystem function in the area by restoring and enhancing the underutilized land as parkland.

Health and Social Benefits

Parkland improvements for all users contribute to the overall physical and mental health of the Community. This plan would lead to recommendations for ways of improving conditions for recreational uses, addressing any existing safety concerns.

Economic Benefits

The study would look at opportunities to enhance the neighborhoods in close proximity to Westchester Creek through improving access, greening, and open space in the Community.

Cost-Benefit Analysis

The area surrounding Westchester Creek contains approximately 12 residential buildings and 31 commercial or industrial buildings within the 100-year floodplain. The study would identify locations where coastal protection features combined with park amenities could protect the buildings at risk. In addition, the potential 3.8 million square feet of underutilized land could be used to create new parkland and development opportunities that would strengthen the local economy. If the study is not funded, the Community would continue to be encroached upon by industrial uses and the potential to incorporate coastal protection features would go unrealized.

Risk Reduction

There are a significant number of homes and businesses in the 100-year floodplain. The study itself would not reduce risk to the Community's assets and population, but would provide an opportunity to assess the feasibility of mitigation strategies through park amenities that would have an impact on risk reduction in the future. The potential natural parkland drainage improvements would reduce the frequency and intensity of flooding from rain events and the

damaging effects of these events on property and infrastructure. The protection of individual properties would only minimally protect the entire area and would not safeguard against a 100-year flood condition. The study would examine a holistic, waterfront protection strategy for the neighborhoods surrounding Westchester Creek.

Timeframe

The timeframe for completion of the study would be 12–18 months from the commencement of the project.

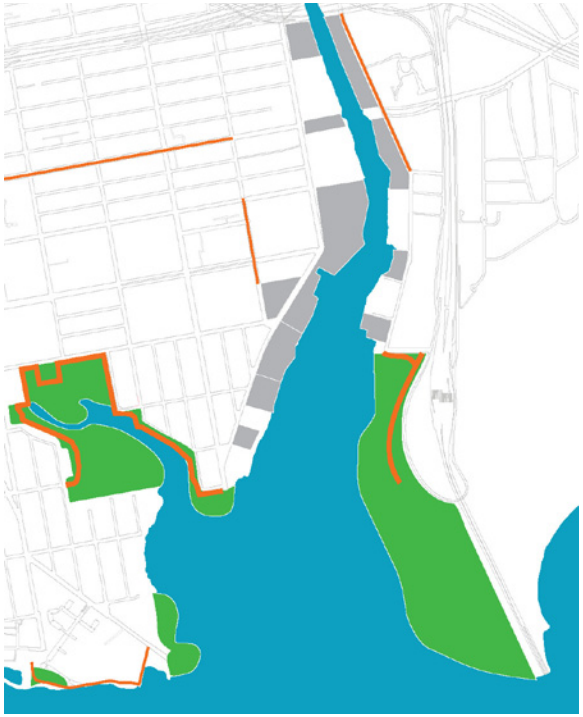
Regulatory Requirements

There are no regulatory review requirements for the study, but there would be necessary coordination with New York City Department of City Planning, New York City Department of Parks and Recreation, New York State Department of Environmental Conservation, and New York City Department of Transportation.

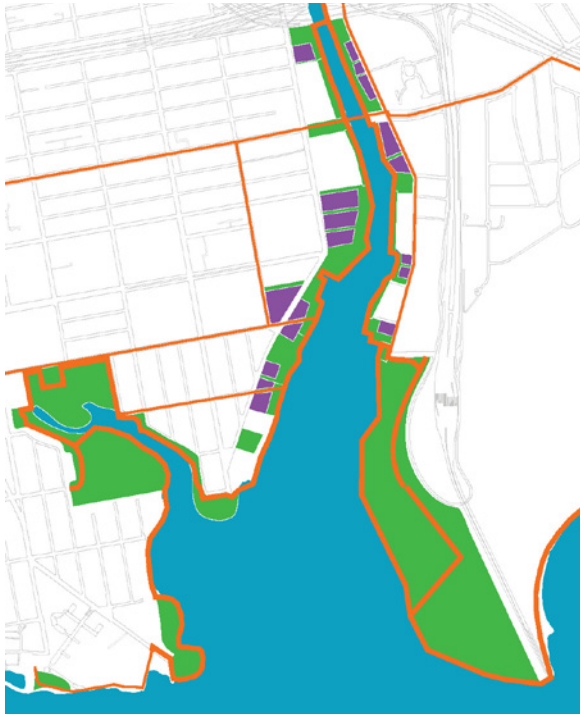
Jurisdiction

The project would likely be under the jurisdiction of the City of New York.

Existing land use conditions along the Westchester Creek Waterfront



Existing Condition



Proposed Vision

Bike or Pedestrian Connection

Open Space

Water Body

Challenges:

- Waterfront access & recreational opportunities are limited
- Bike & pedestrian path is fragmented
- Underutilized lots create opportunity for transformative redevelopment

Opportunities:

- Waterfront access & recreational opportunities are improved
- Bike & pedestrian paths are continuous
- New land uses revitalize the waterfront

Figure IV–12: Westchester Creek Waterfront Study Vision

This is for illustrative purposes only. The recommendations for the Westchester Creek study area will be determined by the study.

Community Facility Resiliency Capital Fund

Featured Project

STRATEGY:
Increase local preparedness and capacity for recovery

Recovery Support Functions

Community Planning

Health & Social Services

Economic Development

Cost

$1 MILLION

Timeline (in years)

0 1 2 3

This project would fund resiliency improvements for critical community buildings and facilities that serve vulnerable populations. Resiliency measures could include flood-proofing, raising mechanical and electrical equipment, and purchasing and installing backup generators.

Project Description

Residents in the East Bronx Waterfront Planning Area (Planning Area) realized after Superstorm Sandy that they relied heavily upon their community facilities in the event of an emergency. These facilities become the sanctuaries for the displaced and those who have lost power, information centers, and gathering places for those affected by the incident and in need of supplies, support, and comfort. Many of the senior housing, nursing homes, adult day-care centers and community centers that serve an important community need are at risk from future storm damage within the Planning Area. Providers operating critical facilities may not be able to obtain loans at market interest rates to make resiliency improvements. This project would create a pool of grants, low-interest loans, or low finance or forgivable loans to finance improvements exclusively for critical community buildings, including health and social service facilities that serve vulnerable populations.

Selection of sites and participating organizations would occur through a rolling competitive application process. Eligible organizations must be able to demonstrate that they serve residents of the Planning Area and require resiliency improvements. Applicants would also request funding for specific improvements at the time of application. Examples of resiliency upgrades include the following:

- Install fixed, on-site backup generators.
- Elevate mechanical equipment above the Base Flood Elevation.
- Flood-proof equipment within the base flood elevation.
- Install temporary flood barriers.
- Elevate lowest floor above the Base Flood Elevation.

Left, City Island Nautical Museum exhibit; Middle, Jeanne Jugan Residence; Right, Public meeting

- Wet flood-proof interior space.
- Make structural improvements to resist wind or storm surge.
- Improve generator efficiency.
- Provide stairwell lighting.
- Increase thermal performance of exterior walls.

The fund could be administered by a New York State or New York City agency, or a community development financial institution. The project would support a program officer working within the organization to administer the fund. The program officer would perform outreach to eligible organizations, provide technical assistance to applicants throughout the application process, and manage loan or grant approvals.

Cost Estimate

$1,000,000

To effectively serve this large Community and its many at-risk facilities, it is anticipated that $1 million would be set aside to ensure that multiple facilities would be able to take advantage of the opportunity to make resiliency improvements. Of this amount, approximately $100,000 would support staffing and indirect costs to administer the program though an existing organization for a period of one year. The remainder would be awarded through a competitive process for capital improvements to community facilities.

Typical costs for resiliency improvements to a 7,000-square-foot facility range from $1,000 for installation of backflow prevention devices to over $200,000 for a fixed diesel or natural gas generator. These estimates are based on engineer experience with projects of similar scope and scale, and would vary depending on selected facilities and specific needs.

Benefit/Co-benefits

Health and Social Benefits

Improvements to facilities that serve vulnerable populations increase their chances of continued operation after a storm event. Because vulnerable populations are often disproportionately affected by emergency events, it is vital that organizations with connections to these populations are active in recovery. Hardening

community buildings allows the entities operating out of key facilities to reopen quickly following emergencies and continue providing basic physical and/or mental healthcare as well as access to food and medicine. There are many neighborhoods within the Community that have expressed a desire for a physical community gathering space. This fund could encourage organizations and their surrounding communities to partner to create and enhance community functions in neighborhoods that lack a central community center.

Economic Benefits

The project will add one part-time loan officer job. Additionally, capital expenses associated with resiliency improvements would generate a small number of temporary construction jobs. The precise number of construction jobs would depend on number and type of improvements, type of facility, and building typology. In general, supporting community facilities strengthens the sense of community within a neighborhood and encourages residents to be more involved and active in community efforts, strengthening the local economy.

Cost Benefit Analysis

Through financial assistance to harden critical facilities, this project would provide health and social benefits to local residents, risk-reduction benefits to selected organizations that serve vulnerable populations, and additional social and economic benefits to the Community. Major benefits associated with the project include continued provision of services to vulnerable populations following a storm event. The Planning Area is home to the following:

- 6,900 senior residents over the age of 65 (15% of total population)
- 240 institutionalized persons (0.5% of total population), many of whom reside in nursing homes and adult care facilities with the Planning Area
- 2,500 households with incomes below the Federal Poverty Level (15% of total households)[1]

It is important that facilities serving these populations return to operation following a disaster to prevent social disconnectedness and negative health impacts. Resiliency improvements should mitigate damage to the buildings, which increases economic stability of the providers. The project would also support salary and benefits for a 0.25 full-time equivalent (FTE) program officer for one year,[2] and approximately four direct and two indirect and induced FTE construction jobs over the same period.[3]

The main costs associated with this project are associated with program administration, construction, and maintenance. Specific construction and maintenance costs would depend on selected sites and scope of improvements. For instance, providers who need generators would incur costs to test the generator monthly and to ensure that it continues to work in the case of an emergency. Administration costs assume that the program would be run by an existing, experienced agency or organization that could limit costs to staffing and reasonable overhead. There are no negative externalities associated with the program, and the project would not negatively impact any specific group. The Community Facility Resiliency Project would benefit vulnerable populations and the Community as a whole. The far-reaching benefits would justify the cost of this project.

Anticipated Risk Reduction

Capital improvements to community facility buildings directly reduce the risk of flooding and storm damage. Facilities that receive a funding award and make upgrades would reduce adverse storm impacts to residents who reside in or utilize these buildings, particularly vulnerable populations.

Timeframe

Implementation would begin with a competitive

process for organizations meeting established criteria for community facilities. The competitive process could take 3–6 months. Depending on the chosen facilities and the scope of resiliency upgrades, the construction phase for each building could take up to 1 year.

Regulatory Requirements

It is anticipated that a regulatory review would not be required to execute the project. Implementation may require permitting from the New York City Department of Buildings and coordination with several additional entities, including the New York City Fire Department, Con Edison, and/or National Grid.

Jurisdiction

The project would fall under jurisdiction of the City of New York.

Building Flood Audit Program

Featured Project

STRATEGY:
Ensure economic resiliency for businesses and property owners in flood-prone areas

Recovery Support Functions

Housing

Economic Development

Cost

$750,000

Timeline (in years)

0 1 2 3

This project would provide technical assistance to homeowners who want to retrofit their buildings to mitigate future storm damage.

Project Description

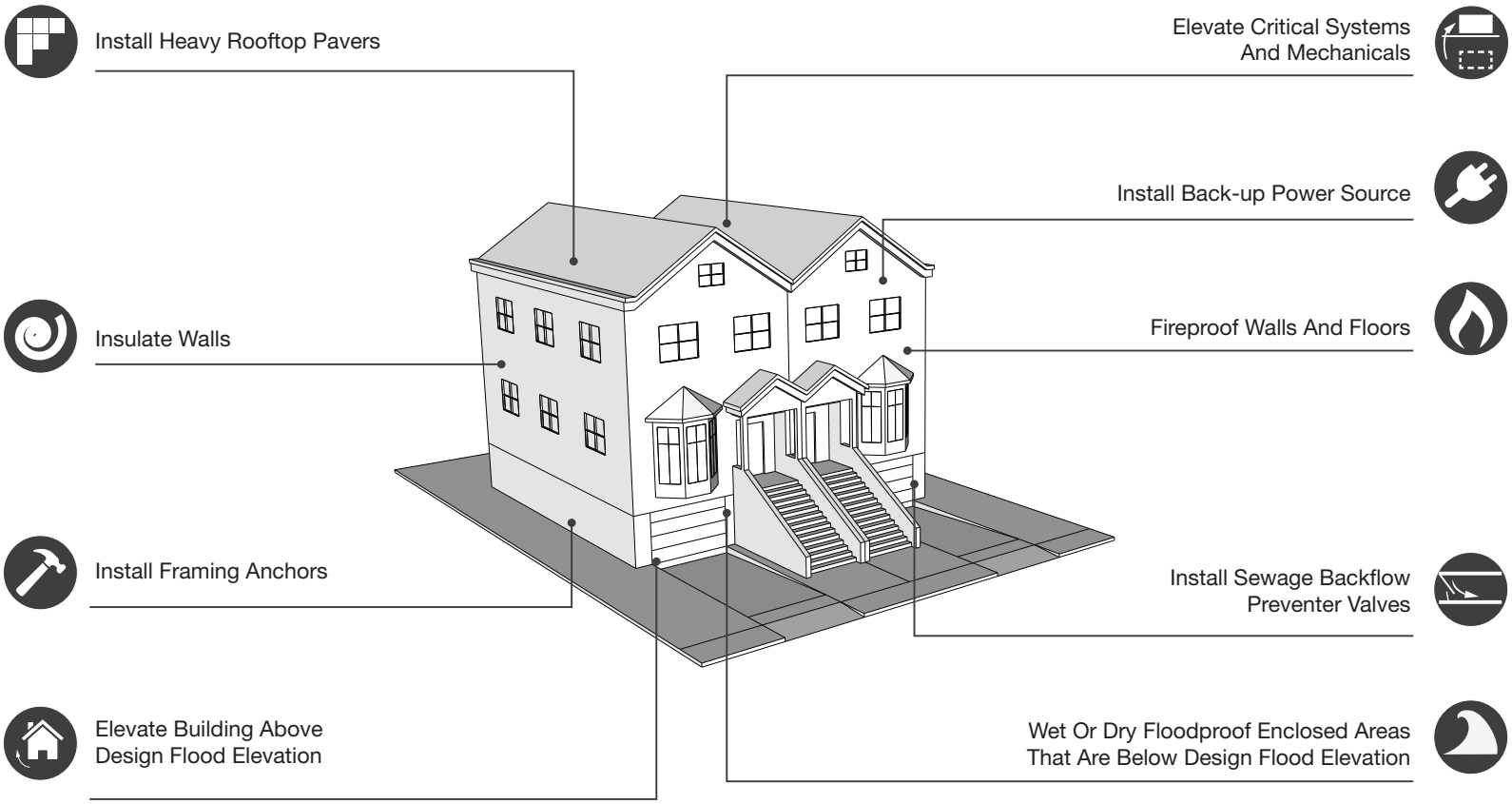
The East Bronx Waterfront Planning Committee (Committee) recognizes that there are homes of many shapes and sizes throughout the East Bronx Waterfront Community (Community) that lie in the 100-year floodplain. Many residents are unsure as to whether they need to consider additional protection and how best to make their homes more resilient in this era of climate change.

New York City first adopted elevation standards in the Building Code in 2003 to require the lowest floor of a building to be raised above the National Flood Insurance Program's recommended Base Flood Elevation plus an additional foot to compensate for unknown factors (known as freeboard).[1] Approximately 90% of the housing units in the Community were built prior to 2000 when elevation was neither required nor common.[2] As a result, many buildings in the floodplain constructed prior to the code change are particularly vulnerable to future flooding from storms and rising sea levels.

Neighborhood-wide coastal protection infrastructure solutions are likely to be long-term and costly construction projects, making individual home resiliency improvements a critical component of the overall resiliency plan for the Community. A Building Flood Audit Program may encourage residents of the East Bronx Waterfront Planning Area (Planning Area) to adopt shorter-term, building-level protection measures that decrease the risk related to future storm damage.

The resiliency audit program would provide recommendations for building-specific improvements. To qualify for the Building Flood Audit Program, a participant would have to own a primary residence in the Federal Emergency Management Agency (FEMA)-designated Flood Insurance Rate Map (FIRM) Special Flood Hazard Area. Homeowners would first apply for an in-person, on-site physical assessment performed by a qualified professional contractor. These audits would result in a discrete list of recommended retrofits to mitigate against future storm damage and the expected market

Figure IV–13: Potential Technical Assistance Provided by the Building Flood Audit Program



Urban Green Council, Building Resiliency Task Force, http://urbangreencouncil.org/content/projects/building-resiliency-task-force, pg. 11. NYC DCP, Retrofitting Buildings for Flood Risk, October 2014, http://www.nyc.gov/html/dcp/pdf/retrofitting/retrofitting_complete_online.pdf, pp. 49-51

cost of each improvement. Homeowners could then make informed investments in improvements based on their risk assessment. The Committee would encourage that the program produce educational materials to disseminate throughout the Community so that all residents can understand the boundaries and requirements of the audit program.

A New York State or City agency or Citywide organization with extensive experience in homeowner outreach programs would administer the Building Flood Audit Program. The administering entity would be responsible for ensuring that participants met program requirements, as well as contracting with the engineers and/or building inspectors that perform the building audits. The agency or organization should provide additional technical assistance by connecting participants with basic resiliency resources, recommendations on financial sources for constructing improvements, and individual homeowner counseling referrals to help owners evaluate cost benefit of upgrades.

Cost Estimate

$750,000

This approximate cost is anticipated to appropriately fund a program of this nature. This estimate is based on projects of similar scope and scale and would likely evolve as the project is further developed and refined.

Operating costs to administer the program through an existing organization would be less than $100,000 annually, including costs for a part-time program officer to conduct outreach, collect and triage applications, and schedule building audits.

The remaining allocation would support physical audits, estimated to range between $750 and $1,000 per home. This estimate is based on existing programs that provide similar services. The project would fund between 700 and 900 audits based on the funding allotted, and the administering entity should seek to leverage outside funding to increase the number of homeowners who could take advantage of the program.

Benefit/Co-benefits

Economic Benefits

An audit program would increase resiliency of homes in the Planning Area by giving residents access to knowledge about potential resiliency improvements. Housing is a critical economic asset in the Planning Area, and greater protection of homes would allow the Community to recover more quickly after a storm event.

Health and Social Benefits

More than 50% of Planning Area residents own their home.[3] If homeowners receive an audit and make improvements to protect their homes, it would increase financial stability for a large portion of the population. Mitigation of future risk contributes to the well-being of residents and overall neighborhood health.

Cost Benefit Analysis

The Community expressed a need for better education and guidance related to how they could protect themselves against future storms. This project provides homeowners with strategies to bolster their home against damage in the short term. The 9,340 single-family homes in the Planning Area have a median value of $505,6604 and approximately 3,450 are located in the 100-year floodplain. This program would provide no-cost audits for 20% to 25% of those floodplain homes, which is particularly important because up to 2,250 of the highly vulnerable floodplain homes are estimated to be owned by low- or moderate-income individuals.[5] Using the average FEMA Individual Housing Assistance Award for Sandy Victims in New York as a proxy for cost of future hurricane damage, the value of making resiliency improvements with a 10% discount would be more than $800 per home in any given year, meaning the homeowner would realize the

Houses in 100-year floodplain

value of their investment within 11 years.[6] As the improvement would offer protection for a longer time period, resiliency improvements identified through the audit would provide a clear economic benefit.

Costs of the program include the cost of each audits, support of one 0.25 full-time equivalent staff person,[7] and operating costs for administering the organization. The costs would be minimal compared to the long-term value of potential damage improvements.

Anticipated Risk Reduction

This project would reduce risk by enabling home and business owners to flood-proof buildings. Resiliency improvements would decrease the likelihood and degree of damage to residential and commercial assets, making these buildings safer and less costly to the people who own and occupy them.

Timeframe

Once an administering organization has been selected, the proposed audit program could be launched within six months. Homeowners could be identified and audits scheduled over the course of one year.

Regulatory Requirements

Audits administered through an existing organization would face minimal regulations. Changes to FIRMs and insurance programs would affect eligibility for the program, but the administering entity would be responsible for maintaining current and accurate materials as regulations and information changes. Matching funds or additional outside funding could trigger additional oversight and regulation.

Jurisdiction

This project would fall under the jurisdiction of the City of New York.

Hammond Cove Living Shoreline Restoration

Featured Project

STRATEGY:
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures

Recovery Support Functions

Natural & Cultural Resources

Infrastructure

Cost

$20 MILLION

Timeline (in years)

0 1 2 3 4

This project would enhance the shoreline on the west side of Hammond Cove that is threatened by sea-level rise.

Project Description

Hammond Cove (the Cove) is a water channel surrounded by natural wetlands and recreational boathouses. Chaffee Avenue, Hatting Place, Glennon Place, Giegerich Street, and Tierney Place are deadend side streets that descend to the edge of the wetland on the west bank of the Cove. The entire area surrounding the Cove is low-lying and vulnerable to storm surge. The street-ends were entry points for floodwater during Superstorm Sandy, but they are also a source of inundation during more frequent storm events. The Hammond Cove Living Shoreline Restoration project would elevate and restore the segment of shoreline between Chaffee Avenue and Tierney Place with the following improvements:

- An approximately 1.5- to 4-feet-high continuous seawall built into an earth berm along the west bank of the Cove to prevent flooding under sea-level rise and protect against erosion
- Pedestrian path on top of the berm
- Retention ponds designed to capture stormwater from 50-year-rain events between the street-ends and the berm
- High- and low-marsh wetland along the shoreline

These integrated coastal protection measures can preserve the natural condition along the Cove and activate the waterfront.

Cost Estimate

$20 MILLION

The conceptual-level cost estimate is based on current unit pricing and typical soft-cost assumptions, and would likely vary as more refined study and schematic design are developed. The cost estimate does not include costs for restoring wetland habitats. Additional costs for environmental review, design, and potential application for an easement through a private property would likely occur as the project is further developed.

Figure IV–14: Hammond Cove Restoration Illustrative Plan

Hammond Cove marinas, *Marcel Negret, Community Board 10.*

Benefits/Co-benefits

Environmental Benefits

This project would provide coastal protection to the adjacent neighborhood without significantly altering the existing wetland habitat. The protection would enhance the resiliency of the edge against future storms and erosion. With additional funding, the project could repair and restore approximately 11.5 acres of wetland along both sides of the Cove to improve water quality.

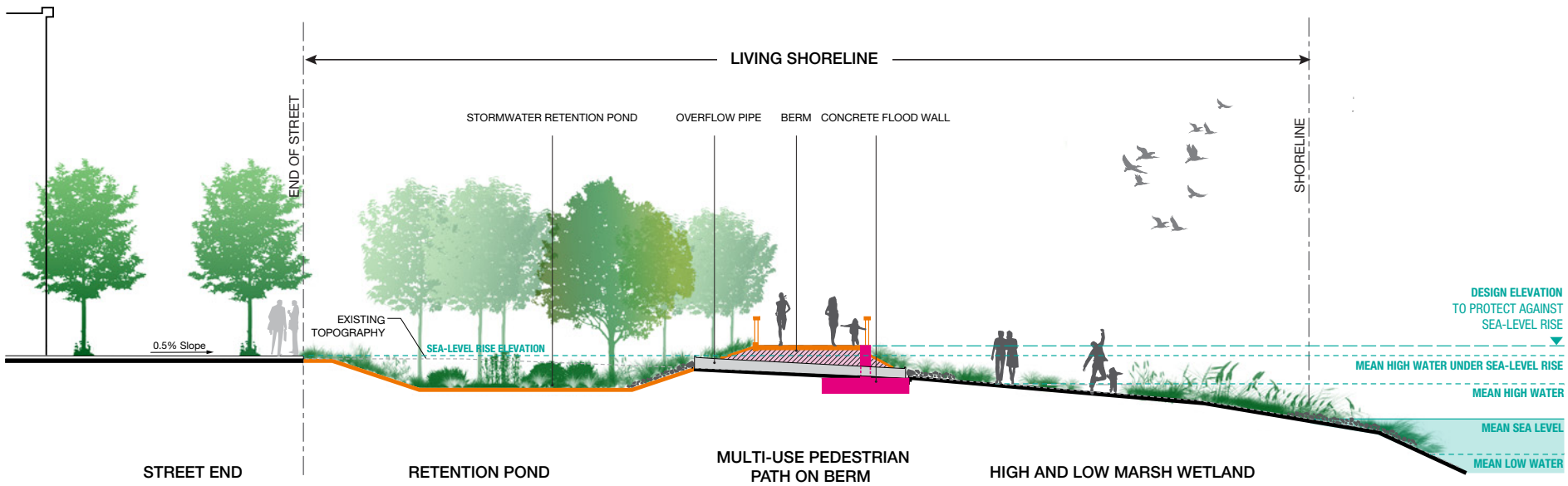
Health and Social Benefits

Parkland improvements can improve overall quality of life. This project would provide a public walkway that would activate underused public parkland without significantly altering the existing wetland habitat. The project would also provide educational benefits to residents of Silver Beach and Locust Point as well as the larger Community.

Cost-Benefit Analysis

Although the project could not protect to a higher-level storm event, it could help the neighborhood resist frequent flooding under 31 inches of anticipated sea-level rise. The proposed interventions would prevent permanent tidal inundation of 6.5 acres of land, including 5.3 acres of wetland and parkland owned by the City of New York, 46,000 square feet of city streets, and affecting 44 homes directly adjacent to the inundated streets and land. Because the anticipated flooding would be regular tidal inundation caused by sea-level rise, this would represent a total loss of these assets or require physical elevation of both the buildings and roadways. Additionally, the construction of retention ponds and overflow system could offset or delay the need for other drainage improvements, potentially including the replacement of sewer pipes to increase stormwater capacity and thus preventing or

Figure IV–15: Hammond Cove Living Shoreline and Stormwater Management Strategy



delaying additional capital investments or long-term maintenance costs for the sewer system.

Less tangible than avoided costs, but also important, would be benefits to the Community generated or leveraged from the project. The Cove, already locally known for its marinas and boathouses, could acquire new publicly accessible recreational land provided by the multifunctional berm.

The project would be compatible with future higher-level and larger-scale measures to protect this extremely vulnerable location. While the benefit of setting the stage for future protection is hard to quantify and predict, it should be noted that New York City is initiating a citywide study for raising shorelines to address sea-level rise and erosion. Having a pilot project moving forward within the larger low-lying, vulnerable area near the Cove and Locust Point would position the Community in advantage to capture future funding opportunities to implement higher-level and larger-scale coastal protection projects.

Risk Reduction

Although the project would not protect the area from a 100-year storm, it would lessen the impacts from sea-level rise. With 31 inches of sea-level rise expected in 2050, the west segment of the shoreline will be at risk from regular high tides. Stabilizing the water's edge through the construction of berms would reduce the risk of habitual and hurricane-related flooding.

The seawall and berm could elevate and reinforce the current edge to reduce vulnerability. The natural vegetation improvements would reduce the intensity of wave action against property and infrastructure adjacent to the waterfront.

Hammond Cove marinas

While the type and scale of interventions would vary and would be developed and refined through design and engineering, it is important to note that a complete, interconnected suite of protection measures would need to be constructed to provide this area of the neighborhood with protection from the anticipated 100-year storm-surge event. Without such an interconnected system, the area would remain vulnerable to flooding through remaining low points. While such an event has a low probability of occurring, it is possible, and flooding would likely occur more rapidly under climate change in recent years.

Timeframe

Once commenced, the project would be completed within 2–3 years.

Regulatory Requirements

The berm construction would be on New York City Department of Parks and Recreation land and would need to go through an environmental review process. This may also involve the New York State Department of Environmental Conservation, U.S. Army Corps of Engineers, and Coastal Zone Management consistency concurrence with the New York Department of State.

Jurisdiction

The project would be under the jurisdiction of the City of New York.

Harding Park Edge Protection Study

Featured Project

STRATEGY:
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures

Recovery Support Functions

Natural & Cultural Resources

Infrastructure

Cost

$200,000–$500,000

Timeline (in years)

0 1 2 3

This project would study potential protection measures along the Bronx and East Rivers to reduce the risk of future flooding caused by coastal storm events.

Project Description

Homes in Harding Park neighborhood are built adjacent to three tidal basins that extend south from Soundview Park, which form a soft park-like edge to the East Bronx Waterfront Community (Community). During Superstorm Sandy, surge over-topped the basins, damaging homes along North Street, U Avenue, and Underhill Avenue. This study would evaluate possible coastal protection measures that can be constructed on the waterfront parkland along the basins to protect the homes against 100-year storm surges and extensive wave actions. The study could include the following elements:

- Analysis of existing conditions – This analysis could identify the topographic constraints as well as existing wetland habitat in the basins.
- Comparison of alternatives for coastal protection measures – The development of alternatives would include conceptual design and design perimeters of potential coastal protection infrastructure.
- Feasibility study and cost-benefit analysis of identified alternatives.
- Assessment of potential impacts on natural environment around the basins and waterfront views of the homes.
- Drainage study – The drainage study would analyze potential impacts on stormwater discharge caused by the new infrastructure and would lay out strategies to address drainage needs.

Cost Estimate

$200,000 – $500,000

The East Bronx Waterfront Planning Committee (Committee) chose not to fund this project with the knowledge that the New York City Department of City Planning (NYC DCP) and the New York City Department of Parks and Recreation (NYC DPR) are currently examining resiliency in the neighborhood.

This estimated cost would cover the study with its scope described previously and would not include physical construction cost. The

One of the three tidal basins in Harding Park

Left, Restoration at south edge of Soundview Park; Above, The study could potentially lead to improvement to existing habitat.

conceptual-level cost estimate is based on engineer experience with studies of similar scope and scale, and would likely vary as the project is further developed and refined.

Benefits/Co-benefits

Environmental Benefits

The study would reevaluate the condition of current basins and wetlands, and could lead to improvement to existing habitat.

Health and Social Benefits

The project would enhance the resiliency of Soundview Park and create a continuous connection for the Soundview Park Greenway.

Cost-benefit analysis

Given the scale of the project and the constraints at the site, the construction cost for a protection infrastructure is potentially well beyond Community Development Block Grant–Disaster Recovery allotment to East Bronx Waterfront. This study has high potential to set the stage for a future capital infrastructure to protect the area and provide opportunity to leverage other funding sources in future.

While the physical risk reduction of such a study cannot be quantified, the need for such an investment can be evaluated based on the magnitude of the risk to the Community. In Harding Park neighborhood, within the 100-year floodplain there are currently:

- 68 buildings, representing 104,000 square feet of floor area;

- 75 residential units, many of which are one-story small bungalows, making it difficult to elevate, and causing building level flood adaptation to be a challenge; and

- Per capital income of the block group is between $16,000 and $21,000, which is lower than average in the Bronx.

The actual protection measures developed through this study will provide long-term benefit to local residents, many of whom are vulnerable populations.

Risk Reduction

The study itself would not reduce risk to the Community's assets and population, but projects developed through the study would reduce risk to adjacent houses. The segments of shoreline that are at risk from 100-year storm are publicly owned. Without any coastal protection infrastructure, the private homes are exposed to direct impacts of surges and waves.

While this risk reduction from potential protection measures developed in this study can be significant, it must be noted that due to existing topography around the basins, such a protection infrastructure could be as high as 12 feet above existing ground at constraint locations to protect to an elevation of 15 feet NAVD88 (approximately a 100-year storm surge event). In addition, the elevated edge would alter the existing stormwater discharge pattern and create flooding risk from stormwater.

Timeframe

The timeframe for completion of the study would be 12–18 months from the commencement of the project.

Regulatory Requirements

The construction of protection infrastructure decided by the study would be on NYC DPR land and would need to go through a National Environmental Policy Act environmental review process. This may also involve the New York State Department of Environmental Conservation, U.S. Army Corps of Engineers, and Coastal Zone Management consistency concurrence with New York State Department of State jurisdiction.

Jurisdiction

The identified project area falls within the jurisdiction of the City of New York.

Houses at Harding Park

City Island Wetland Restoration & Coastal Protection

Featured Project

STRATEGY:
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures

Recovery Support Functions

Natural & Cultural Resources

Infrastructure

Cost

$3–5 MILLION

Timeline (in years)

0 2 4 6

This project would create additional waterfront access for the East Bronx Waterfront Community (Community), increase wetland habitat, and improve stormwater storage capabilities while adding a strategic piece to the long-term overall coastal protection strategy needed for City Island. Multiple undeveloped parcels owned by a single owner between Ditmars and Tier Streets present an opportunity to acquire land and restore a natural area along the waterfront in City Island.

Project Description

This project would restore existing wetland areas on a section of privately owned parcels on the west side of City Island and would install coastal protection features extending north to protect surrounding homes. The northern portion of City Island was severely flooded during Superstorm Sandy with boat travel as the only means of residents leaving their homes. The wetlands are an entry point for surge that affects the homes behind it. The project would include the following:

- Coastal wetland restoration with berming to provide protection from a 10-year storm surge
- Shoreline access
- Bulkhead/seawall construction along the coast from Ditmars Street to the approximate mid-point of Hunter Avenue
- Deployable floodwall construction from the end of the bulkhead/seawall to Browne Street

In combination, these improvements would protect adjoining residential and commercial areas from a 10-year storm surge. In addition, the restoration would increase stormwater capture and reduce runoff.

Cost Estimate

$3,000,000 to $5,000,000 (not including site acquisition)

The cost includes the restoration of wetlands and the construction of berms. This estimate

Figure IV–16: City Island Wetland Restoration and Coastal Protection Strategy Overview

is based on the previously identified cost of wetland restoration by the U.S. Army Corps of Engineers (USACE). In addition, the conceptual-level cost estimate is based on engineer experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined.

Benefit/Co-benefits

Environmental Benefits

Development of this parcel of land would result in permanent loss of natural habitat. The restoration of the land as wetlands would have significant environmental benefits by preserving the land permanently as wetland and improving the water quality by filtering stormwater runoff. A natural berm would create a natural protection measure.

Health and Social Benefits

Parkland improvements for all users contribute to the overall physical and mental health of the Community. This project would create more than 4 acres of publicly accessible natural space. Public access would be created by adding up to 1,000 feet walking paths that would create new passive recreational uses. The space would also create stormwater retention with 4 acres of natural area available for water storage.

Economic Benefits

This potential protection and restoration project would reduce costly damages to 2 commercial and 35 residential buildings caused by regular, recurring flooding.

Cost-Benefit Analysis

The project would require the purchase or condemnation of land to create the opportunity for habitat restoration. Without purchase, there is a potential for the degradation of the current natural area. Without protection in place, this location will be threatened with flooding during storm events, which will impact beyond site and into the larger neighborhood. If not converted into a park space, the location would serve as an isolated natural habitat. While protection measures associated with the project would protect adjacent homes and businesses, the 100-year floodplain extends well beyond the specific location, which would necessitate a much larger protection project to create meaningful coastal protection.

Risk Reduction

This section of City Island sits within the 100-year floodplain and is susceptible to coastal flooding. There are high ground locations within the vicinity that could be connected that would protect against a 9-foot storm surge. The natural wetland drainage improvements would reduce the frequency and intensity of flooding from rain events, moon and equinox tides, and the damaging effects of these events on property and infrastructure. The protection of this one area would have only minimal protection, which would not protect against the 100-year flood condition.

Timeframe

Once the property has been acquired, this project could begin within 2 years, with final construction completed in 3–5 years, depending on the scope of the project and the identification of appropriate partners.

Regulatory Requirements

This project would require direct coordination of several Federal, and New York State and City agencies for its planning, permitting, and implementation. The land is privately owned and would need to be acquired by the New York City Department of Parks and Recreation or similar public agency. The project would require coordination with agencies working in the public right-of-way, including the New York City Departments of Transportation, of Environmental Protection, and potentially of Design and Construction, as well as private property owners.

Since the area falls within the Coastal Zone boundary, it would be subject to regulation under New York City's Waterfront Revitalization Program and thus the New York State Waterfront Revitalization of Coastal Areas, Inland Waterways Act, and the Federal Coastal Zone Management Act. In addition, it would require the participation of New York City Department of City Planning and the New York Department of State.

The shoreline location and potential impact on coastal wetlands and other habitats would mean that an environmental review process would need to be completed—State Environmental Quality Review Act and/or National Environmental Policy Act—and permits from the New York State Department of Environmental Conservation and USACE would be required.

Jurisdiction

Once the private property was acquired, the project would be in the jurisdiction of the City of New York.

City Island wetland existing condition

V. Additional Materials

NY RISING COMMUNITIES
East Bronx Waterfront
Public Meeting #2
EXIT

Additional Resiliency Recommendations

Strategy	Project Name	Short Description	Estimated Cost	Regional (Y/N)
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures	Deployable Floodwalls Along City Island Avenue	Recommendation that the City of New York study the feasibility of constructing deployable floodwalls along City Island Avenue to protect the northern portion of City Island during future storm events.	>$10 million	N
	Low Interest Loans for Coastal Protection Measures	Recommendation that low interest loans are made available to construct coastal protection infrastructure for vulnerable communities in the East Bronx Waterfront Planning Area.	>$10 million	N
	City Agency Shall Consider Sustainability, Resiliency, and Protection In All Future And Ongoing Studies And Plans	Recommendation that all city agencies consider sustainability, resiliency, and protection in all future and ongoing studies, plans and projects.	NA	Y
Ensure economic resiliency for businesses and property owners in flood-prone areas	NYC DOB Set Base Floodplain Elevation	Recommendation that New York City Department of Buildings establish the base floodplain elevation so that homeowners rebuilding will know which height to raise their homes to.	N/A	Y
	NYC DCP Ease Conforming Lots Restrictions	Recommendation that New York City Department of City Planning ease the regulations for non-conforming lots so that homeowners can make resiliency improvements.	N/A	Y
Improve and increase the capacity of stormwater management infrastructure	Pennyfield Avenue Reconstruction	Recommendation that the NYC DOT project involving road reconstruction and high level storm sewers along Pennyfield Avenue be moved to the priority list and provide protection against future storm events.	>$10 million	N
	NYC DEP High Level Storm Sewers	Recommendation that NYC DEP high level storm sewers be installed as planned in the following areas: Throggs Neck, Pennyfield Avenue Outlet, Fairfax Avenue/ Waterbury Avenue/ Rawlins Avenue, Waterbury Avenue/ Stadium Avenue.	>$10 million	N

Master Table of Projects

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Maintain the Community's close relationship to the water by developing diverse coastal edge protection measures	Vulnerable Coastal Edge Protection - Street-End Study and Pilot Project	This project would study the many different low-lying street end conditions that will need to be addressed throughout the Community and identify possible coastal protection typologies that could be used to protect the street ends. The project would fund up to three pilot projects identified in the study.	Proposed	$1.85 million	Y
	Hammond Cove Living Shoreline Restoration	This project would enhance the living shoreline on the west side of Hammond Cove that is threatened by sea-level rise.	Featured	>$20 million	N
	Harding Park Edge Protection Study	This project would be a study of potential protection measures along the Bronx and East Rivers to reduce the risk of future flooding caused by coastal storm events.	Featured	$200,000–$500,000	N
	City Island Wetland Restoration & Coastal Protection	This project would restore existing wetland areas on a section of privately owned parcels on the west side of City Island and would install coastal protection features extending north to protect surrounding homes.	Featured	$3–5 million	N
	Deployable Floodwalls Along City Island Avenue	Recommendation that the City of New York study the feasibility of constructing deployable floodwalls along City Island Avenue to protect the northern portion of City Island during future storm events.	Additional Resiliency Recommendations	>$10 million	N
	Low Interest Loans for Coastal Protection Measures	Recommendation that low interest loans are made available to construct coastal protection infrastructure for vulnerable communities in the East Bronx Waterfront Planning Area.	Additional Resiliency Recommendations	>$10 million	N
	City Agency Shall Consider Sustainability, Resiliency, and Protection In All Future and Ongoing Studies And Plans	Recommendation that all city agencies consider sustainability, resiliency, and protection in all future and ongoing studies, plans and projects.	Additional Resiliency Recommendations	NA	Y

Master Table of Projects (continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Harden power panels and provide alternative power sources for key Community facilities	Locust Point Civic Association Resource Center and Resiliency Improvements	This project would provide funds for flood-proofing of the Locust Point Civic Association Center, a key community facility in Locust Point.	Proposed	$700,000	N
	North Tower Firehouse Resource Center and Resiliency Improvements	This project would provide funding for resiliency improvements to the North Tower Firehouse to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.	Proposed	$1 million	N
	Edgewater Park Pumping System Hardening	This project would harden the pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.	Proposed	$150,000	N
Increase local preparedness and capacity for recovery	Community Recovery Plan	This project would create a local community recovery plan to enhance coordination with existing New York City resources, educate communities about the effects of climate change, and provide access to information about post-disaster resource services.	Proposed	$325,000	Y
	Locust Point Civic Association Resource Center and Resiliency Improvements	This project would provide funds for flood-proofing of the Locust Point Civic Association Center, a key community facility in Locust Point.	Proposed	$700,000	N
	North Tower Firehouse Resource Center and Resiliency Improvements	This project would provide funding for resiliency improvements to the North Tower Firehouse to ensure its reliability during emergencies and to optimize its use as a gathering place and resource and distribution center.	Proposed	$1 million	N
	Community Facility Resiliency Capital Fund	This project would fund resiliency improvements for critical community buildings and facilities that serve vulnerable populations. Resiliency measures could include flood-proofing, raising mechanical and electrical equipment, and purchasing and installing backup generators.	Featured	$1 million	Y

Master Table of Projects (continued)

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional Project (Y/N)
Ensure economic resiliency for businesses and property owners in flood-prone areas	Westchester Creek Waterfront Study	This project would provide funding for a study to re-envision the Westchester Creek waterfront. Waterfront access is limited along the creek but the many underutilized lots create an opportunity to transform Westchester Creek into a resilient, accessible community asset.	Proposed	$200,000–$400,000	Y
	Building Flood Audit Program	This program would provide technical assistance to homeowners who want to retrofit their buildings to mitigate future storm damage.	Featured	$750,000	Y
	NYC DOB Set Base Floodplain Elevation	Recommendation that New York City Department of Buildings establish the base floodplain elevation so that homeowners rebuilding will know which height to raise their homes to.	Additional Resiliency Recommendations	N/A	Y
	NYC DCP Ease Conforming Lots Restrictions	Recommendation that New York City Department of City Planning amend the regulations for non-conforming lots so that homeowners can make resiliency improvements.	Additional Resiliency Recommendations	N/A	Y
Improve and increase the capacity of stormwater management infrastructure	Edgewater Park Pumping System Hardening	This project would harden the sewage pump system in Edgewater Park by raising the six control panels that support pumping systems and hardening electrical conduits.	Proposed	$150,000	N
	Ferry Point Local Street Improvement Project	This project would repave and regrade up to three local streets in the Ferry Point neighborhood. A similar green infrastructure approach to roadway paving could be replicated in similar neighborhoods with streets where the mapped width exceeds the built width in the East Bronx Waterfront and throughout New York City.	Featured	$375,000–$2+ million	Y
	Pennyfield Avenue Reconstruction	Recommendation that the NYC DOT project involving road reconstruction and high level storm sewers along Pennyfield Avenue be moved to the priority list and provide protection against future storm events.	Additional Resiliency Recommendations	>$10 million	N
	NYC DEP High Level Storm Sewers	Recommendation that NYC DEP high level storm sewers be installed as planned in the following areas: Throggs Neck, Pennyfield Avenue Outlet, Fairfax Avenue/Waterbury Avenue/ Rawlins Avenue, Waterbury Avenue/Stadium Avenue.	Additional Resiliency Recommendations	>$10 million	N

Public Engagement Process

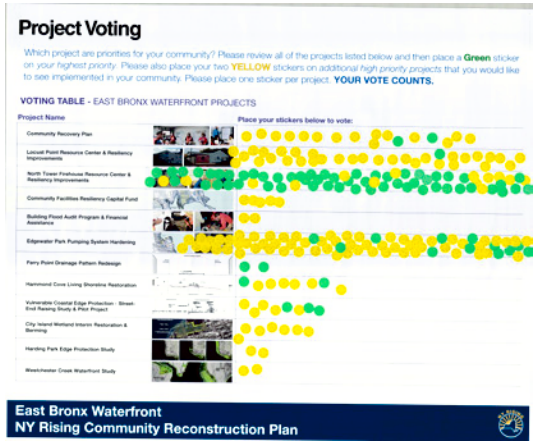
As a community-driven planning process, public engagement has been central to the iterative development of the East Bronx Waterfront NY Rising Community Reconstruction (NYRCR) Plan. Over the course of six months, more than 300 residents, elected officials, and professionals participated in East Bronx Waterfront NYRCR events, including three public engagement events and nine Committee Meetings. Public input guided each step in the reconstruction process, including the identification of assets, risks, needs, strategies, and ultimately the formulation of projects that are proposed for funding in the NYRCR Plan. Extensive public engagement has ensured that the NYRCR Plan reflects the East Bronx Waterfront Community's (the Community) priorities for rebuilding and resiliency.

Planning Committee

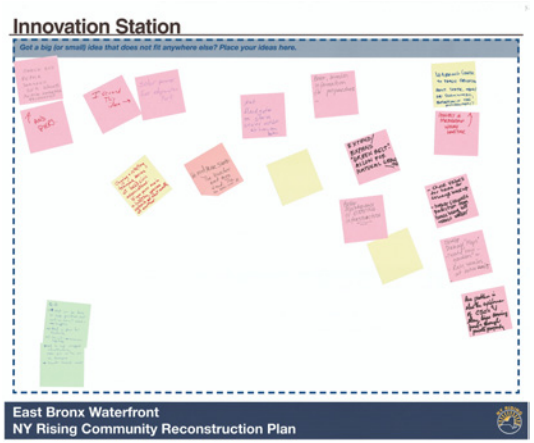
The East Bronx Waterfront Planning Committee (Committee) was composed of 16 volunteer Committee Members who represented various constituencies within the East Bronx Waterfront Planning Area (Planning Area) including but not limited to, homeowners, civic leaders, and business owners. Committee members served as ambassadors of the NYRCR process and were responsible for ensuring Community voices were heard throughout the process. The Committee spearheaded community outreach, identifying avenues for outreach and developing a strategy for effectively soliciting public feedback.

Committee meetings were the central venue for the Planning Committee's discussion and decision-making. Specific tasks and discussions held at the meetings included identification of community assets, assessment of critical issues, needs and opportunities, formalization of reconstruction and resiliency strategies, refinement of projects, and finalization of proposed and featured projects. Committee meetings were open to the public and held at several community locations, including the Locust Point Civic Association and Bronx Community Board 10 office. The NYRCR website *http://stormrecovery.ny.gov/nyrcr/community/east-bronx-waterfront* served as the official portal of information for the Committee meetings, including both meeting time and location, and post-meeting minutes.

Public Engagement Meeting



Public Voting for Projects



Public Engagement Process

Public Engagement Events were designed to be highly interactive and to maximize feedback on the priorities and needs of the Community. Three Public Engagement Events were held prior to the submission of the NYRCR Plan. The events were held at the Providence Rest Nursing Home, a centrally located and easily accessible venue for the Planning Area. At the three Public Engagement Events, the Committee offered general information about the NYRCR process, presented outcomes and information gathered to date, and solicited feedback through dynamic discussions and interactive displays. A translator was on hand at all events to accommodate Spanish speakers. Following each Public Engagement Event, the Community's feedback was aggregated and analyzed in order to guide discussion during subsequent Planning Committee meetings.

Public Engagement Event Outreach

Extensive outreach was undertaken in advance of the three Public Engagement Events. Committee members leveraged community distribution channels and relationships with local community based organizations (CBO) to distribute printed meeting advertisements in the form of flyers and storefront posters. Printed material—both English and Spanish—and email blasts went out to Community Boards, community centers and organizations, schools and religious intuitions, elected officials, businesses, and by word-of-mouth. The Civic associations were an important resource in communicating the event details, distributing the flyers in their mailings and emails to the members. An online and print advertisement campaign was launched through a local media outlet.

Online Engagement and Social Media Outreach

The NYRCR website, located at *www.stormrecovery.ny.gov/nyrcr*, served as a valuable public resource. The aforementioned East Bronx Waterfront NYRCR page featured announcements, meeting dates and locations, and materials produced by the Committee throughout the process. The NYRCR website also directed visitors to the NYRCR Facebook page (located at *https://www.facebook.com/NYStormRecovery*) and Twitter account (@NYStormRecovery). Communities were also able to submit comments through the NYRCR website and by emailing *info@stormrecovery.ny.gov*.

Public Engagement Event #1 (August 2014)

Program Scope; Goals and Timeline; Community feedback on Community Vision,

Critical Issues, Needs and Opportunities, Geographic Scope and Community Assets

The first Public Engagement Event showcased the NYRCR program's scope and presented the Committee's preliminary community vision, assessment of community assets, critical issues, and needs and opportunities. The Public Engagement Event began with a formal presentation that introduced the NYRCR Program and objectives to the Community. Following the presentation, an open house-style event was held with Committee Members facilitating group discussion and inviting the Community's input on its vision, assets, critical issues, and needs and opportunities as featured on the display boards. While the public engaged in conversation around the display boards, they were invited to write their feedback directly on the boards. The event ended with a wrap-up, including reporting from each display station and a general question and answer session. More than 100 members of the Community attended the event and contributed valuable feedback that guided subsequent Committee discussions.

Public Engagement Event #2 (September 2014)

Summarized feedback from Public Engagement Event #1; Presentation of and gathering community feedback on list of strategies

The second Public Engagement Event solicited public responses to the priority resiliency strategies presented by the Committee and public. The event followed a similar format to the previous Public Engagement Event and featured an introductory presentation, an open house with display boards and feedback mechanisms, and a wrap-up. Members of the Community not only engaged with Committee members staffing the display boards, but were additionally encouraged to provide feedback through three different comment cards. Once again, more than 80 members of the Community attended the event and contributed valuable feedback on the strategies that helped shaped the Committee conversation during the formulation of proposed and featured projects.

Public Engagement Event #3 (November 2014)

Presentation of and community feedback on proposed and featured projects, and additional resiliency recommendations

The third Public Engagement Event provided a critical opportunity to share the Proposed and Featured projects with the Community and obtain feedback. The event featured an open house with informational boards on the Proposed and Featured projects. A central component of the open house was the projects' voting board through which visitors indicated their support and opposition to the proposed and featured projects with colored stickers. By the end of the event, the voting board featured a colorful indication of the public's feedback on the projects and was used to guide the selection of Proposed and Featured projects.

Public Engagement Event #4 (January 2015)

Presentation of NYRCR Plan

Public Engagement Event #4 will take place in January of 2015 and conclude the Public Engagement Event series. At this event the Committee will present the proposed projects and the NYRCR Plan to the public.

Community Asset Inventory

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Brush Avenue Industrial And Commercial Centers	High	Economic	Industrial, Warehousing and Manufacturing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Brush Avenue Industrial And Commercial Centers	Moderate	Economic	Industrial, Warehousing and Manufacturing	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	2.5	4	30
Castle Hill Avenue Commercial Corridor	N/A	Economic	Employment Hub	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	0.0	1	0
City Island Avenue Commercial Corridor	High	Economic	Employment Hub	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	3.0	5	45
City Island Marinas	Extreme	Economic	Marina/Water Based Business	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	4.0	5	60
Edgewater Cooperative Office And Retail Center	Moderate	Economic	Grocery/Food Suppliers	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.0	3	18
Evers Seaplane Base And Marina	Extreme	Economic	Marina/Water Based Business	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	5	68
Silver Beach Cooperative Office And Retail Center	Moderate	Economic	Grocery/Food Suppliers	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.0	3	18

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
East Tremont Avenue Commercial Corridor	N/A	Economic	Employment Hub	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	0.0	1	0
Zerega Avenue Industrial Business Area	Moderate	Economic	Industrial, Warehousing and Manufacturing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.0	4	36
Zerega Avenue Industrial Business Area	High	Economic	Industrial, Warehousing and Manufacturing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Advancement of Blind & Retarded, Inc. (AABR)	N/A	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	No	1.5	3	0	3	0
Advancement of Blind & Retarded, Inc. (AABR)	Moderate	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	No	1.5	3	2	4	24
Archimedes Academy For Math, Science And Technology	High	Health and Social Services	Schools	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Bronx Friendship House	Moderate	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	Medium	No	Yes	No	No	Yes	Yes	1.5	3	2	3	18
Edgewater Park Fire Department	Moderate	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
EMS Station 3	Moderate	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3	4	36
Firehouse, Eng 70, Lad 53	Moderate	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	No	1.5	3	2	4	24
Firehouse, Eng 72	N/A	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	0	2	0
Handicap Day Care	Moderate	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Institute Of Applied Human Dynamics	Moderate	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	Medium	No	No	Yes	Yes	Yes	No	1.5	3	2	3	18
JASA Throggs Neck Senior Center	Moderate	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	Medium	No	Yes	No	No	Yes	Yes	1.5	3	2	2	12
Jeanne Jugan Residence	N/A	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	Medium	No	No	Yes	Yes	Yes	No	1.5	3	0	1	0
Lamp Catholic Ministries	Extreme	Health and Social Services	Public Works Facilities	Yes	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
Lil' Angels Childcare, Inc.	High	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	Yes	2	3	3	4	36
Maritime College (SUNY)	High	Health and Social Services	Higher Education Institutions	No	No	Medium	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Monsignor Scanlan High School	Moderate	Health and Social Services	Schools	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	2.5	3	23
NYS "Day Hub" Center	High	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Providence Rest, Inc.	High	Health and Social Services	Healthcare Facilities	Yes	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
PS 175	High	Health and Social Services	Schools	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	3	23
PS 72	N/A	Health and Social Services	Schools	No	No	High	No	No	No	Yes	Yes	No	1	3	0	1	0
PSS City Island Senior Center	N/A	Health and Social Services	Daycare and Eldercare	Yes	Yes, FEMA	High	No	Yes	Yes	Yes	Yes	No	2	3	0	2	0
ST. Frances De Chantal School	Moderate	Health and Social Services	Schools	No	No	High	No	No	Yes	Yes	Yes	No	1.5	3	2	3	18
ST. Joseph's School For The Deaf	Moderate	Health and Social Services	Schools	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	2.5	3	23
Throggs Neck Volunteer Ambulance	N/A	Health and Social Services	Emergency Operations/Response	No	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	No	1.5	3	0	2	0

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Villa Maria Academy Private Elementary School	High	Health and Social Services	Schools	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	3	4	36
Castle Hill Residential In Extreme Risk Zone	Extreme	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	5	68
Castle Hill Residential In High Risk Zone	High	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
City Island Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
City Island Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Clason Point Residential In Extreme Risk Zone	Extreme	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.50	5	68
Clason Point Residential In High Risk Zone	High	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
County Club Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
County Club Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Edgewater Park Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Edgewater Park Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Ferry Point Residential In Extreme Risk Zone	Extreme	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	5	68
Ferry Point Residential In High Risk Zone	High	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Harding Park Residential In Extreme Risk Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
Harding Park Residential In High Risk Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Locust Point Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Locust Point Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	4	36
Pilot Cove Manor Senior Citizen Housing And Dock	High	Housing	Senior Housing	Yes	Yes, FEMA	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Schulylerville Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
Schulylerville Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Silver Beach Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Silver Beach Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	4	36
Spencer Estates Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	5	68
Spencer Estates Residential In High Zone	High	Housing		No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Throgs Neck Residential In Extreme Zone	Extreme	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	3.5	5	53
Throgs Neck Residential In High Zone	High	Housing		No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
Bronx-Whitestone Bridge	Extreme	Infrastructure Systems	Transportation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	4	3	36
City Island Ferry Dock	Extreme	Infrastructure Systems	Transportation	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	4	4	48

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
City Island Pumping Station	Moderate	Infrastructure Systems	Wastewater	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	4	24
City Island Road Bridge	Extreme	Infrastructure Systems	Transportation	No	No, Locally Signifi-cant	High	No	Yes	No	Yes	Yes	Yes	2	3	4	4	48
Department Of Sanitation	Moderate	Infrastructure Systems	Hazardous Materials, Solid Waste, and Recycling	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3	3	27
Edgewater Park Cooperative Pumping Station	High	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	5	45
Edgewater Park Cooperative Pumping Station	High	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
Edgewater Park Cooperative Pumping Station	High	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
Edgewater Park Cooperative Pumping Station	High	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	5	45
Edgewater Park Cooperative Pumping Station	High	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	5	45
Edgewater Park Cooperative Pumping Station	Moderate	Infrastructure Systems	Stormwater	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	5	30
Gas Station	N/A	Infrastructure Systems	Liquid Fuels	No	Yes, FEMA	Medium	No	Yes	Yes	Yes	Yes	No	2	3	0	1	0

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Gas Station	N/A	Infrastructure Systems	Liquid Fuels	No	Yes, FEMA	Medium	No	Yes	Yes	Yes	Yes	No	2	3	0	1	0
Gas Station	Moderate	Infrastructure Systems	Liquid Fuels	No	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	Yes	2	3	2.5	2	15
Gas Station	Moderate	Infrastructure Systems	Liquid Fuels	No	Yes, FEMA	Medium	No	Yes	No	Yes	Yes	Yes	2	3	2.5	2	15
Gildersleeve Avenue Pumping Station	Extreme	Infrastructure Systems	Stormwater	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	3	41
Hart Island Ferry Dock	Extreme	Infrastructure Systems	Transportation	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	4	4	48
MTA Zerega Maintenance And Training Facility	High	Infrastructure Systems	Transportation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	3	32
Throgs Neck Bridge	Extreme	Infrastructure Systems	Transportation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	4	3	36
Throgs Neck Pumping Station	High	Infrastructure Systems	Stormwater	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Verizon Substation	N/A	Infrastructure Systems	Telecommunications	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	0	1	0
Zerega Avenue Pumping Station	High	Infrastructure Systems	Stormwater	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	5	53
Ambrosini Field	High	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	No	1.5	3	2.5	4	30
American Turners Club	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	3	5	45

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Bethlehem Lutheran Church	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Bicentennial Veteran Memorial Park	Moderate	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	2.5	3	23
Bronx River Trail 2	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	4	3	36
Bronx YMCA	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	5	45
Calvary Christian Fellowship	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Castle Hill Park	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	4	54
Church Of God	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
City Island Community Center	Moderate	Natural and Cultural Resources	Community Centers	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
City Island Medical Office	Moderate	Natural and Cultural Resources	Healthcare Facilities	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
City Island Nautical Museum	Moderate	Natural and Cultural Resources	Museums, Performing Arts Centers, Stadiums	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	3	23
City Island Public Library	Moderate	Natural and Cultural Resources	Libraries	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
City Island Tidal Wetlands	High	Natural and Cultural Resources	Wetlands and marshes	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	3	32
City Island Yacht Club	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
DA Beach Club Inc.	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	3	5	45
Ferry Point Park	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	4	54
Grace And Peace Church	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	3	23
Grace Episcopal Church And Pps City Island Senior Center	N/A	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	0	3	0
Greenways/Bike Trails	High	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	3	32

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Greenways/Bike Trails	High	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	3	32
Greenways/Bike Trails	Moderate	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	No	2	3	2.5	3	23
Hammonds Cove Marina	High	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	5	53
Harlem Yacht Club	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Hawkins Park	Moderate	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	No	1.5	3	2	5	30
Kane's Park	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	4	4	48
Kips Bay Boys And Girls Club	N/A	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	0	2	0
Knights Of Columbus	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	3	23
Leonard H. Hawkins Post 156, American Legion	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Locust Point Civic Association	High	Natural and Cultural Resources	Community Centers	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	3	5	45
Locust Point Yacht Club	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Manhem Club Inc.	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	3	5	45
Methodist Church	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Minnieford Yacht Club	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
Morris Yacht And Beach Club	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
North Bronx Ghana Seven Day Adventist Church	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Palmer Inlet	Extreme	Natural and Cultural Resources	Wetlands and marshes	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	3	41
Pelham Bay Assembly Of God Church	N/A	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	0	3	0

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Pugsley Creek Park	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	4.5	4	54
Saint Mary Star Of The Sea Church	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
Sisters Of St John The Baptist	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
Soundview Park	Extreme	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	No	Yes	Yes	Yes	2	3	4	4	48
Soundview Spanish Seventh-Day Adventist Church	N/A	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	0	3	0
St. Frances de Chantal Church	Moderate	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	No	Yes	Yes	Yes	No	1.5	3	2	3	18
Stuyvesant Yacht Club	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
Throggs Neck Post 1456, American Legion	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2.5	5	38
Touring Kayak Club	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60

Community Asset Inventory (continued)

Meaning of Risk Scores
Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk Assessment			
Asset	Risk Area	Asset Class	Asset Sub-category	Socially Vulnerable Populations	Critical Facility	Community Value	Erosion	Waterline	Shore defenses	Protective vegetation	Dunes	Barrier Island or Filled Wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Waterfront Garden	High	Natural and Cultural Resources	Parks and Recreation	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	3	3.5	4	42
Westchester Country Club	Moderate	Natural and Cultural Resources	Community Centers	No	No	High	No	Yes	No	Yes	Yes	No	1.5	3	2	3	18
West Fordham Street Beach Club	Extreme	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	No	Yes	Yes	Yes	2	3	4	5	60
White Cross Fishing Club	High	Natural and Cultural Resources	Cultural or Religious Establishments	No	No	High	No	Yes	Yes	Yes	Yes	No	2	3	3	5	45

Endnotes

Foreword

1 Five of the Round I Planning Areas—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.

Section I

1 "A Walk Through The Bronx", *Thirteen, WNET New York Public Media*. Accessed November 11, 2014, http://www.thirteen.org/bronx/history.html
2 "The Neighborhood and History of City Island in the Bronx", *The BX. Net.* Accessed August 11, 2014, http://thebx.net/info/_neighborhoods_bronx_cityisland.php
3 "History of Fort Schuyler," SUNY Maritime College. Accessed December 17, 2014, http://www.sunymaritime.edu/Maritime%20Museum/FortSchulyer
4 Pluto – New York City. Department of City Planning. NYC MapPLUTO 14v1. May 2014.
5 ACS –US Census. American Community Survey 2008-2012: Planning Area Census Tracts. Washington: U.S. Census Bureau, December 21, 2010.
6 "City Island History." *City Island History*. City Island Nautical Museum. Accessed July 25, 2014, http://www.cityislandmuseum.org/history.html
7 "Harding Park, Bronx." *Forgotten New York.* FNY. Accessed July 25, 2014, http://forgotten-ny.com/2006/02/harding-park-bronx/
8 2013 Dun & Bradstreet via Esri. Market Profile: Bronx Census Tracts. Washington: U.S. Census Bureau December, 21, 2010. Microsoft Excel file.

Section II

1 *NYC Wastewater Resiliency Plan*. New York City Department of Environmental Protection (October 2013). Accessed August 20, 2014 at http://www.nyc.gov/html/dep/html/about_dep/wastewater_resiliency_plan.shtml
2 "Get Involved: NYC CERT." New York City Office of Emergency Management. Accessed August 20, 2014, http://www.nyc.gov/html/oem/html/get_involved/cert.shtml
3 "Westchester Creek Waterbody/Watershed Facility Plan." NYC Department of Environmental Protection, 2011. Accessed August 20, 2014, http://www.hydroqual.com/projects/ltcp/wbws/westchester.htm

Section V

Community Recovery Plan

1 Full-time equivalent costs assume the average salary for a nonprofit community coordinator in the New York Metro area reported by Indeed.com with benefits equivalent to the average employer costs for employee compensation reported by the Bureau of Labor Statistics.

Locust Point Civic Association Resource Center and Resiliency Improvements

1 Esri. Census 2010 Summary Profile: 1 Mile Radius of 3300 Tierney Place, Bronx, NY 10465. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.
2 Construction impacts are generated through IMPLAN, an industry standard input-output model which analyzes interactions among 440 sectors in the economy and traces the pattern of commodity purchases and sales between each sector. It is used to conduct economic impact analyses by leading public and private sector organizations across the United States.

North Tower Firehouse Resiliency Improvements

1 "Edgewater: A Community That is Being Threatened to Extinction by Needless Park Plans," 1967, Edgewater Taxpayers, Inc.
2 Esri. Census 2010 Summary Profile: 1 Mile Radius of 1 Adee Drive, Bronx, NY 10465. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.
3 Construction impacts are generated through IMPLAN, an industry standard input-output model which analyzes interactions among 440 sectors in the economy and traces the pattern of commodity purchases and sales between each sector. It is used to conduct economic impact analyses by leading public and private sector organizations across the United States.

Community Facility Resiliency Capital Fund

1 Esri. Census 2010 Summary Profile: East Bronx Waterfront Census Tracts. Washington: U.S. Cen-

sus Bureau, December 21, 2010. Microsoft Excel file.

2 Full-time equivalent costs assume the average salary for a loan officer in the New York Metro area with benefits equivalent to the average employer costs for employee compensation reported by the Bureau of Labor Statistics.

3 Construction impacts are generated through IMPLAN, an industry standard input-output model that analyzes interactions among 440 sectors in the economy and traces the pattern of commodity purchases and sales between each sector. It is used to conduct economic impact analyses by leading public- and private-sector organizations across the United States.

Building Flood Audit Program

1 "Background on Floodplain Management and Building Codes in New Jersey, New York State, and New York City." FEMA Mitigation Assessment Team Report, Nov. 2013. Web. 7 Nov. 2014.

2 Esri. American Community Survey 2008-2012: Planning Area Census Tracts. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.

3 Esri. American Community Survey 2008-2012: Planning Area Census Tracts. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.

4 Esri. American Community Survey 2008-2012: Planning Area Census Tracts. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.

5 Esri. American Community Survey 2008-2012: Planning Area Census Tracts. Washington: US Census Bureau, 21 Dec 2010. Microsoft Excel file.

6 Calculations represents present value of avoiding payout of $8,807, the average FEMA Individual Housing Assistance Award for New York City homeowners following hurricane Sandy, with 1% chance of storm and 10% discount rate in any given year.

7 FTE costs assume the salary for nonprofit program manager at precedent administering organization with benefits equivalent to the average employer costs for employee compensation reported by the Bureau of Labor Statistics.

Glossary

ABFE
Advisory Base Flood Elevation

ADA
Americans with Disabilities Act

BRIP
Business Resiliency Investment Program

CBO
Community-based organization

CCMP
Comprehensive Conservation and Management Plan

CERT
Community Emergency Response Team

CRP
Comprehensive Restoration Plan

CSO
Combined sewer overflow

DCAS
Department of Citywide Administrative Services

FEMA
Federal Emergency Management Agency

FIRM
Flood Insurance Rate Map

FTE
Full-time equivalent

HRE
Hudson-Raritan Estuary

HUD
Housing and Urban Development

IRT
Interborough Rapid Transit

LISS
Long Island Sound Study

LTCP
Long-Term Control Plan

NFIP
National Flood Insurance Program

NYC DCP
New York City Department of City Planning

NYC DEP
New York City Department of Environmental Protection

NYC DOB
New York City Department of Buildings

NYC DOT
New York City Department of Transportation

NYC DPR
New York City Department of Parks & Recreation

NYC HPD
New York City Housing Preservation and Development

NYC OEM
New York City Office of Emergency Management

NYPD
New York City Police Department

NYRCR
NY Rising Community Reconstruction

NYS DOS
New York State Department of State

SIRR
Special Initiative for Rebuilding and Resiliency

SUNY
State University of New York

USACE
U.S. Army Corps of Engineers

WRP
Waterfront Revitalization Plan

NY RISING
COMMUNITIES