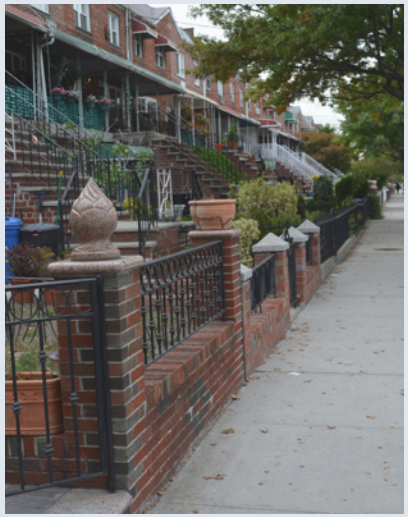
Bergen Beach, Georgetown, Marine Park, Mill Basin, Mill Island

NY Rising Community Reconstruction Plan

December 2014

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This document was developed by the Southeast Brooklyn Waterfront NY Rising Community Reconstruction (NYRCR) Planning Committee as part of the NYRCR Program within the Governor's Office of Storm Recovery. The NYRCR Program is supported by New York State (NYS) Homes and Community Renewal and NYS Department of State.

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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 Southeast Brooklyn 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.

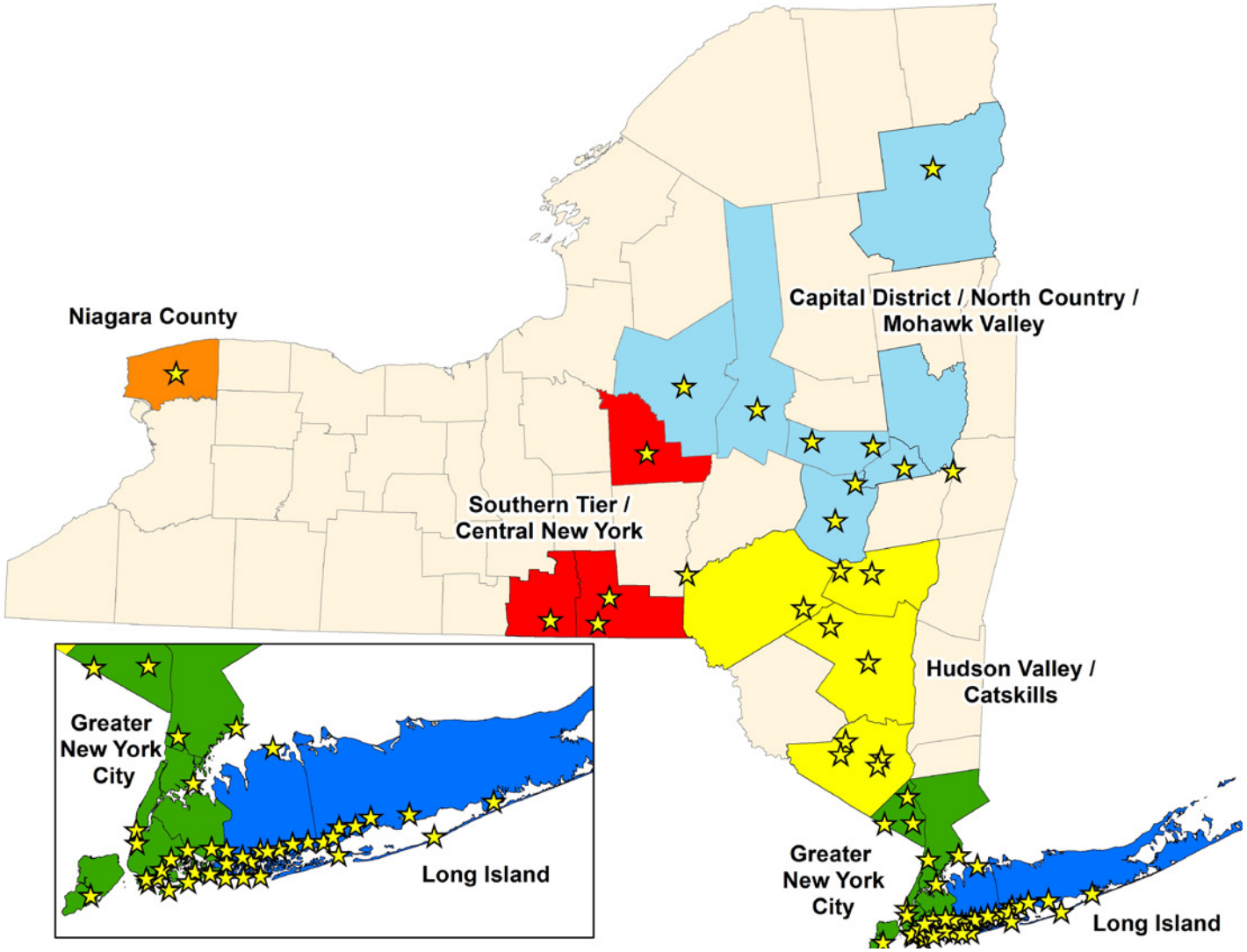
As part of Round II of the NYRCR Program, the Southeast Brooklyn Waterfront NYRCR Planning Area has been allotted up to $4.38 million in CDBG-DR funds for the implementation of eligible projects identified in this plan.

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.)

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The Southeast Brooklyn Waterfront NYRCR Community gathered to provide public input at the first Public Engagement Event in summer 2014.

Executive Summary Southeast Brooklyn Waterfront Community

Bergen Beach, Georgetown, Marine Park, Mill Basin, and Mill Island are close-knit communities with strong civic ties and comprise the Southeast Brooklyn Waterfront NYRCR Community (Community). These five neighborhoods are characterized by their proximity to Jamaica Bay, tree-lined residential blocks, vast swaths of recreational facilities and open space, and vibrant commercial corridors. The Community also has a wealth of large publicly-owned waterfront and natural spaces, including Floyd Bennett Field, Marine Park, and the Gateway National Recreation Area. Located just to the north of Jamaica Bay, five creeks and basins from the Bay flow into the Community—Marine Park Creek, Mill Basin, East Mill Basin, Shellbank Creek, and Paerdegat Basin. Some neighborhoods, like Mill Island, are bounded by water on three sides; some homes even accommodate private docks.

Home to a population of 53,000, residents of the Community are relatively well-educated and high-earning. In fact, median household incomes across all five neighborhoods exceed City and State levels. The majority, or 63%, of the Community's primarily single-family and two-family homes are owner-occupied. These housing typologies, combined with lack of local subway access, contributes to a car-oriented, suburban character.

Superstorm Sandy impacted the Community in unprecedented ways. Homes and streets that had never experienced significant flooding were inundated. Jamaica Bay waters rose over bulkheads and banks of the four basins in the area. Low-lying neighborhoods adjacent to the Bay—Bergen Beach and Mill Island—faced the greatest levels of inundation, with six-to-nine feet of flooding reported in some areas. Wastewater sewer backup caused stormwater to jet out from manholes and flood streets, especially in low-lying areas. Sewer backup flooded basements and blocked sewers, some exacerbated by overgrown tree roots. Power loss was experienced through much of the Community, with some homes and businesses losing power for a few hours while others were off-line for weeks. The effects of Superstorm Sandy also impacted the delivery of critical supplies: gas stations were unable to pump gas due to loss of power or lack of access to gas, while grocery stores lost merchandise

The Mill Island neighborhood, which sits on the Mill Basin waterbody, suffered considerable damage during Superstorm Sandy.

without working refrigerators. Gridlock on major roadways during the days following the Storm hampered access.

The NY Rising Community Reconstruction (NYRCR) Program was established to provide additional rebuilding and revitalization assistance to communities severely damaged during Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. Through Community Development Block Grant-Disaster Recovery (CDBG-DR) funding from the U.S. Department of Housing and Urban Development, New York State has allotted up to $4.38 million to the Southeast Brooklyn Waterfront NYRCR Community, which is defined by the following boundaries: Gerritsen and Nostrand Avenues to the southwest, Paerdegat Basin to the northeast, Avenue N and Flatlands Avenue to the north, Floyd Bennett Field to the south, and Jamaica Bay to the east. The community-driven process has resulted in the identification of projects and policy recommendations intended to enhance the physical, environmental, social, and economic resiliency of the Community. The projects identified in this Plan address Superstorm Sandy-related impacts and better prepare communities for future severe weather-related events.

Community Vision Statement

"Through the NY Rising Community Reconstruction Program, the Southeast Brooklyn Waterfront Community aims to increase preparedness around severe weather-related events and climate change through education, planning, infrastructure development, and leveraging the ties that bind the community together."

The Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) is comprised of eight volunteer members who are local homeowners, civic leaders, and business leaders. In order to create a framework for developing projects, the Committee drafted a vision statement at the outset of the process.

Over the course of six months, over 150 residents, elected officials, business owners, and other community stakeholders participated in three Public Engagement Events. Technical information on issues related to coastal protection strategies, stormwater management measures, and public emergency education best practices, among others, was shared at these events to help inform public feedback on project ideas. In addition to these events, presentations were made to the five civic organizations representing the Community. A web-based and paper survey was widely distributed and a toll-free voicemail line was established to solicit additional feedback or questions. Committee members participated in nine planning meetings to learn more about the resiliency issues facing their communities, develop a vision for their Plan, identify strategies, and recommend projects. City, State, and Federal agency input also was solicited throughout this process in order to leverage opportunities to tie into existing or proposed public projects or vet independent project ideas.

As part of the planning process, an assessment of risks and needs was conducted. The coastline bordering the Southeast Brooklyn Waterfront Community remains exposed to coastal flooding from future storms and sea-level rise. Much of the waterfront and some low-lying inland areas—primarily in the neighborhoods of Bergen Beach and Mill Island—are located within either the high or extreme risk zones. These areas remain at high risk of damage from future coastal hazards due to inundation from surge or wastewater and stormwater sewer backup. In addition, the Community's residents (particularly vulnerable populations) and assets are vulnerable due to a lack of social and technical preparedness. The lack of a comprehensive emergency preparedness plan, as well as unclear or incomplete information about emergency response procedures and resources, hinders effective emergency response and recovery, thus increasing potential damage to assets.

Top, The Southeast Brooklyn Waterfront NYRCR Planning Area is home to a wide array of recreational spaces, including Marine Park. Bottom, One of the greatest assets—and vulnerabilities—of the Southeast Brooklyn Waterfront Planning Area is its housing stock, mostly comprised of 1- and 2-family homes.

Based on discussions held at Planning Committee meetings, as well as public feedback received at two Public Engagement Events, strategies were developed that would ultimately influence and shape the Proposed Projects. The discussions that led to the development of the following strategies were based on a review of Community needs, risks, and vulnerable assets.

- Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development at at-risk locations, and mitigating any potential negative impacts of new projects.
- Improve stormwater and wastewater management to prevent flooding and backup.
- Make power supply more resilient and redundant.
- Enhance emergency preparedness and response.
- Improve resiliency of commercial corridors and critical supply chains.
- Improve residential resiliency through education, technical assistance, and funding.

This process resulted in the eight Proposed Projects described in the Plan. Projects fall under three categories: Proposed Projects, Featured Projects, and Additional Resiliency Recommendations. 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 following projects address the previously stated strategies and are not listed in order of priority.

Southeast Brooklyn Waterfront NYRCR Planning Committee members brainstormed needs, opportunities, strategies, and project ideas over the course of several Committee meetings and Public Engagement Events.

To address the first strategy related to the reduction of neighborhood flooding, the **Southeast Brooklyn Waterfront Coastal Protection Study** would develop a comprehensive coastal protection strategy for the Community. A joint project with the Canarsie NYRCR Community—**Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects**—would examine the feasibility, costs, and benefits for stormwater capture and retention. The **Bergen Beach Retention/Detention System** also would contribute to the strategy of improving stormwater management the construction of a stormwater retention/detention system within a naturalized park area in Bergen Beach, and tie into City plans to construct new sewers and outfall in the area. To address the need to make power more resilient and redundant, a project to install **Alternative Power Hotspots** in privately-owned parking lot(s) would provide a reliable source of lighting in the event of an outage and create a meeting space where residents could power mobile devices.

In addition, community education and technical assistance programs would address the needs of homeowners, businesses, and critical care providers. To address the strategy to enhance emergency preparedness and response, a **Community Preparedness Education Program** would develop a local preparedness and response guide as well as educational programming to help inform community members of what to do before, during, and after a severe weather event. **Recovery Community Centers** would be created and based out of existing community facilities and organizations to provide emergency-related supportive services and supplies to residents after a severe event. Funding would help health and social service providers make building-level capital upgrades to ensure continuity of service during and after an emergency through the **Critical Facility Upgrades Program**. Finally, a **Homeowner Assistance Program** would fund resiliency educational programming, counseling, and audits for homeowners in the Community and address the strategy to improve residential resiliency.

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 Recovery Support Functions were utilized when developing needs, opportunities, strategies, and projects to ensure that a comprehensive approach is reinforced throughout the effort to shape a well-rounded resiliency strategy for the Community.

Health & Social Services

Community Planning & Capacity Building

Economic Development

Natural & Cultural Resources

Housing

Infrastructure Systems

Proposed and Featured Projects

Southeast Brooklyn Waterfront Coastal Protection Study

This project would develop a study to determine the cost and feasibility of coastal protection measures along the Southeast Brooklyn Waterfront shoreline in order to protect the Community from a severe weather event. The scope of the study would include an assessment of populated areas that are most at risk from coastal flooding, a comparison and feasibility analysis of potential alternatives, the conceptual design of protection measures, community engagement, and agency coordination. The study would require coordination with the U.S. Army Corps of Engineers and the City of New York in order to recommend targeted strategies and approaches that leverage existing plans and initiatives by these agencies.

Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects

This project would fund: 1) a study to examine the feasibility, costs, and benefits for various stormwater capture and retention projects in the joint Planning Areas of Southeast Brooklyn Waterfront and Canarsie, followed by 2) the implementation of recommended scalable pilot projects within the Southeast Brooklyn Waterfront Planning Area.

Bergen Beach Stormwater Retention/Detention System

This project would construct a stormwater retention/detention wetland within a natural area of southern Bergen Beach on land owned by New York City Department of Parks and Recreation. This stormwater retention system would link to City plans to construct a new storm sewer and outfall along Avenue Y, providing stormwater flooding abatement for a low-lying, at-risk residential community, while also removing pollutants from stormwater that may otherwise enter nearby East Mill Basin. This project would mitigate stormwater runoff in an area that recurrently experiences this issue.

Alternative Power Hotspot

This project would fund the installation of alternative energy infrastructure along critical thoroughfares throughout the Planning Area to serve as pilots for similar interventions in the neighborhood. Alternative power hotspots

The Southeast Brooklyn Waterfront NYRCR Planning Area has an extensive edge, and many Community assets, including supermarkets and shopping centers, sit along the water.

would provide a reliable source of lighting in the event of an outage and create a space where residents could meet and power mobile devices, while also accessing food and other services nearby. In locating the hotspots, the project would leverage the large number of big-box retailers and associated street-facing parking lots within the Planning Area.

Emergency Preparedness Education Program

This project would develop a local emergency preparedness and response guide, online hub, and educational programming to help inform community members throughout the Southeast Brooklyn Waterfront NYRCR Planning Area of what to do before, during, and after a storm event. Materials would focus on preparedness measures, evacuation protocol, and where to go to access supplies and information, among other topics.

Some residents in the Southeast Brooklyn Waterfront NYRCR Planning Area own boats which they keep docked in Mill Basin.

Recovery Community Centers

This Proposed Project would fund the development of Recovery Community Centers to be based out of existing community facilities and organizations. Centers would facilitate disaster preparedness coordination across community-based organizations (CBOs) in advance of an event. Centers could provide power, information, and supplies for residents, among other services. These would be located outside of the floodplain, have a parking lot, and be compliant with the Americans with Disabilities Act (ADA).

Critical Facility Upgrades Program

This project would help health and social services providers to make critical building-level capital improvements. Providers could include medical clinics, hospitals, voluntary emergency/ambulance organizations, and senior living facilities, among others. Funding for upgrades would help to prevent disruption in the essential services these organizations offer as a result of power outages or structural damages in the event of a storm. Potential capital improvements may include: 1) backup power (natural gas); 2) floodproofing measures, such as elevating mechanicals and applying waterproof coatings to the basement and ground floor, among other measures.

Homeowner Assistance Program

This project would fund educational programming and one-on-one counseling, as well as audits for high-risk homeowners, in the Southeast Brooklyn Waterfront NYRCR Planning Area. Project components may include: 1) education to eliminate confusion around retrofitting for resiliency, flood insurance, and other financial questions; 2) individual counseling to provide one-on-one assistance; and 3) audits, performed by specialized engineers, to recommend specific measures to enhance home resiliency.

I. Community Overview

Geographic Scope of NYRCR Plan

The NY Rising Community Reconstruction (NYRCR) Program was established to provide additional rebuilding and revitalization assistance to communities severely damaged during Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. New York State has allotted up to $4.38 million to fund eligible projects developed by the Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee), which includes the neighborhoods of Bergen Beach, Georgetown, Marine Park, Mill Basin, and Mill Island, in Community Development Block Grant–Disaster Recovery (CDBG-DR) funding from the U.S. Department of Housing and Urban Development (HUD). The Committee, comprising volunteer members from the aforementioned neighborhoods, has undergone an extensive planning process to identify short- and long-term resiliency projects that may be funded with this allotment and promote longer-term recovery. The Committee has also identified a broader vision for the Community to guide this longer-term recovery effort.

The Southeast Brooklyn Waterfront NYRCR Planning Area is home to a unique waterfront geography, including the Marine Park salt marsh.

For the purposes of this program, the Committee has defined the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) as the area bounded by Gerritsen and Nostrand Avenues to the southwest, Paerdegat Basin to the northeast, Avenue N and Flatlands Avenue to the north, Floyd Bennett Field to the south, and Jamaica Bay to the east. Represented by Brooklyn Community Board 18, the Planning Area is composed of five neighborhoods with active civic associations, and is home to approximately 53,000 residents.

The Planning Area features a unique waterfront geography that varies across neighborhoods, with some communities facing water on three sides. Both Bergen Beach and Mill Island are peninsulas that originated as islands within Jamaica Bay. Bergen Beach was connected to the Brooklyn mainland via landfill

in the first quarter of the 20th century and is now separated from the neighboring Canarsie NYRCR Community by the Paerdegat Basin channel. Mill Island, part of Mill Basin, sits on the Mill Basin Inlet of Jamaica Bay and was connected to the Brooklyn mainland around the same time as Bergen Beach. The neighborhood of Marine Park is largely landlocked, but includes an eponymous park and Floyd Bennett Field, which borders Jamaica Bay to the south.

Along the coastal edge are several large waterfront public and natural spaces, which provide ample recreational amenities for the surrounding communities. Paerdegat Basin Park and McGuire Fields line Paerdegat Basin, and provide athletic facilities and green space for the adjacent neighborhoods of Georgetown and Bergen Beach. The southern portion of Bergen Beach, part of Gateway National Recreation Area, is home to the Jamaica Bay Riding Academy. Gateway National Recreation Area also includes the Barren Island peninsula at the south of the Planning Area, home to Marine Park and Floyd Bennett Field. Mainly a salt marsh, Marine Park is Brooklyn's largest public park at nearly 800 acres in size and is home to cricket fields, ballfields, and a golf course. Floyd Bennett Field is the former home of New York City's first municipal airport and now hosts a variety of uses, including a campsite, the airfield of the New York City Police Department (NYPD), and Aviator Sports and Events Center.

Floyd Bennett Field, home to a variety of recreational and cultural amenities, is a unique asset in the Southeast Brooklyn Waterfront NYRCR Planning Area.

Public transportation primarily consists of bus service, with nine bus lines running through the Planning Area. Subway access is limited, with the closest subway stations located outside of the Planning Area: west of Marine Park at Kings Highway (B and Q lines); and north of the Planning Area at Flatbush Avenue-Brooklyn College (2 and 5 lines).

McGuire Fields, in the Bergen Beach neighborhood, is one of many well-used recreational areas.

Community Overview

The Southeast Brooklyn Waterfront NYRCR Planning Area is home to roughly 53,000 residents in 19,000 households. The Community's population has remained largely stable in the past decade, experiencing 0.5% population growth on an annual basis from 2000 to 2010. The local community is composed mostly of residents who identify as White (73% of the population), with the next most predominant racial group being Black, representing 16% of the population. Approximately 8% of residents identify as Hispanic. The median age of the Community is 40 years old, with 25% between 25–44 years of age and 29% between 45–64 years of age. A sizable portion of the population is under 24 years of age (32%), with 20% under the age of 18. There is a relatively smaller proportion of senior residents in the Community, with 15% of residents 65 and over, and 7% 75 and over.[1]

The Community is relatively well-educated and high-earning. Approximately 91% of the population over 25 years of age has a high school degree, which is higher than the rate for New York City (79%) and New York State (85%). Thirty-four percent of the population has at least a bachelor's degree, which is equal to the rate for New York City (34%) and slightly above the rate for New York State (33%). Area median household income for the Planning Area was estimated to be high at $76,015 for 2008-2012, which is substantially higher than for residents of New York State ($57,683) and New York City ($51,865) overall, as well as for Brooklyn in general ($45,215).[2]

The majority of Community residents are homeowners who live in single-family or two-family homes. Of the estimated 22,000 total (vacant and occupied) housing units in the Planning Area, approximately 63% are owner-occupied. The area's housing stock comprises mostly single-family homes (around 55%), with a slightly higher proportion of attached single-family homes than detached. Another 30% of the housing stock comprises two-family homes, and an additional 12% are three- to four-family homes. Only 2.5% of housing units are located in structures with more than five units. The median age of the housing stock is 62 years (built in 1952), with 65% of housing built before 1959.[3]

A variety of commercial uses support neighborhood residents. Strip malls and single-standing chain stores dot Flatbush Avenue, Avenue N, and Avenue U. Additionally, the large Kings Plaza Shopping Center is located at Flatbush Avenue and Avenue U in Mill Basin, and contains over 150 retail and dining establishments. The Community is also supported by

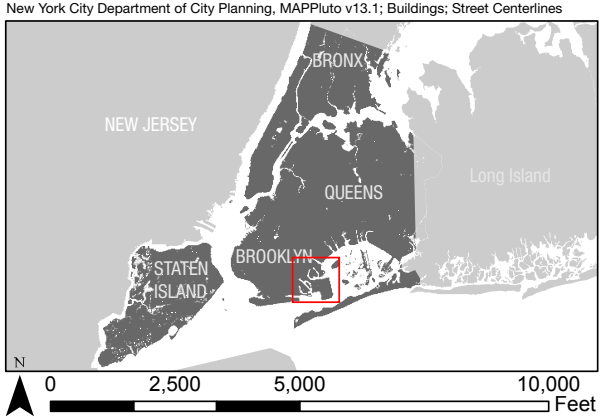
Top, The Kings Plaza Shopping Center, one of the largest shopping centers in Brooklyn, is located in the Mill Basin neighborhood; Bottom, Community members benefit from a large network of supermarkets, including Key Food.

Figure I–1: Southeast Brooklyn Waterfront NYRCR Planning Area

NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



small commercial storefronts along corridors like Avenue T in Mill Basin and Quentin Road in Marine Park.

The Planning Area is home to five distinct neighborhoods:

Bergen Beach is a community characterized by a median household income of $80,517. It features high rates of homeownership (66%), consistent with the high proportion of single-family homes in its housing stock (63%).[4] The primarily-residential community is characterized by single-family and semi-attached homes with driveways and garages on large lots. Within the past decade, construction in the northeast section of the neighborhood has resulted in new single-family homes and small condominium buildings. Most businesses and retail uses are confined to small strips.

Georgetown, identified as a separate neighborhood here but formally part of Bergen Beach, has a median household income of $77,930, well-above New York City and New York State levels. Seventy-percent of the area's housing stock is composed of two-family and multifamily housing, and features a homeownership rate of 52%. Like many homes in the Planning Area, most homes in Georgetown have driveways and garages. The housing stock is relatively new, with many homes constructed after the 1970s. Attached, peak-roofed, brick two-family homes are typical of the area's housing stock. The neighborhood is also served by the Georgetown Shopping Mall, a large outdoor strip mall located at Ralph Avenue and Avenue L.

Marine Park is home to 40% of the Planning Area's population and is relatively high-earning, characterized by a median household income of $79,957. The neighborhood features a high rate of homeownership (64%), reflective of its high proportion of single-family homes (68%), which includes attached houses and the neighborhood's distinctive semi-attached and detached brick Tudor-style houses. Larger homes line Marine Parkway with private driveways and garages. Small retail corridors exist along Quentin Road and Avenue S, and Flatbush Avenue offers more extensive retail uses, including Kings Plaza Shopping Center, on Flatbush Avenue, and Avenue U. The neighborhood is also characterized by Brooklyn's largest park, Marine Park.

Mill Basin, which formally includes Mill Island but is identified separately here, is home to 21% of the Planning Area's population. It features a median household income of $69,930, and a high homeownership rate of 63%. Nearly 90% of the neighborhood's housing stock comprises single- and two-family homes, with a near-equal distribution among each type. Avenue U is a primary east-west commercial corridor in this neighborhood, with big-box retailers including The Home Depot, Lowe's, and the Kings Plaza Shopping Center lining the southern edge of the street along the Mill Basin waterfront.

Mill Island, formally part of Mill Basin, is characterized by a high rate of homeownership (68%) and a median household income of $62,441.[5] The neighborhood is a peninsula jutting into Mill Basin, dominated by detached single-family and attached two-family houses on large lots located on wide, circular streets. Large single-family homes line the waterfront, often with private boat slips facing the Mill Basin water body. Retail uses are confined to a handful of commercial corridors, including Avenue U and Strickland Avenue.





The Southeast Brooklyn Waterfront is home to five distinct residential neighborhoods (clockwise from top left): Georgetown, Mill Island, Bergen Beach, Mill Basin and Marine Park.

Description of Storm Damage

Summary of Storm Impacts

The greatest impact from Superstorm Sandy in the Southeast Brooklyn Waterfront NYRCR Planning Area came from extensive flooding. The combination of high surge and high tide—owing to a full moon—resulted in waters rising above the height of bulkheads and natural river banks at various water bodies, including Mill Basin, East Mill Basin, Shellbank Creek, and Paerdegat Basin. While the natural landscape and wetlands of the Barren Island peninsula, Marine Park, and Bergen Beach served to lessen the strength and reach of storm surge into the Community's habitable areas, water still flooded into the streets of every neighborhood in the Planning Area, with surge reaching as far upland as Avenue N.

The neighborhoods of Bergen Beach and Mill Island—water-facing, and at low elevations—experienced the greatest levels of inundation. Bergen Beach, bordered by the waterways of East Mill Basin to the southwest and Paerdegat Basin to the northeast, was entirely inundated. Water levels as high as 9 feet were recorded in some areas, with the majority of the neighborhood experiencing water levels of 3–6 feet. Surge from the East Mill Basin water body traveled as far inland as East 74th Street, having entered the area at a vulnerable point along the shoreline at Avenue V, and traveling along Avenues W and X. Eyewitness accounts of the surge in this area recall that the water was slow-moving, giving some residents time to move their vehicles. Mill Island experienced similar levels of flooding largely within the northwest area of the neighborhood, between Avenue U and Mayfair Drive North, where streets are flatter. Waters within Mill Island originated primarily from East Mill Basin and flowed into one of the only residential areas of the Planning Area not protected by natural landscape features or wetlands. The neighborhoods of Marine Park, Mill Basin, and Georgetown also experienced flooding from storm surge, although water levels rarely reached higher than 3 feet in these areas. Community members have commented that had Superstorm Sandy generated more rainfall, flooding likely would have been far more extensive throughout the Planning Area. Surge carried away cars throughout the Community, particularly along Gerritsen Avenue in the west.

Fires occurred in the aftermath of the storm. *Courtesy of A. Sinesi.*

Figure I–2: Superstorm Sandy Inundation Levels

NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Sandy Inundation (Depth of Flooding)

- <3 feet
- 3-6 feet
- 6-9 feet
- >9 feet

FEMA Sandy Modeling Task Force Final High Resolution Surge Area-Field-Verified February 14,2013.
New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines

Wastewater sewer backup was a significant issue during Superstorm Sandy, which may have been caused, in part, by the temporary shutdown of the Coney Island Wastewater Treatment Plant in nearby Sheepshead Bay, which services the Community's wastewater sewers. While the plant was out of service for only a matter of hours, recovery from sewer backup was an intense, slow process, and individual homeowners and businesses were left to pay for their own repairs. Stormwater sewers were also overburdened during the storm, causing stormwater to jet out from manholes and inundate streets across the Planning Area. According to residents, one particularly low-lying area in Bergen Beach—the intersection of East 74th Street and Avenue Y—had stagnant stormwater pooling on the street for three days. Street stormwater flooding was particularly a problem for homeowners whose driveways recess into their basement. While stormwater overflow affected most of Bergen Beach, instances of overflow also occurred in the adjacent neighborhoods of Mill Basin and Mill Island. In the two weeks following Superstorm Sandy, residents within the Planning Area reported 96 street-flooding complaints to the City of New York's 311 service, largely limited to these neighborhoods.[6] Additionally, overgrown tree roots blocked stormwater sewers in Mill Basin and other areas, exacerbating backup. The Planning Area has reported numerous instances of widespread and extensive sewer backup during periods of moderate-to-heavy rainfall, both before and after Superstorm Sandy made landfall. This remains a critical issue facing this part of the Planning Area.

The properties most severely damaged as a result of Superstorm Sandy were those that experienced inundation from storm surge, and stormwater and wastewater sewer backup, with some residents experiencing water levels up to 8 feet in their basements from a combination of both surge and sewage. For those properties that filed flood insurance claims, the Federal Emergency Management Agency (FEMA) found the average cost of damages to be $8,853, with total damages estimated at $17,244,843.[7] Community members have reported that these numbers are understated and do not accurately reflect the actual cost of repairs—a discrepancy that has been a widespread source of frustration for many residents in the Community.

Power loss was a problem for some neighborhoods before, during, and after Superstorm Sandy, with Bergen Beach experiencing some power loss prior to Superstorm Sandy's arrival. For the majority of the Community, power loss was largely due to

Top, Floodwaters entered the Malone Community Center in Bergen Beach. *Millennium Development Corporation;* Bottom, Surge carried cars away. *Photograph by Steve Solomonson.*

damage of overhead wires, typically from wind force, and lasted for at most three days. The duration and location of power outages after Superstorm Sandy varied. Some residents in Bergen Beach, for example, never lost power, while some residents on East 72nd Street reported having lost power for an entire week. Others on East 73rd Street remained without power for 28 days and were finally brought back on line by out-of-state utility crews.

Key neighborhood retailers like gas stations and supermarkets also experienced power outages, reducing access to critical supplies in the Community. In addition, several gas stations could not open due to disruptions in the fuel supply chain, which meant they were without fuel to sell to customers, even if they had power. Those gas stations that were open initially had long lines, which contributed to clogged roads. However, once an odd-even rationing system was instituted, residents were able to purchase gas more easily.

St. Bernard of Clairvaux Parish and School distributed clothing and welcomed students from the Rockaways in the aftermath of Superstorm Sandy.

In addition to limited gas availability, mobility of Community residents during and after Superstorm Sandy was further compromised by the lack of functioning public transportation, in addition to traffic-clogged roads. Buses went out of service the night before Superstorm Sandy made landfall, with limited service returning to the B1, B3, B41 and B46 bus lines on the day after the storm. The primary entry and exit road for the western end of the Rockaway Peninsula is the Marine Parkway Gil Hodges Bridge, which becomes Flatbush Avenue, and is a major thoroughfare in the Planning Area that divides Marine Park from Mill Basin. During and after Superstorm Sandy, Flatbush Avenue experienced gridlock, with first responders traveling to and from the Rockaways to deliver supplies, as well as residents leaving the Rockaways to seek refuge elsewhere.

Faced with limited transportation options, many residents were stranded and without

supplies in the immediate aftermath of the storm. With the closest overnight evacuation shelter—Franklin D. Roosevelt High School—located around four miles away, access was difficult. Furthermore, there was confusion among residents about where the closest evacuation shelter was; many believed it was Brooklyn College, formerly the closest evacuation shelter for the area, but no longer in service by the time of Superstorm Sandy's landfall.[8] To provide more temporary relief and assistance, local community institutions opened their doors, even while they were recovering from damage themselves. St. Bernard of Clairvaux Parish and School in Bergen Beach, for instance, was closed for a week following the storm, yet thereafter, welcomed students from the Rockaways so that they would not have to miss school days.

Many homes and businesses in the Community are still experiencing lingering damage from Superstorm Sandy. Numerous homeowners have not been able to pay for remediation of mold infestation and other damage to their homes that accompanied flood inundation. Some have also struggled to receive insurance benefits for damage related to sewer backup and not surge inundation. Additionally, select businesses have been unable to reopen due to extensive damage.

Strong wind forces during Superstorm Sandy swept trees onto cars throughout the Southeast Brooklyn Waterfront NYRCR Planning Area. *Courtesy of A. Sinesi.*

Critical Issues

Community residents and Committee members identified numerous critical resiliency issues, brought to light in the aftermath of Superstorm Sandy. Through the NYRCR planning process, the Committee and public raised several issues that have informed an assessment of needs and opportunities.

One of the most critical issues facing the Community is vulnerability to inundation from surge. This is particularly the case in the low-lying areas of Mill Island and Bergen Beach, where most residents experienced 3-6 feet of inundation during Superstorm Sandy. Community members in Bergen Beach also report that backfill is receding in the area, softening the edge and possibly lessening the neighborhood's protection from surge.

In addition to surge inundation, another issue frequently cited by area residents is wastewater and stormwater sewer backup. Unlike the majority of Brooklyn, the wastewater and stormwater sewer systems in most of the Planning Area are separate, meaning that sanitary and stormwaters are carried along different water lines, with stormwater emptying directly into the Bay. There are reports of backup of both systems not only during Superstorm Sandy, but during heavy rain events as well. In some areas, residents have reported tree root overgrowth obstructing the stormwater pipes, blocking proper flow of the water and exacerbating backup.

During and after Superstorm Sandy, community members throughout the Planning Area experienced power outages. For most community members, outages lasted a few days, though some experienced outages for a week or longer. The outages often varied on a property-by-property basis, and residents and business owners lack information as to why power outages occurred at some properties and not others on the same block.

Lack of organized local emergency response and information around available resources are also major concerns for the Community. Community members report not knowing if and when emergency personnel would come to the area, forcing residents to rely on their neighbors for assistance. Additionally, many residents lacked information on resources that could be accessed beyond the closest evacuation shelter. While some schools and churches in the Planning Area opened their doors to community members to provide needed supplies and refuge, residents reported the need for a more

Residents experience sewer backup not only during severe events, but during regular heavy rain events as well. Here, a resident in Bergen Beach uses a sump pump to remove stormwater sewer backup from a basement in the aftermath of Superstorm Sandy. *Photograph by Steve Solomonson.*

extensive and coordinated relief effort, and for greater access to information about available resources.

For the Community, there are few transportation options in the event of an emergency. After Superstorm Sandy, community members were isolated, with several gas stations out of service, public buses not running, and gridlock on major entry and exit thoroughfares. Cars also encountered traffic throughout the Planning Area, particularly on Flatbush Avenue, which was congested with traffic from the Marine Parkway Bridge, the main access road to the hard-hit Rockaway Peninsula.

Homeowners throughout the Planning Area face mounting repairs due to Superstorm Sandy-related damage and flood insurance premium increases. Residents report lacking information around the types of improvements to perform to enhance their home's resiliency, as well as frustration with existing financial and technical assistance programs. Community members have been unhappy with the response rate of assistance programs like Build It Back, though remain hopeful that adjustments to the program will be beneficial.

Stormwater from the street flows easily into the driveways of many Planning Area homes.

Community Vision

The Committee established both a long-term vision and overarching resiliency and recovery goals for the Community.

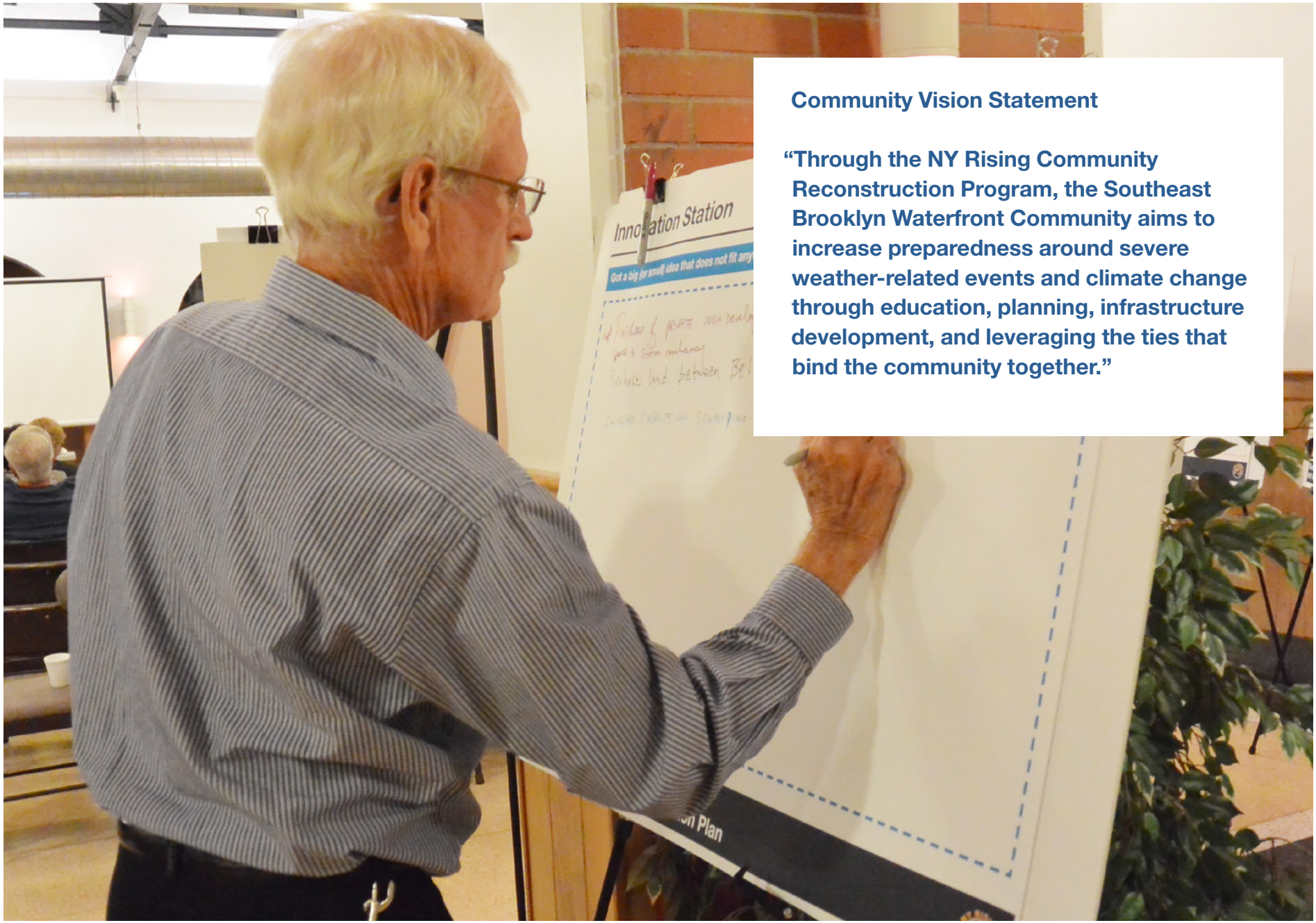
Setting targets and aspirations for the future helped the Committee look beyond the current situation in order to develop a vision for a more resilient, sustainable community. From a review of assets, critical issues, needs, and opportunities, the Community defined a vision and goals.

Short Term Goals (2–5 Years)

- More informed about emergency preparedness and response procedures and resources
- Emergency preparedness plan in place
- More stable stormwater sewer system
- Plan for more resilient power supply
- Back-up generators in critical retail stores and gas stations
- Cellphone charging stations
- Public knowledge of gas and utility availability
- Closer official evacuation center
- No release of wastewater sewage under any circumstances

Long Term Goals (5–10 Years)

- Stable stormwater sewer system
- Improved surge protection
- Hardened power infrastructure



Community Vision Statement

"Through the NY Rising Community Reconstruction Program, the Southeast Brooklyn Waterfront Community aims to increase preparedness around severe weather-related events and climate change through education, planning, infrastructure development, and leveraging the ties that bind the community together."

A Southeast Brooklyn Waterfront NYRCR Planning Committee member contributes ideas for a more resilient future at Public Engagement Event #2.

Relationship to Regional Plans

Regional Perspectives: Jamaica Bay

From Sea Gate on the western edge of Coney Island, to South Valley Stream at its headwaters in Nassau County, Communities in and around Jamaica Bay suffered enormous damage from Superstorm Sandy. Home to more than 800,000 people, Jamaica Bay is a unique ecosystem in an urban landscape, famous for its salt marsh islands, intertidal flats, horseshoe crabs, and migratory birds that use the area as a refuge during their seasonal travels. A New York State-designated Significant Coastal Fish and Wildlife Habitat, Jamaica Bay is home to numerous fish species, including striped bass, fluke, flounder and porgies. Beyond the water, the Bay is surrounded by woodland and forests that host an array of wildlife.

All of the Jamaica Bay communities suffered significantly during and after Superstorm Sandy, some from flooding or surge inundation, and some from wave action damage. Homes, businesses, beaches and parklands, schools, roadways, and mass transit were all damaged; neighborhoods around Jamaica Bay also endured one of the most extensive and long-lasting power outages in New York City.

In the future, flood risk is likely to be exacerbated throughout the Bay by projected sea-level rise associated with climate change. According to FEMA's preliminary Flood Insurance Rate Maps (FIRM), the 100-year floodplain has expanded since 1983. Floodplain expansion has been especially dramatic for the Jamaica Bay area, and it is anticipated that this trend will continue, with the low-lying areas at the edges of Bay communities experiencing more frequent flooding at greater flood depths.

There are also ecological factors to consider: Jamaica Bay is a tidal estuary. Though severely degraded over the 19th and 20th centuries, the Bay remains a dynamic ecosystem, providing critical habitat to a variety of species, including a number of protected and threatened birds that inhabit both the beach and Bay. Habitat loss and degradation of the Bay's chemical, physical, and biological environment has largely been due to human activities, although New York City and Federal policies and restoration efforts have yielded dramatic improvements in the quality of the Bay's water and habitat.

In this hydrologically connected system, projects and interventions in one area of the Bay can have ecological and coastal protection ramifications across the estuary. The cumulative impact of projects implemented in different locations around the Bay can be greater than the sum of their individual impacts. At the same time, interactions between projects can sometimes have negative effects, including—albeit rarely—induced wave or surge activity.

Planning for Jamaica Bay

The NYRCR Program recognizes that solutions for Jamaica Bay will affect all of the Communities that front its borders and extended waterways. This includes communities from Brooklyn, Queens, and Long Island. Acknowledging that strategies for Jamaica Bay are complicated and that consensus building will be achieved through dialogue, the NYRCR Program formed the Jamaica Bay Regional Working Group to bring affected communities together to research current and planned projects, and to meet with local, State, and Federal officials, and other groups working in Jamaica Bay. The Working Group will continue to meet over the next several months to analyze options and opportunities, discuss goals and challenges, and strive to arrive at a consensus on a long-term approach to resiliency in Jamaica Bay.

To maximize benefits and minimize risk, NYRCR Communities as well as the various City, State, and Federal agencies active within the Bay will need to coordinate. In addition to the NYRCR effort, there are many agencies, organizations, and stakeholders

The salt marshes in Marine Park are some of the many natural areas in the Southeast Brooklyn Waterfront NYRCR Planning Area managed by the New York City Department of Parks and Recreation.

involved in Jamaica Bay. The newly formed Jamaica Bay Resiliency Institute, established through an initiative led by the City University of New York in partnership with the City of New York, the National Park Service (NPS), and the Trust for Public Land, among other organizations, are potential partners and present an opportunity for NYRCR Communities in Jamaica Bay to collaborate with other organizations and agencies.

Existing Plans, Studies, and Projects

Due to the many challenges and risks associated with the region, plans and projects to improve resiliency and the overall urban environment existed before Superstorm Sandy at the Federal, State, regional and City levels. Attention on the region has only grown since Superstorm Sandy, as have the number of planned and active projects.

To avoid duplication of plans and to best identify how the NYRCR Program may fill existing gaps, it is essential to understand and assess potential relationships to existing initiatives. This includes overall resilience and Superstorm Sandy-specific recovery plans, as well as other hazard mitigation, waterfront, infrastructure, and sustainability plans. The analysis and recommendations included in these reports contribute valuable information and ideas to the NYRCR planning process and project definitions.

Unlike some of the other Jamaica Bay communities impacted by Superstorm Sandy, there has been considerably less planning in Southeast Brooklyn Waterfront by outside entities. While the area's community-based organizations have discussed issues, these discussions have not yet resulted in action. Key programs, plans, and projects—and their linkage to the Community's rebuilding and resiliency strategies and projects—are described below.

Federal Initiatives

The U.S. Army Corps of Engineers (USACE) is a major player in both coastal protection and ecological restoration efforts within Jamaica Bay and is currently conducting a number of studies and projects that could provide resiliency benefits, including dredging and ecosystem restoration studies. These include studies that predated Superstorm Sandy as well as post-Superstorm Sandy updates to the previous plans and studies. While initiated and led by USACE, the projects that stem from these studies may have many implementation partners, including multiple New York State and New York City agencies.

Among ongoing USACE studies, the **East Rockaway Inlet to Rockaway Inlet (Rockaway Beach) Reformulation Study i**s of primary importance to coastal protection planning in Jamaica Bay, as the results of this study will inform and guide future USACE coastal protection planning for the Community and the rest of Jamaica Bay. While the study was initiated prior to Superstorm Sandy, and preliminary alternative and existing conditions were developed by 2011, the study has undergone significant revision since in light of the impacts of the storm. By early 2015, the USACE is expected to release a Draft Reformulation Report with refined coastal storm risk management alternatives for the Atlantic Coast portion of the study area, as well as preliminary risk management alternatives for Jamaica Bay.

In addition to its coastal protection work, the USACE is active in ecosystem restoration projects throughout Jamaica Bay. Thirty-nine potential ecosystem restoration opportunities in the Bay are identified in the **Hudson Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP).** Adopted in 2009, the USACE and Port Authority of New York and New Jersey developed the HRE-CRP in collaboration with Federal, New York State, municipal, and non-governmental organizations, as well as

other regional stakeholders. It sets forth a consensus vision, master plan, and strategy for future ecosystem restoration in the New York/New Jersey Harbor.

Some of these ecosystem restoration opportunities are currently being reevaluated by the USACE to assess post-Superstorm Sandy changes and their potential to provide additional resiliency benefits as part of the **Jamaica Bay, Marine Park and Plumb Beach, NY Feasibility Study**, which is ongoing**.** This Feasibility Study is a joint undertaking of the USACE and the New York City Department of Environmental Protection (NYC DEP).

The interim draft report identified eight priority restoration sites in Jamaica Bay (550 acres) from the HRE-CRP. One of these sites, Dead Horse Bay in Marine Park, is located within the Planning Area. Here, the plan recommends enhancing the local marsh habitat and restoring 131 acres of marsh, creek, and dunes, in order to undo area erosion that has occurred over the past several decades.

Another restoration site within the Planning Area identified in the HRE-CRP is Paerdegat Basin, located next to Georgetown and Bergen Beach. Enhancing water quality is the primary restoration goal at Paerdegat Basin, and significant work has been completed on this site by NYC DEP since 2009 (see later description).

In April 2014, the NPS released its **Final General Management Plan Environmental Impact Statement** for the Gateway National Recreation Area. The report updates the prior general management plan from 1979, and presents several vision and management strategies for Gateway National Park, which includes Floyd Bennett Field, in the aftermath of Superstorm Sandy. The report presents potential general management strategies, assesses Superstorm Sandy-affected environments and environmental consequences, and reviews the community participation process the NPS undertook to develop the General Management Plan.

City and Local Initiatives

In addition to the Federal initiatives and projects centered on Jamaica Bay, there are a number of New York City-wide initiatives relevant to resiliency planning in Southeast Brooklyn Waterfront.

Special Initiative for Rebuilding and Resiliency (2013). The Special Initiative for Rebuilding and Resiliency (SIRR) was initiated by Mayor Bloomberg in December 2012 to assess the damage wrought by Superstorm Sandy and consider the implications going forward for New York City in light of anticipated sea-level rise. In June 2013, SIRR released its findings in a comprehensive report, *A Stronger, More Resilient New York* (SIRR Report), which outlined New York City's plan for rebuilding post-Superstorm Sandy and ensuring resiliency into the future. The plan contains actionable recommendations for communities affected by the storm as well as chapters covering citywide issues, including coastal protection, buildings, insurance, utilities, liquid fuels, health care, transportation, parks, water and wastewater, and other critical networks. While the SIRR report on Southern Brooklyn does not include Southeast Brooklyn Waterfront, the report does make coastal protection recommendations for Jamaica Bay. It additionally prioritizes expanding the Department of Parks and Recreation's Greenstreets program in Marine Park, which is aimed at reducing flooding through stormwater retention measures, with a goal of implementation by 2014. The report and latest updates on implementation can be found on the SIRR website: *http://www.nyc.gov/html/sirr/.*

NYC Hazard Mitigation Plan (2014). Replacing the previous Hazard Mitigation Plan from 2009, the new plan was developed by the New York City Office of Emergency

Management (NYC OEM) in partnership with the New York City Department of City Planning (NYC DCP) and will be effective from April 17, 2014, to April 17, 2019. The plan first assesses New York City's risk related to hazards, which include coastal storms, coastal erosion, and flooding. It then lays out a citywide mitigation strategy, focusing on measures to be taken by New York City agencies to enhance response and recovery efforts. The report also provides a retrospective analysis of Superstorm Sandy. The report can be found on the NYC OEM website: *http://www.nyc.gov/html/oem/html/planning_response/planning_hazard_mitigation_2014.shtml*

NYC Housing Recovery programs (ongoing). The City of New York has launched several initiatives under the NYC Housing 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 surrounding Jamaica Bay. For example, the Build it Back program seeks to assist homeowners, landlords, and tenants whose homes were damaged by the storm. The City is also pursuing a program that will offer incentives to small businesses to invest in improvements to protect against severe weather. More information on NYC Housing Recovery programs can be found here: *http://www.nyc.gov/html/Recovery/.*

NYC Revised Building Codes (2013). Particularly relevant to NYRCR Communities are ongoing and potential future updates to the building and zoning codes. U.S. Green Building Council's Building Resiliency Task Force made 33 recommendations for code updates to the New York City Council. While several recommendations are still in various states of review, 16 initiatives have been passed. In addition, NYC DCP's Flood Resiliency Zoning Text Amendment was approved by New York City Council on October 9, 2013. The amendment removed obstacles to homes that are rebuilding in the flood zone, allowing homes to build to the new standards.

NYC Regional Economic Development Council's (NYC REDC) Five–Year Strategy Plan (2011). This plan entails a comprehensive economic strategy to address and promote workforce development, government fiscal responsibility, and infrastructure investment, to support 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, like supporting small businesses and neighborhood revitalization, align with the goals of NYRCR.

NYC DCP's Retrofitting Buildings for Flood Risk (2014) and Designing for Flood Risk, Urban Waterfront Adaptive Strategies (2013). NYC DCP recently published a comprehensive guide that outlines retrofitting options for housing in the 100-year floodplain. It specifically provides a step-by-step guide for how property owners, architects, and developers should approach resiliency improvements for several common housing typologies in New York City.

NYC DCP began the Designing for Flood Risk reports in 2012 as a follow-up to the Vision 2020 Waterfront Plan; when Superstorm Sandy struck, these reports evolved to reflect new, post-storm conditions and challenges. *Designing for Flood Risk* 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 typologies. The Urban Waterfront Adaptive Strategies Report identifies strategies for improving coastal resilience, assesses the costs and benefits of

NYC DEP's Paerdegat Basin Ecosystem Park provides public access to Paerdegat Basin and features seating areas.

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 Southeast Brooklyn Waterfront neighborhoods specifically, the design strategies for one- to two-family homes in *Designing for Flood Risk* and the evaluation framework for assessing resiliency strategies are particularly appropriate for Southeast Brooklyn Waterfront given the area's building stock

NYC DEP's Jamaica Bay Watershed Protection Plan (2005, updated 2010) outlines NYC DEP strategies and projects aimed at restoring and maintaining the water quality and ecological integrity of Jamaica Bay. This plan included the Paerdegat Basin Combined Sewer Outflow improvements described below, and along with the NYC DEP's Green Infrastructure Program, introduced a series of green infrastructure projects and studies.

NYC DEP's Paerdegat Basin Combined Sewer Overflow Facility (2011).
In 2011, NYC DEP opened the Paerdegat Basin Combined Sewer Overflow (CSO) Facility, which they estimate will prevent up to 50 million gallons of CSOs during heavy rain events from being discharged into Paerdegat Basin, dramatically improving water quality in the Basin and Jamaica Bay. In addition to the CSO facility, NYC DEP is near completion on the Paerdegat Basin Natural Park and Ecosystem Park. These projects, which include restoration of wetlands and natural grasslands, will help absorb stormwater runoff, further improving water quality in the basin and potentially reducing stormwater flooding in surrounding neighborhoods.

NYC DEP's Green Infrastructure Annual Report and Plans (2014) provides an update on NYC DEP's Green Infrastructure Program, created to address water quality impacts that result from CSO events. Under this program, NYC DEP and its partner agencies design, construct and maintain a variety of sustainable

green infrastructure measures, including green roofs, rain gardens, and right-of-way bioswales on New York City-owned property including, sidewalks, schools, and public housing. The program also provides grants for green infrastructure projects on private property. Projects underway in Southeast Brooklyn Waterfront neighborhoods include a long-term control plan to achieve specific water quality standards for the Jamaica Bay CSO area in Paerdegat Basin, as well as rain barrels in Marine Park and bioswales in Mill Basin. NYC DEP is also currently conducting additional demonstration projects in the Jamaica Bay CSO tributary area to assess the benefits of green infrastructure use at a neighborhood level, the results of which will be published in a 2016 Performance Metrics Report.

NYC DOT's Transportation Planning and Improvements (2014). The New York City Department of Transportation (NYC DOT) has a variety of recently completed, under construction, and planned street and infrastructure projects in the Bergen Beach, Georgetown, Mill Basin, Mill Island, and Marine Park areas. In Mill Basin, NYC DOT is in the process of reconstructing and landscaping the Mill Basin Drawbridge, a project that started in 2013 and is slated for completion in 2017. This is part of a larger ongoing initiative to reconstruct seven bridges along the Belt Parkway. In Georgetown, NYC DOT and NYC DEP are in the design phase of a Bergen Avenue Area street reconstruction project, which has an expected completion date of 2026. In Marine Park, NYC DOT is working with the New York City Department of Design and Construction (DDC) to install bus rapid transit stations on Nostrand Avenue, a project that was slated for completion in June 2014.

Another major NYC DOT project in the Planning Area is the **Jamaica Bay Greenway**—an in-development 28-mile multi-use path linking communities surrounding Jamaica Bay. To date, NYC DOT and partners have developed 10 miles of Greenway, including sections in McGuire Fields and Floyd Bennett Field in the Planning Area. NYC DOT is undertaking community engagement efforts to determine additional route development. Priorities for the final route development and implementation are expected to be released in spring of 2015.

NYC Department of Parks and Recreation's Remove and Replant Program. New York City Department of Parks and Recreation (NYC DPR) recently launched this program in order to remove and replant trees damaged by Superstorm Sandy. Foresters have conducted a survey of trees within the Superstorm Sandy inundation zone to identify those damaged by saltwater inundation and wind, and in need of removal. NYC DPR expects to remove and replant around 10,000 trees through this effort. Tree removals began in July 2014 and are expected to continue through July 2015, with all trees replanted within 12 months of removal. Residents report that tree removal has already begun in the Southeast Brooklyn Waterfront NYRCR Planning Area.

Brooklyn Recovery Fund's Brooklyn Communities Speak: An Action Guide for Local Decision-Makers (2014). This report surveys conditions in six coastal Brooklyn neighborhoods in the wake of Superstorm Sandy and provides both borough-wide and neighborhood-specific recommendations for government recovery and resiliency programs. While Bergen Beach, Georgetown, Marine Park, Mill Basin, and Mill Island were not included in the six neighborhoods surveyed, borough-wide recommendations around housing and rebuilding, health, businesses, infrastructure, and immigrant and undocumented populations provide context for post-Superstorm Sandy challenges in these communities. Additionally, two Brooklyn Community Foundation Emergency Fast Track grants of $10,000 each went to Mill Basin area community-based organizations in the immediate aftermath of Superstorm Sandy:

Millennium Development received funding for restoring electricity in powerless homes; and the Jewish Community Council of Canarsie, which serves the Canarsie, Bergen Beach, Mill Basin, and Mill Island areas, received funding for emergency food needs and mental health services.

Other Initiatives

Con Edison's Fortifying the Future (2013). Consolidated Edison (Con Ed), the electricity provider in the Planning Area, put forth a plan to protect Superstorm Sandy-affected power infrastructure, which includes burying 30 miles of overhead lines around facilities that provide critical emergency support functions, including police and fire stations, hospitals, pharmacies, and supermarkets. Con Ed's plan also includes reducing the number of customers served by a single section of overhead line.

The planning efforts above have produced considerable work that can be leveraged throughout the NYRCR planning process, though gaps still remain. Key outstanding issues include:

- Addressing sewer backup in the area through system-wide upgrades, education, and technical and financial assistance toward the installation of in-home check valves and other measures.
- Expanding the range of programs that are targeted to housing, both for enhancing structural resiliency, as well as helping maintain affordability for homeowners amidst rising flood insurance premiums.
- Enhancing the resiliency of larger neighborhood-supportive retail, which may not be eligible for the City's programs, including supermarkets and shopping centers in the area.
- Strengthening the capacity of local organizations, including the wide network of Civic Associations, to provide assistance to community members before, during, and after storm events.

The many homes and private docks that line the Mill Basin Inlet, part of Jamaica Bay, will be affected by Federal plans for the Bay.

II. Assessment of Risk and Needs

Description of Community Assets

Assets are locations, features, infrastructure and development located within or outside of the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) whose loss or impairment due to flood or storm events would compromise any essential social, economic, or environmental functions and/or critical facilities of the Southeast Brooklyn Waterfront NYRCR Community (Community).

Assets may facilitate economic and social activities or refer to critical infrastructure required to support those activities. Assets may also be part of the built or the natural environment. The goal of the asset inventory is to assemble a description of the NYRCR Community's most important assets with sufficient information to assess risk to the assets under current and future conditions. Assets identified fall within at least one of two categories:

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

Assets were identified using a combination of publicly available data and input from the Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) and the public. The inventory and associated maps were initially generated using New York City land use and infrastructure data to identify assets within the Planning Area. The maps were refined by the Committee and presented to the Community at the initial Public Engagement Event for feedback. The assets described here reflect the input and feedback of the Committee and the public. The asset inventory is organized by NYRCR asset class.

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://stormrecovery.ny.gov/community-reconstruction-program*.

Recovery Support Functions

Throughout this plan, six 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:

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

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.

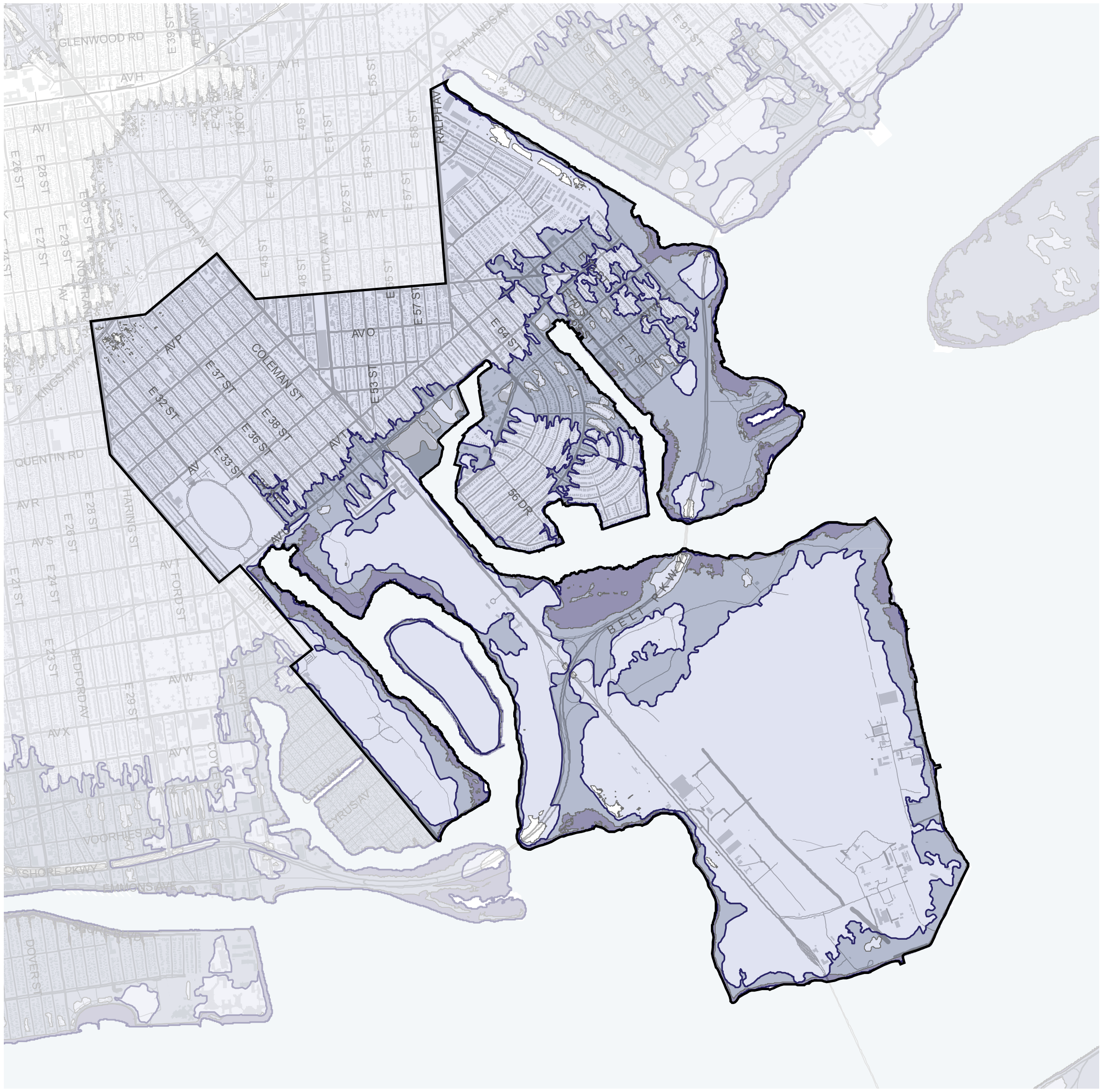
Community Planning & Capacity Building
This function addresses a community's ability to implement immediate storm recovery activities and organize long-term resiliency plans. Formal and informal community networks, dedicated emergency education and planning efforts, and experience recovering from past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

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.

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.

Figure II–1: NYS Department of State Risk Map



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Areas

NYSDOS Risk Areas

- Moderate
- High
- Extreme

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:

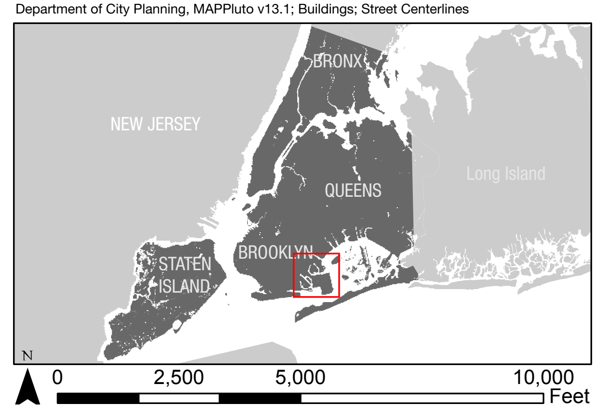
Extreme: Areas currently at risk of frequent inundation and vulnerable to erosion and wave action over three feet (FEMA V zone), subject to shallow coastal flooding (within the National Weather Service's shallow coastal flooding advisory threshold), or likely to be inundated in the future due to sea 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 of 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 NYRCR website, as can a link to on online viewer for the risk assessment area maps, at http://stormrecovery.ny.gov/community-reconstruction-program.

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Health and Social Services Assets

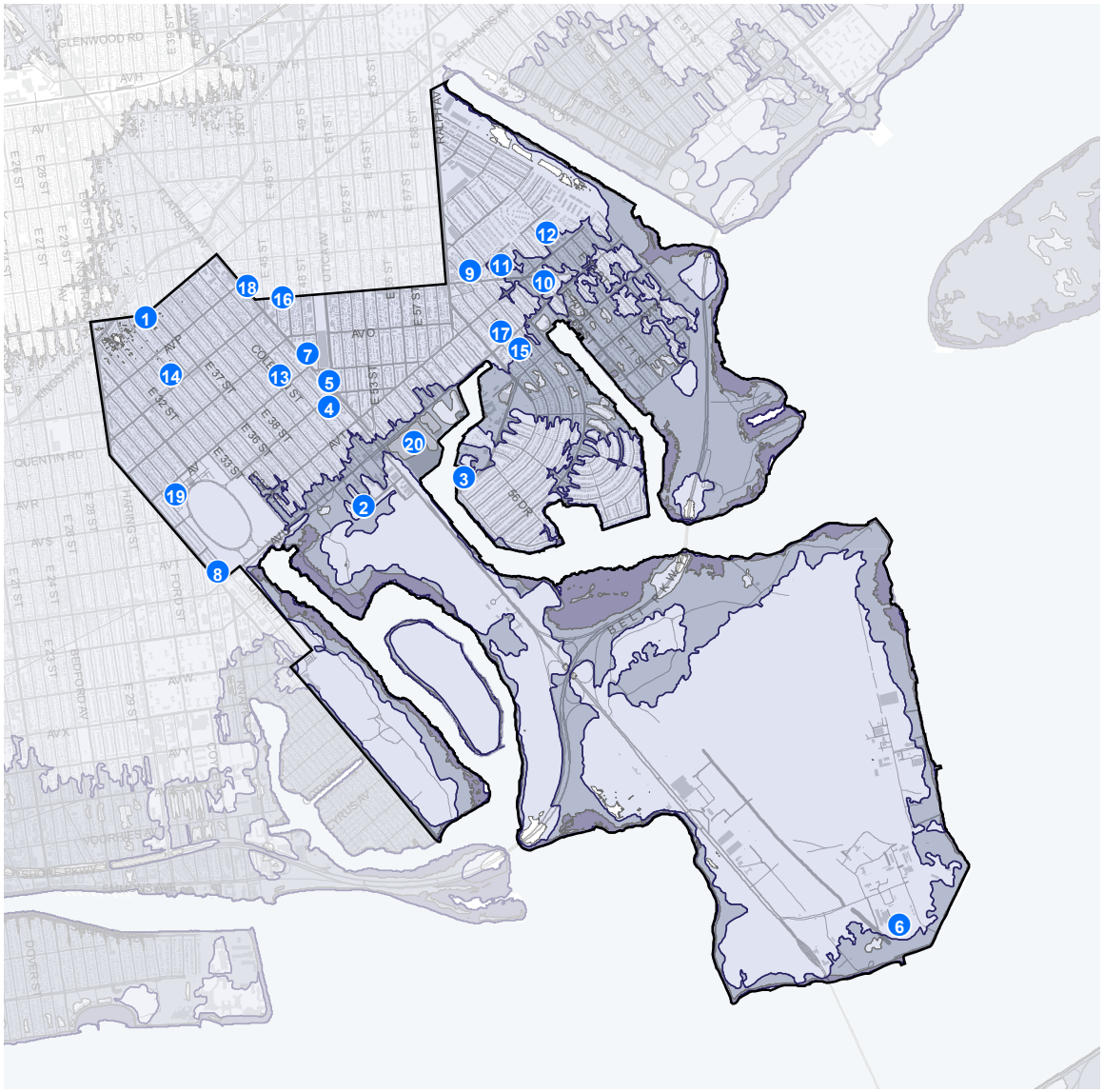
The Community identified six community schools as assets, with half of them located in Bergen Beach. Among these are both public and private schools, including P.S. 236 in Mill Basin, P.S. 312 in Bergen Beach, and J.H.S. 278 in Marine Park. Additionally, there are a number of schools in the Community that are affiliated with religious institutions, including St. Bernard School in Bergen Beach and Mary Queen of Heaven School in Old Mill Basin. Schools have served as important centers for information and response during emergencies. For example, Saint Bernard of Clairvaux Parish and School, a campus that is located between Veterans Avenue and Avenue U, served as a critical recovery center in the aftermath of Superstorm Sandy.

There is one senior and assisted-living center in the Community: Sunrise Senior Living Center in Mill Island, which is critical in serving the Community's senior population. While there are no major medical facilities located within the Planning Area, assets like the Physicare Family Health Center, the Flatlands Volunteer Ambulance Corps, the Jewish Community Center of Marine Park, as well as several 24-hour pharmacies, are crucial to maintaining the health of the Community before, during, and after a major storm event. Additionally, the Planning Area benefits from several medical facilities located outside of the Planning Area, including Mount Sinai Beth Israel, New York Community Hospital, and Kings County Hospital.

The Community is served by three New York Fire Department (FDNY) engine companies. All three of these facilities, located within the moderate risk area, are critical to effective emergency response, and thus, the safety and resiliency of the Community. With a lack of New York Police Department (NYPD) precincts located within the Planning Area, the Community has a greater reliance on these FDNY stations.

FDNY Engine 323 (Top) and Sunrise Senior Living (Bottom) are two of the many health and social services assets located in the Planning Area.

Figure II–2: Health and Social Services Assets Map



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Health and Social Service Assets

Health,Social Service, and Emergency Response Assets

Extent of High & Extreme Risk Zones

NYSDOS Risk Areas

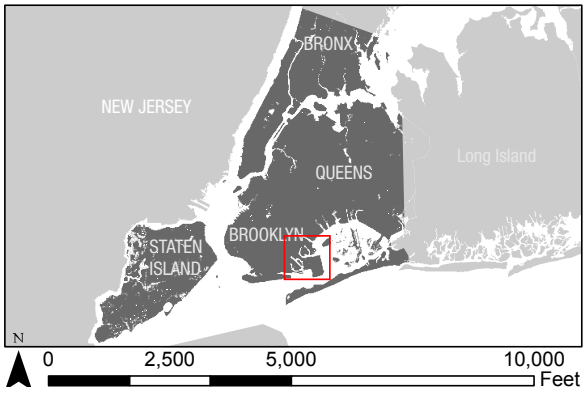
- Moderate
- High
- Extreme

1 PHYSICARE FAMILY HEALTH CENTER
2 SOUTH BROOKLYN NEPHROLOGY (DIALYSIS) CENTER
3 SUNRISE SENIOR LIVING CENTER
4 RITE AID PHARMACY
5 WALGREENS PHARMACY
6 ARMED FORCES RESERVE CENTER
7 FDNY ENGINE 309, LADDER 159
8 FDNY ENGINE 321
9 FDNY ENGINE 323
10 SAINT BERNARD OF CLAIRVAUX PARISH AND SCHOOL
11 JUNIOR HIGH SCHOOL 78 ROY H MANN
12 PUBLIC SCHOOL 312 (BERGEN BEACH)
13 PUBLIC SCHOOL 207 ELIZABETH G LEARY
14 PUBLIC SCHOOL 222 KATHERINE R SNYDER
15 PUBLIC SCHOOL 236 (MILL BASIN)
16 FLATLANDS VOLUNTEER AMBULANCE CORPS
17 HATZOLAH OF MILL BASIN
18 JCC OF MARINE PARK
19 JUNIOR HIGHSCHOOL 278 MARINE PARK
20 KINGS PLAZA SHOPPING CENTER

OUTSIDE OF THE PLANNING AREA:

21 CVS PHARMACY
22 MADISON HIGH SCHOOL
23 PUBLIC SCHOOL 203
24 PUBLIC SCHOOL 251
25 SOUTH SHORE EDUCATIONAL COMPLEX
26 KINGS COUNTY HOSPITAL CENTER
27 NY COMMUNITY HOSPITAL
28 CONEY ISLAND HOSPITAL
29 MOUNT SINAI BETH ISRAEL HOSPITAL

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Economic Assets

The Planning Area is served by four commercial corridors: Avenue N, Flatbush Avenue, Ralph Avenue, and Avenue U, the last of which runs the width of the Planning Area and passes through Marine Park, Mill Basin, and Bergen Beach. Of these avenues, Flatbush Avenue and Avenue U are similar, each characterized by four-lane roadways and sporadic development. Flatbush Avenue, in particular, features many small businesses that rely on the major thoroughfare's pedestrian traffic.

At the intersection of Flatbush Avenue and Avenue U is Kings Plaza Shopping Center, the largest of many shopping centers located within the Planning Area. Located at the intersection of the Mill Basin and Marine Park neighborhoods, Kings Plaza Shopping Center is a centrally-located commercial node and one of the largest enclosed shopping malls in Brooklyn, which draws shoppers from throughout the borough of Brooklyn. Also of note is the collection of shopping centers along Ralph Avenue in Georgetown, which serves both the residents of Georgetown and Bergen Beach. These commercial corridors and businesses are critical to day-to-day economic activities, as well as the Community's ability to prepare for and recover from disasters.

Left, Commercial storefronts line Avenue N, one of many busy commercial thoroughfares in the Southeast Brooklyn Waterfront NYRCR Planning Area; Right, There are several supermarkets that serve the Southeast Brooklyn Waterfront NYRCR Community, including Key Food on Avenue U.

Figure II–3: Economic Assets Map

NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Areas

NYSDOS Risk Areas

- Moderate
- High
- Extreme

Economic Assets

- # Economic Assets
- Commercial Corridors (Flatbush Avenue, Avenue N, Avenue U, Ralph Avenue)
- Shopping Centers

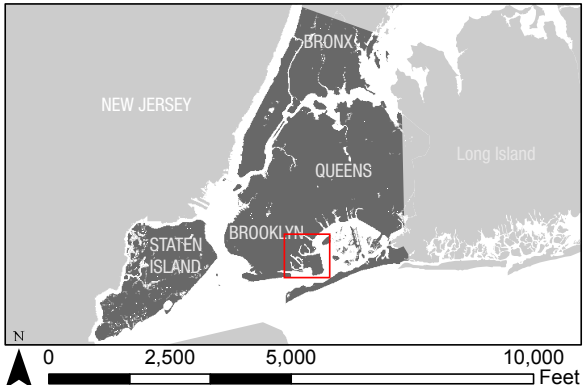
Economic Use

- Mixed Residential & Commercial
- Commercial & Office Buildings
- Industrial & Manufacturing

1 AVE N COMMERCIAL CORRIDOR
2 FLATBUSH AVE COMMERCIAL CORRIDOR
3 RALPH AVE COMMERCIAL CORRIDOR
4 AVE U COMMERCIAL CORRIDOR
5 GEORGETOWN SHOPPING CENTER
6 KINGS PLAZA SHOPPING CENTER
7 RALPH AVE SHOPPING CENTER
8 KEY FOODS
9 WALDBAUMS GROCERY

OUTSIDE OF THE PLANNING AREA:
10 KEY FOODS GROCERY

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Housing Assets

While every residence within the Planning Area is important, those residences within the high and extreme risk zones were highlighted as particularly vulnerable assets. There are 2,890 residential buildings either partially or entirely in the high and extreme risk flood zones, the majority of which are one- and two-family residences in Mill Island and Bergen Beach. There are some instances of multifamily walk-up buildings, mostly within Bergen Beach, and close to Paerdegat Basin. The housing stock of these two neighborhoods, while similar in type, varies in size and architecture. For instance, Mill Island is home to numerous waterside homes that feature private docks, as well as semi-attached homes. Alternatively, Bergen Beach is characterized by a mixture of detached one- and two-family homes as well as semi-attached single-family homes, as is more common throughout the Planning Area.

Single-family residences that are located along Avenue U within Marine Park and Mill Basin are also within the high and extreme risk areas. While these at-risk residences are fewer than those in Mill Island and Bergen Beach, they face a similar level of flood risk, particularly for those residences with driveways that ramp down into basements.

Housing typologies vary from attached 1-2-family dwellings (Top) to large single-family detached dwellings (Bottom).

Figure II–4: Housing Assets Map

NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Housing Assets

One and Two Family Residences in High and Extreme Risk Zones

Multi-Family Walk-Up Buildings in High and Extreme Risk Zones

Extent of High & Extreme Risk Areas

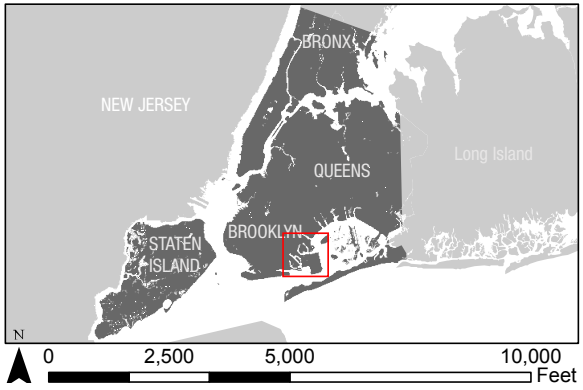
NYSDOS Risk Areas

Moderate

High

Extreme

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Infrastructure Assets

Infrastructure assets, including facilities for the distribution and supply of power and water, as well as for the management and treatment of sewage, are critical to the Community's preparedness, response, and recovery from future storms.

There are three power-generating substations within the Community, all of which are located below street-level. Two of these substations are located along Avenue N, with the third located near Avenue U. While the Community is largely serviced by overhead electrical wires, the integrity of these substations is critical to the electrical supply of the Planning Area.

Another key infrastructure asset is the Paerdegat Basin Combined Sewer Overflow (CSO) Retention Center, owned and operated by the New York City Department of Environmental Protection (NYC DEP). Completed in 2011, the facility prevents up to 50 million gallons of CSOs from being discharged into Paerdegat Basin. While this facility does not serve the Planning Area, loss of functionality or severe damage to the facility during a future storm event could cause severe sewer complications for residents within the Planning Area.

The Planning Area is serviced by the Coney Island Wastewater Treatment Plant in Sheepshead Bay. While this plant is outside of the Planning Area, it is critical to the functionality of the Planning Area's separated wastewater and stormwater systems.

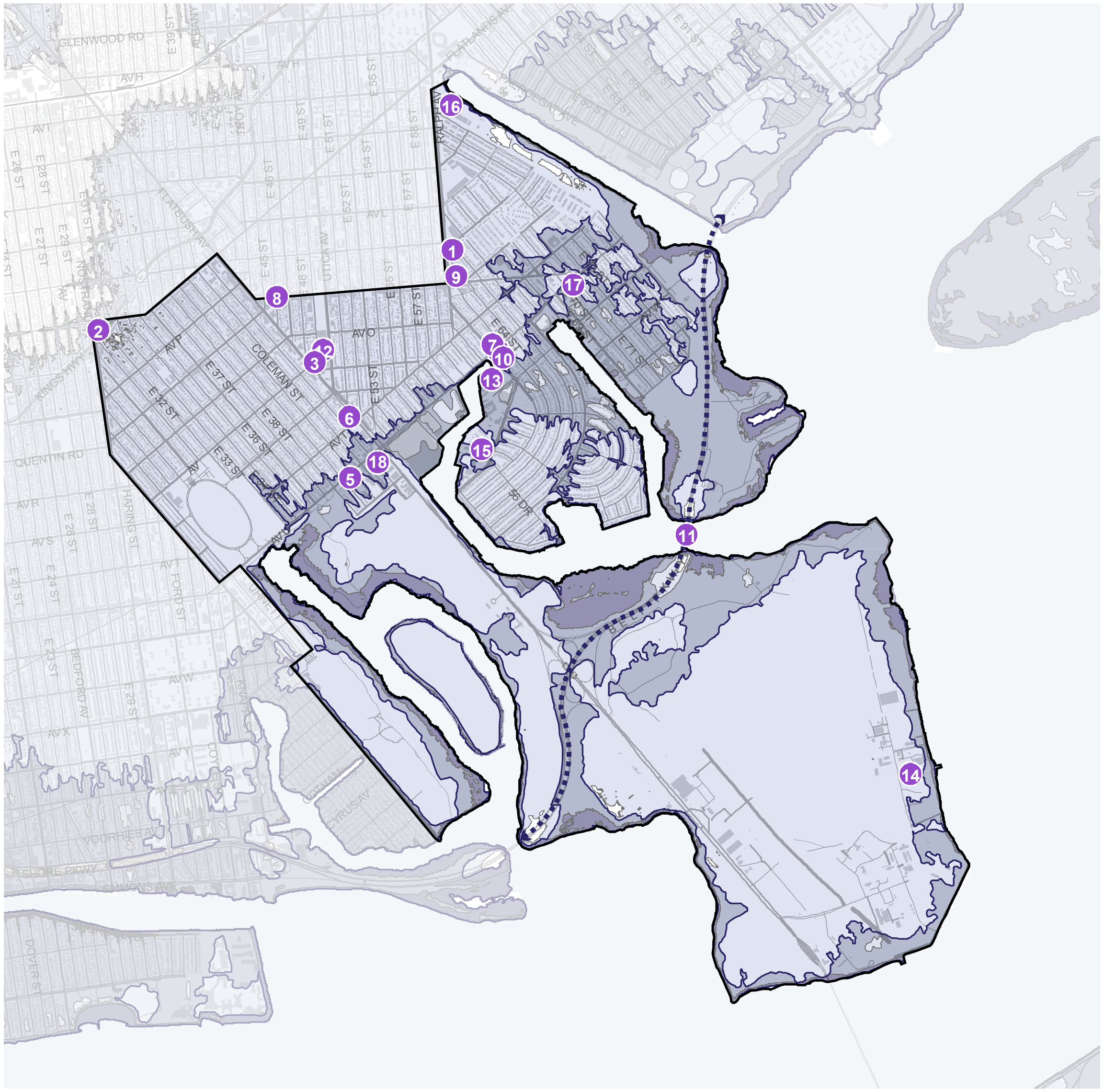
The Community has limited transit access. The closest subway stations—Kings Highway (B and Q lines) and Flatbush Avenue-Brooklyn College (2 and 5 lines)—are located outside of the Planning Area, north of Marine Park and Mill Basin at Brooklyn College and west at Kings Highway. However, the Community is well served by New York City Transit buses. Four bus lines—B41, B9, B2, and B46—travel along Flatbush Avenue in the Planning Area, with Kings Plaza Shopping Center serving as a terminus. Other major corridors in the Community are also served by buses. Two express buses—the BM1 and BM4—also serve the Planning Area, providing limited-stop, express service into Lower and Midtown Manhattan.

The Planning Area is served by the Belt Parkway (called Shore Parkway within the Planning Area). The Parkway is a two-way, east-west, limited-access highway that operates with three moving lanes of traffic in each direction. Entry and exit ramps are located at Flatbush Avenue in the Planning Area.

Additionally, the Planning Area connects to the Rockaway Peninsula via the Marine Parkway-Gil Hodges Memorial Bridge, to the south of Floyd Bennett Field and a key vehicular access route.

The NYC DEP CSO Retention Center is one of several infrastructure assets located in the Southeast Brooklyn Waterfront NYRCR Planning Area.

Figure II–5: Infrastructure Assets Map



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Infrastructure Assets

Infrastructure Systems Assets

Belt Parkway

Extent of High & Extreme Risk Zones

NYSDOS Risk Areas

Moderate

High

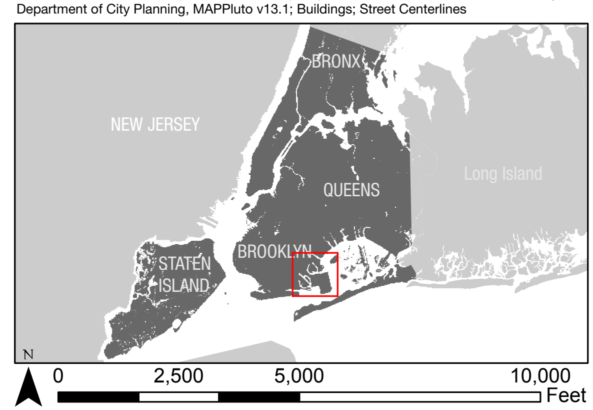
Extreme

1	GAS STATION
2	GAS STATION
3	GAS STATION
4	GAS STATION
5	GAS STATION
6	GAS STATION
7	GAS STATION
8	CON EDISON SUBSTATION
9	CON EDISON SUBSTATION
10	CON EDISON SUBSTATION
11	BELT PARKWAY
12	FLATBUSH AVE BUS DEPOT (MTA)
13	MILL AVE SCHOOL BUS DEPOT
14	NYPD AIR OPERATIONS (FLOYD BENNETT FIELD)
15	STRICKLAND AVE SCHOOL DEPOT LOT
16	PAERDEGAT BASIN COMBINED SEWER OVERFLOW RETENTION CENTER
17	CON EDISON TRANSFORMER
18	CON EDISON TRANSFORMER

OUTSIDE OF THE PLANNING AREA:

20	GAS STATION (2773 NOSTRAND AVE)
21	GAS STATION (2402 KNAPP ST)

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Natural and Cultural Resources Assets

Many cultural assets, including community centers and churches, serve critical community and capacity-building functions, acting as centers for gathering and communication, as well as providing skills training and support to residents. The Community benefits from two community centers located within the Planning Area. The newly-constructed Carmine Carro Community Center in Marine Park is ideally situated adjacent to park space and a junior high school. Completed in 2013, the New York City Department of Parks and Recreation (NYC DPR) facility is partially powered by solar energy and features a vegetated roof, serving as a precedent for resilient and sustainable design.[1] The John Malone Community Center is located near Paerdegat Basin in Bergen Beach. Opened in 2003, the Center provides key recreational and educational programming to the Community.[2] Both of these centers provide vital community services, including meals to senior citizens in the Planning Area. According to residents, the Church of St. Thomas Aquinas in Marine Park also acted as an informal recovery center in the aftermath of Superstorm Sandy.

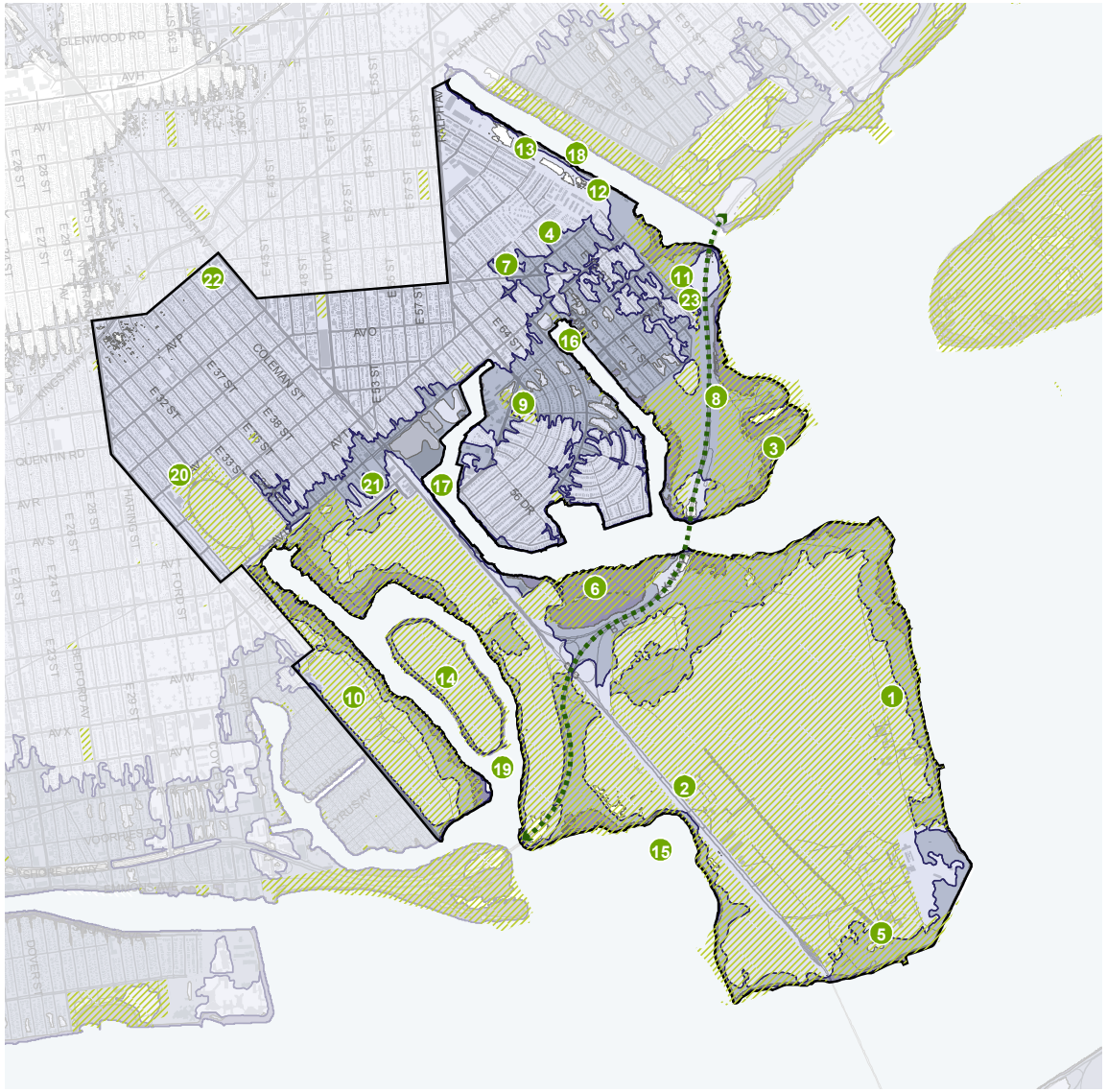
The Planning Area is home to extensive parkland and open space, concentrated primarily along the Jamaica Bay shoreline and the various inlets and water bodies that define it. These shorelines contain marshlands and other natural areas, as well as recreational space. The largest park in Brooklyn, Marine Park consists of 530 acres of grassland and salt marshland, which NYC DPR has committed to protecting through its Forever Wild Program. While a portion of the park is protected natural area, the park also offers a wide range of recreational activities to the Community, including a golf course, playgrounds, bikeways, basketball courts, and baseball diamonds.[3] The majority of Marine Park sits within the moderate risk area, though portions are located in the high and extreme risk zones. Additional park space is located on the northeast boundary of the Planning Area, along the Paerdegat Basin shoreline. In conjunction with the Paerdegat Basin CSO Retention Center project, NYC DEP is constructing a natural area and Ecology Park along the basin. These two areas connect to the existing McGuire Fields, creating natural and recreational areas that stretch the length of the Paerdegat Basin shoreline.

Paerdegat Basin itself is a natural resource asset as well as a major source of floodwaters that affected the Community during Superstorm Sandy. The NYC DEP process of restoring the tidal wetlands and shorelines of the basin into natural areas will augment water quality and ecological improvements along the basin.[4]

The Carmine Carro Community Center in Marine Park serves as a precedent for sustainable design.

The park space and natural areas of the Community's Jamaica Bay shoreline are part of the National Park Service's (NPS) Gateway National Recreation Area. As such, this shoreline ties into the larger NPS recreation area for all of Jamaica Bay, including the Jamaica Bay Greenway. Gateway National Recreation Area includes the southern portion of Bergen Beach, home to the Jamaica Bay Riding Academy and Floyd Bennett Field, once the site of New York City's first municipal airport. Today, Floyd Bennett Field features the Aviator Sports and Events Center recreational complex and a visitor's center

Figure II–6: Natural and Cultural Resources Assets Map



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Zones

Natural and Cultural Resource Assets

Natural and Cultural Resource Assets

Jamaica Bay Greenway

Parks and Open Space

NYSDOS Risk Areas

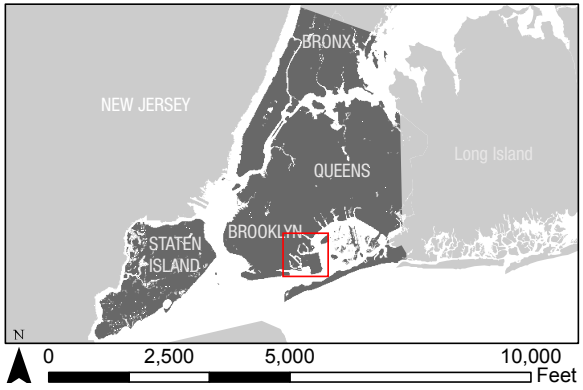
Moderate

High

Extreme

1 HISTORIC AIRCRAFT RESTORATION PROJECT
2 AVIATOR SPORTS
3 BERGEN BEACH (GATEWAY NATIONAL RECREATION AREA, NATIONAL PARKS SERVICE)
4 BERGEN BEACH PLAYGROUND
5 FLOYD BENNETT FIELD (GATEWAY NATIONAL RECREATION AREA, NATIONAL PARKS SERVICE)
6 FOUR SPARROW MARSH
7 HICKMAN PLAYGROUND (NYC PARKS)
8 JAMAICA BAY GREENWAY
9 LINDOWER PARK (NYC PARKS)
10 MARINE PARK (NYC PARKS)
11 MCGUIRE FIELDS (NYC PARKS)
12 PAERDEGAT BASIN ECOLOGICAL PARK (UNDER CONSTRUCTION, NYC PARKS)
13 PAERDEGAT BASIN PARK (NYC PARKS)
14 WHITE ISLAND
15 DEAD HORSE BAY
16 EAST MILL BASIN
17 MILL BASIN
18 PAERDEGAT BASIN
19 MARINE PARK CREEK AND MILL CREEK
20 CARMINE CARRO COMMUNITY CENTER
21 ST. COLUMBA CHURCH
22 CHURCH OF ST. THOMAS AQUINAS
23 JOHN MALLONE COMMUNITY CENTER

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Assessment of Risk to Assets and Systems

The assessment of risk to assets identified by the Community provides important information to inform the evaluation and prioritization of the projects developed. The assets and systems of assets that collectively define the neighborhoods in the Planning Area are at risk due, in large part, to their location relative to the impact of future flood hazards (risk area). The various water bodies that surround the Community, and that experienced high surge from Superstorm Sandy—including Paerdegat Basin along the northeast, Mill Basin and East Mill Basin near the center of the Planning Area, and Shell Bank Creek along the southwest—were entry points for inundation during Superstorm Sandy. These coastlines remain exposed to coastal flooding from future storms and sea-level rise. While the hazard of future flooding is not equivalent in all neighborhoods, none of the neighborhoods are immune from this threat. While upland portions of the Community are located within the moderate risk area, much of the waterfront and some low-lying inland areas—primarily in the neighborhoods of Bergen Beach and Mill Island—are located within either the high or extreme risk zones. These areas remain at high risk of damage from future coastal hazards due to inundation from surge or wastewater and stormwater sewer backup.

In addition to physical factors, there are many issues with respect to community capacity that contribute to the vulnerability of residents and assets throughout the Planning Area. The lack of a comprehensive emergency preparedness plan, as well as unclear or incomplete information about emergency response procedures and resources, hinders effective emergency response and recovery, thus increasing potential damage to assets.

The assessment of risk to assets and systems of assets provide background information to

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 risk to assets or systems of assets produced important information to evaluate needs and opportunities and help guide Committee decisions about resiliency strategies and projects. The New York State Department of State (NYS DOS) developed a risk assessment tool that is aimed at determining the level of flood risk faced by key community assets. The tool assigns each asset a risk score by evaluating three 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 return to service 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 ability to reduce risk to assets. For access to the NYS DOS Risk Assessment Tool and additional information on how to use it, see *http://stormrecovery.ny.gov/resources-0*

help in the development of projects, particularly those projects that protect assets from flooding.

Health and Social Services Assets at Risk

Several schools within the Planning Area, and particularly in Bergen Beach, are located within the high risk area, including Public School 312, Roy H. Mann Junior High School 78, the Saint Bernard School, and the Temple Sholom Hebrew School. Schools provided temporary relief and assistance following Superstorm Sandy after having to close for a week in the immediate aftermath of the storm. Damage due to a disaster severely limits the availability of public facilities to serve as centers for response and recovery efforts, increasing the vulnerability not only of the assets themselves but of the Community's ability to provide disaster response services. The South Brooklyn Nephrology (Dialysis) Center in Marine Park is also located within the high risk area. The remaining health and social services assets, including other healthcare facilities and schools, in addition to senior and assisted living centers and the FDNY engine companies that serve the Community, are located within the moderate risk area.

The ability of these assets to withstand damage in the face of future storms will be crucial to the long-term resiliency of the Planning Area's neighborhoods. These assets provide vital services during storm events and assist vulnerable populations, including seniors, people with disabilities, low- and very low-income populations, young children, and people at risk of becoming homeless.

Economic Assets at Risk

Portions of two of the four major commercial corridors in the Community—specifically, the southern segment of the Flatbush Avenue commercial corridor and much of the Avenue U commercial corridor—are located in the high risk area. The Kings Plaza Shopping Center in Mill Basin and the Key Food grocery store in Bergen Beach are also located in the high risk area. Other portions of these corridors, as well as the Ralph Avenue and Avenue N commercial corridors, are located in the moderate risk area.

These economic assets and the businesses throughout the Community, particularly in the low-lying areas near the waterfront, are not designed to withstand flooding, and remain vulnerable to damage due to flooding from storm surge and sewer backup. Many businesses throughout the Planning Area are still addressing damage caused by Superstorm Sandy, with some businesses unable to reopen due to extensive damage. Loss of, or damage to, these assets would limit residents' access to basic goods and services and disrupt local economic activity, thus exacerbating the effect of a significant storm upon the community.

Public School 312 is located in the high-risk zone.

Housing Assets at Risk

Many one- and two-family residences are located in the high risk area, primarily in Bergen Beach and Mill Island, but also along or near Avenue U in Mill Basin and Marine Park. Flooding in housing units as a result of Superstorm Sandy included stormwater backup and surge inundation, and homes remain at risk due to this

combination. Stormwater flooding on streets was especially problematic and widespread, resulting in damage to homes, both with and without driveways ramped down to basements.

It is not feasible to elevate much of the housing stock due to construction constraints, making it difficult to address the vulnerability of housing assets. In addition, rising flood insurance premiums and ineligibility for flooding reimbursement through many Federal programs limits the financial capacity of homeowners to make resiliency improvements. This has resulted in widespread concern and frustration among residents of the Planning Area.

Infrastructure Assets at Risk

Transportation assets located within the high and extreme risk areas include two bus depots in Mill Island (Mill Avenue and Strickland Avenue School Bus Depots), some of which are used to store school buses; the NYPD Air Operations facility within Floyd Bennett Field; and portions of the Belt Parkway. There also are a few gas stations located within the high risk area. Inundation of these facilities could result in interruptions of operations that would hinder emergency response and day-to-day community activity.

There are also aspects of the local transportation system that limit the Community's ability to respond in the event of a disaster and that increase overall neighborhood vulnerability: limited roadway access to peninsular neighborhoods like Mill Basin and Bergen Beach; the location of these roadways in low-lying flood-prone areas; lack of transportation options, particularly limited subway access; vulnerabilities to public bus service disruption during flooding; and lack of alternatively-powered street lighting and signals.

The sewer system is also at risk, with ongoing concerns about both wastewater and stormwater sewer backup. Reports of backup are increasingly common during heavy rain events, and are not limited to the aftermath of Superstorm Sandy. Failure of stormwater to drain in low-lying areas of Bergen Beach, Mill Basin and Mill Island following Superstorm Sandy continues to remain a significant concern. Additionally, the Community has reported the overgrowth of tree roots that block stormwater pipes as exacerbating the problem.

Outside the Planning Area, the Coney Island Wastewater Treatment Plant that services the Community is similarly at risk. NYC DEP identified 1,204 target pieces of equipment below the critical flood elevation (100-year storm plus 30 inches) at risk of flooding and estimated the cost of resiliency upgrades at $15.5 million.[5]

Some neighborhoods in the Planning Area experienced power outages leading up to, during, and following Superstorm Sandy due, in part, to damaged overhead power lines and vulnerable substations. The lack of a resilient power supply adds to the vulnerability of the many assets and recovery functions throughout the Community.

Natural and Cultural Assets at Risk

Most of the natural and cultural resource assets within the Community are located either entirely or partially within the extreme risk area along or near the waterfront. These assets are currently at risk of frequent inundation, are vulnerable to erosion in the next 40 years, or are likely to be inundated in the future due to sea-level rise. These assets within the extreme risk area include five water bodies (Paerdegat Basin, Mill Basin, East Mill Basin, Shell Bank Creek, and Dead Horse Bay), in addition to a number of parks and recreational assets throughout the Planning Area, including Bergen Beach, Gateway National Recreation Area, McGuire Fields, Paerdegat Basin Park, Marine Park, Four Sparrow Marsh, and the Jamaica Bay Greenway.

Natural and cultural resource assets located in the high risk area include the John Malone Community Center in Bergen Beach, Bergen Beach Playground, Floyd Bennett Field, Gateway National Recreation Area, Hickman Playground, and Lindowner Park. Other natural and cultural resource assets are located in the moderate risk area.

While many of these natural assets are resilient and less vulnerable to damage from flooding, they remain at risk of damage and their potential capacity to provide additional protection to other assets could be improved.

The John Malone Community Center in Bergen Beach is located in the high-risk zone.

Assessment of Needs and Opportunities

Throughout the NYRCR planning process, the Community's identification of needs and opportunities provides a critical foundation for the development of strategies and projects to enhance collective resiliency. At Planning Committee Meetings and the first Public Engagement Event, Committee members and members of the public identified key resiliency needs and opportunities in the Planning Area.

Needs are safety and resiliency measures identified by the Community that will help address its critical issues and minimize potential impacts associated with climate change, including extreme weather events or rising sea levels. Needs may also demonstrate those things that will help the Community become more resilient overall.

Opportunities include important underutilized assets and existing programs that can be leveraged to reduce risks or address issues.

Together, needs and opportunities address gaps in the Community's collective resiliency to severe weather-related events.

The needs and opportunities outlined here reflect the firsthand experiences of Planning Committee members and Community residents, along with their combined knowledge of risks, challenges, unmet needs and untapped potential across the neighborhoods of the Planning Area. These needs include:

- **Coastal edge strengthening and protection** (Infrastructure, Natural and Cultural Resources)
- **Improved drainage and stormwater management** (Natural and Cultural Resources)
- **Emergency preparedness and response planning** (Community Planning and Capacity Building, Health and Social Services)
- **A resilient power supply** (Infrastructure)
- **Enhanced residential resiliency** (Housing)
- **Ensured access to food and supplies** (Health and Social Services, Community Planning and Capacity Building)
- **Tree maintenance and damaged tree removal** (Natural and Cultural Resources)

Coastal Edge Strengthening and Protection

Needs

Community members have cited a need for increased protection from coastal flooding and shoreline erosion. These needs focus on the most at-risk areas, such as Bergen Beach, which experienced flooding from all sides during Superstorm Sandy. Bergen Beach is primarily built on landfill, and residents have reported that its filled shorelines are eroding and need to be strengthened in order to increase natural edge surge and tidal protection.

Opportunities

- **The narrow width of the inlets and basins** that were the source of floodwaters during Superstorm Sandy may provide an opportunity to have a meaningful flood mitigation impact through relatively small-scale interventions. The reconstruction of several bridges across these basins through the New York City Department of Transportation's (NYC DOT) Seven Bridges project may also provide an opportunity to tie interventions—for example, tide gates—into the new bridges. Additionally,

there are a number of low-lying, vulnerable points along the Planning Area's shoreline where floodwaters entered during the storm and where there may be opportunity for further small-scale, yet strategic, interventions.

- **Existing efforts led by NYC DEP and the U.S. Army Corps of Engineers** may also provide coastal protection benefits. Through the Paerdegat Basin Wetland Restoration Project (*see "Relationship to Regional Plans," page I–18*), NYC DEP, in coordination with NYC DPR, has already elevated portions of the basin's shoreline within Georgetown. Continuing this elevation south into Bergen Beach could provide targeted protection to the Community from waters rising from Paerdegat Basin and inundating at-risk inland areas. Additionally, the USACE is in the process of studying various alternatives for flood risk reduction for communities on Jamaica Bay as part of Phase 2 of the Rockaway Inlet to East Rockaway Inlet Reformulation Study (*see "Relationship to Regional Plans," page I–18*), due for release in 2015. While the study will fund long-term interventions in the Bay, a number of local flood-risk reduction projects, incorporating both "green" and "grey" infrastructure and providing varying levels of risk reduction, will be considered. Recently funded interventions around Jamaica Bay include projects at Lower Spring Creek (Howard Beach), Sunset Cove (Broad Channel), and Breezy Point (Rockaway Peninsula).

Many drains and catchbasins in the Southeast Brooklyn Waterfront NYRCR Planning Area are clogged, inhibiting proper drainage.

Improved Drainage and Stormwater Management

Needs

Residents have reported instances of wastewater and stormwater sewer backup in the aftermath of Superstorm Sandy, as well as during heavy rain events. Backup signals a crucial need for **improvements** to, and **increased maintenance** of, the existing separated **sewer system** in the Planning Area. Community members have identified a strong need for existing sewer infrastructure to be upgraded and for the

Planning Area's catch basins, and wastewater and stormwater sewers, to be cleaned more frequently, in order to reduce the frequency of sewer backup.

Opportunities

- **Ample open space, wetlands, and recreational assets** provide an opportunity to implement **stormwater capture measures** throughout the Planning Area, and on a large-enough scale to potentially provide meaningful stormwater runoff reduction benefits. Bioswales,[6] permeable paving,[7] rainwater storage tanks, and wetlands restoration can reduce the amount of rainwater entering stormwater sewers, and thereby reduce backup. These measures may also lessen the amount of stormwater that inadvertently enters wastewater sewers and exacerbates wastewater sewer backup.

- **NYC DEP has already begun implementing stormwater capture measures** in the in the Planning Area that the NYRCR Program may be able to leverage. This includes their Rain Barrel Giveaway Program, through which NYC DEP has distributed rain barrels to homeowners in Marine Park that capture roof runoff from a home's downspout.[8] Additionally, through its Greenstreets program, NYC DEP has constructed a bioswale in Mill Basin.[9] **Repairs to faulty manhole covers and other openings** may decrease the amount of stormwater that enters the wastewater sewer system, thereby reducing wastewater sewer backup.

Tree Maintenance and Removal

Needs

Residents have reported an extensive need for **tree removal and pruning** throughout the Planning Area, particularly in Mill Basin and Bergen Beach. Tree roots have lifted sidewalks and blocked sewers, exacerbating back-up in Superstorm Sandy's aftermath and during heavy rain events. Trees close to vulnerable overhead power lines resulted in power loss during Superstorm Sandy, as a result of strong winds. Additionally, dead and dying trees, a consequence of saltwater inundation during Superstorm Sandy, need to be removed to preserve the Community's appearance and reduce risk of personal injury or property damage.

Local power infrastructure is in need of repair and hardening.

Opportunities

- Through its **Remove and Replant Program**, NYC DPR has surveyed trees within the Superstorm Sandy inundation zone and has begun removal of those trees damaged during the storm. NYC DPR plans on removing an estimated 10,000 damaged trees, with the goal of replanting them within 12 months of removal.

A Resilient Power Supply

Needs

Many residents and business owners throughout the Community experienced power outages during and after Superstorm Sandy. Residents have reported a need for a **more resilient local power supply,** both through strengthening existing power infrastructure (e.g., overhead power lines that experienced wind damage during Superstorm Sandy), and through increasing power redundancy, using solar energy and backup generators. Consistent power is needed in order to ensure access to lighting, heating and air conditioning, perishable food, and cellphone charging during and after severe weather-related events. Additionally, vital retailers such as gas stations and supermarkets require redundant power supply in order to prevent disruptions to food and gasoline access.

Opportunities

- Con Ed has plans to **fortify or bury overhead power lines** in coastal areas of New York City in order to protect against the wind damage that caused outages during Superstorm Sandy.[10] Con Ed also owns and operates substations throughout the Planning Area that can be fortified to address vulnerabilities.

- **Off-the-grid technologies** could reduce demand on the Planning Area's existing system and help to prevent power failures. Technologies including solar panels, wind-powered energy, and other alternative power sources could be leveraged to help meet demand and increase redundancy.

- Finally, the several **large parking lots for big-box retailers** in the Planning Area could be outfitted with backup power supply and provide services like cellphone charging.

Emergency Preparedness and Response Planning

Needs

Community members have reported several needs related to emergency preparedness and response planning. First, during Superstorm Sandy, residents lacked **information on the locations of vital supplies and resources** Residents have noted that a **network of predetermined, centralized recovery centers** or meeting zones is essential to a coordinated response effort. Second, residents have indicated a need for **a flood notification system** that identifies the approach of a high tide. Additionally, community members have cited inadequate transportation coordination in the wake of Superstorm Sandy and a **need for greater emergency transportation planning.**

Opportunities

- There is a **wide network of civic and religious organizations** that can distribute tide-level and other storm information to resident networks in advance of a storm. Many of these organizations are located in **large community facilities,** which served as informal gathering spaces in the wake

of Superstorm Sandy and may be able to serve as centralized recovery centers within a more formalized community network.

- The area also benefits from **Kings Plaza Shopping Center,** which has a multilevel, elevated parking structure that did not flood during Superstorm Sandy and may serve as a strategic location for informal response efforts and service delivery, particularly for the surrounding Mill Basin community.

Ensured Access to Food and Supplies

Needs

Community members have voiced a need for backup power and improved coordination in emergency food and gas supply chain management in order to ensure uninterrupted access to these goods after severe weather-related events.

Opportunities

- Key community and religious centers that provided food and supplies in the wake of Superstorm Sandy can be bolstered with backup and alternative power supply to promote continued access to these goods in the event of supermarket closures.

- Food and supply distribution during emergency situations is a larger-scale regional issue that the City closely examined in Superstorm Sandy's wake as part of its **Special Initiative for Rebuilding and Resiliency (SIRR).** Through this effort, the City of New York has committed to analyzing where breakdowns in the supply chain occurred during Superstorm Sandy, and to providing greater planning and coordination with food and utility providers to prevent such disruptions into the future.

Enhanced Residential Resiliency

Needs

Many residents still have not completely remediated their homes from Superstorm Sandy-related flood damage. Residents have reported lacking the **funds to perform repairs** and the **information** needed to make informed decisions about home improvements that could affect flood insurance rates. Additionally, many community members have reported issues in obtaining insurance benefits for flooding related to sewer backup and not surge, and require both **technical assistance** as well as **funding** toward related repairs.

Opportunities

- There are several citywide organizations with robust technical assistance and community outreach programs that present an opportunity for leveraging and expanding assistance to the Community.

III. Reconstruction and Resiliency Strategies

Reconstruction and Resiliency Strategies

The Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) identified strategies for enhancing the physical, environmental, social, and economic resiliency of the Southeast Brooklyn Waterfront NYRCR Community (Community). Developed by the Committee and refined by the public at two Public Engagement Events, these strategies identify the approach the Community intends to take in order to address Superstorm Sandy-related impacts, as well as better prepare for future severe weather-related events.

The following strategies described provide the framework for the Proposed Projects put forth for funding in the Community's NYRCR Plan, as well as the Featured Projects and additional resiliency recommendations for which the Plan advocates.

The list in this section reflects the Community's vision for bolstering and expanding the health, vitality and sustainability of its neighborhoods. Feedback from the first Public Engagement Event on the Community's critical issues, needs, and opportunities helped inform the development of a preliminary list of strategies. At the second Public Engagement Event, residents then provided input and voted on the list. Meetings were held at different locations throughout the Southeast Brooklyn Waterfront Planning Area (Planning Area) to acknowledge and accommodate varying neighborhood needs and aspirations. The corresponding Recovery Support Functions (see page II–18) accompany each of the following strategy descriptions:

- Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development at at-risk locations, and mitigating any potential negative impacts of new projects (Infrastructure, Natural and Cultural Resources)
- Improve stormwater and wastewater management to prevent flooding and back-up (Infrastructure, Natural and Cultural Resources)
- Make power supply more resilient and redundant (Infrastructure)
- Enhance emergency preparedness and response (Community Planning and Capacity Building, Health and Social Services)
- Improve residential resiliency through education, technical assistance, and funding (Housing)
- Improve resiliency of commercial corridors and critical supply chains (Health and Social Services, Economic Development)

Proposed and Featured Projects

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.

Reduce Neighborhood Flooding Through Stabilizing the Coastal Edge, Discouraging Development at At-Risk Locations, and Mitigating any Potential Negative Impacts of New Projects

The shoreline of the Planning Area weaves along five interconnected basins. During Superstorm Sandy, the combination of storm surge and a high tide resulted in waters overtopping bulkheads and natural shorelines, with surge inundating neighborhoods from all basins and reaching as far upland as Avenue N. Given the exposed shoreline and its low-lying nature—coupled with the impacts of climate change, which include rising sea levels and more frequent and intense coastal storms—the Planning Area can expect to experience significant flood events in the future. Coastal protection measures that take into consideration both increased risk, as well as how protective measures can be incorporated into the shoreline's existing conditions, will be critical to the Community's long-term resiliency.

The Committee has considered the feasibility of various coastal protection approaches, as well as the challenges facing implementation in regards to existing conditions of the shoreline. These include landscape attributes, ownership, and land use. The Committee seeks coastal protection strategies that are most feasible and effective for reducing the Planning Area's flood risk while maintaining its waterside way of life. In the long term, the Community would benefit from coastal protection measures that build off of existing assets and take advantage of ongoing plans and studies in the Planning Area. Foremost among such studies is the U.S. Army Corps of Engineers (USACE) East Rockaway to Rockaway Inlet Reformulation Study (reformulation study). This regional approach to flood risk mitigation throughout Jamaica Bay includes consideration of a storm-surge barrier at Rockaway Inlet and the necessary connecting infrastructure—a measure identified as part of New York City's long-term comprehensive coastal protection plan in *A Stronger, More Resilient New York.*[1] The Committee recognizes that such measures will require coordination with City, State, and Federal entities.

An alternative or interim strategy for providing storm-surge protection for the Community could include localized approaches. For example, tide gates or surge barriers could be placed at Gerritsen Inlet, Mill Basin, and Paerdegat Basin, which tie into protective measures in-between, including berms, levees, or flood walls. The Committee has also considered a more strategic coastal protection approach that targets especially vulnerable areas (for example, Bergen Beach and Avenue U) by constructing protective measures in areas where inundation was particularly severe during Superstorm Sandy or is expected to be in the future. Coastal protection measures must also reduce risk from more gradual hazards. While the Planning Area shoreline is not highly susceptible to wave action, preventing erosion and degradation will stabilize the shoreline, potentially reducing entry points for future surge and vulnerability to sea level rise.

Restoration of wetlands and marshes help to strengthen the coastal edge and provide some protection against sea level rise.

Table III–1: Strategy Table

STRATEGY: Reduce Neighborhood Flooding Through Stabilizing the Coastal Edge, Discouraging Development at At-Risk Locations, and Mitigating any Potential Negative Impacts of New Projects				
Project Name	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Southeast Brooklyn Waterfront Coastal Protection Study	This Proposed Project would develop a study to determine the cost and feasibility of coastal protection measures along the Southeast Brooklyn Waterfront shoreline in order to protect the Community from a severe weather event.	Proposed Project	$500,000	Y

Improve Stormwater and Wastewater Management to Prevent Flooding and Backup

Community residents have indicated that improving stormwater and wastewater systems within the Planning Area is crucial to the health of their neighborhoods. During Superstorm Sandy, many residents and business owners in low-lying areas experienced basement flooding from stormwater runoff, as well as sanitary and storm sewer backup in some locations. At the first two Public Engagement Events, community members also reported experiencing flooding from backup during regular heavy rain events, and have speculated that such issues have worsened since the storm. Both the Committee and Community members have expressed a strong desire to address recurring drainage issues.

In the long term, government agencies could perform upgrades and improve maintenance to sewer and stormwater infrastructure, including catch basins and sewer lines, in order to enhance system capacity and reduce blockages that may cause backup.

To supplement this, the Committee has prioritized shorter-term, targeted stormwater diversion measures in areas particularly vulnerable to sewer backup and street flooding. Measures to reduce stormwater flooding and backup include the diversion and capture of stormwater before it enters the sewer—or floods—low-lying areas in the Community. Stormwater management measures (e.g., rain barrels, permeable paving, storage tanks) and green infrastructure (e.g., bioswales and wetlands) can be installed in public open spaces as well as individual properties.

Additionally, Community members are concerned with decreasing or preventing sewer backup into homes. Targeted measures to address storm and sanitary sewer backup into homes could include the installation of check valves and proper roof drainage systems on individual homes. These measures can help prevent flooding in homes and ensure stormwater does not overburden the sewer systems. The Committee also has expressed interest in leveraging ongoing New York City Department of Environmental Protection (NYC DEP) infrastructure programs and projects within the Planning Area.

Bioswales are one of several stormwater capture mechanisms that can be deployed in the Southeast Brooklyn Waterfront NYRCR Planning Area. *Corey Burger.* [2]

Table III–2: Strategy Table

STRATEGY: Improve Stormwater and Wastewater Management to Prevent Flooding and Backup				
Project Name	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects	This Proposed Project would fund: • A study to examine the feasibility, costs, and benefits for various stormwater capture and retention projects in the joint NYRCR Planning Areas of Southeast Brooklyn Waterfront and neighboring Canarsie. • The implementation of those pilot projects in the Southeast Brooklyn Waterfront NYRCR Planning Area that were identified in the study as having the highest feasibility and impact. May include measures such as bioswales, permeable paving, and improvements in and around public and open spaces to enhance area stormwater capture capacity.	Proposed Project	$650,000	Y
Bergen Beach Stormwater Retention/Detention System	This Proposed Project would construct a stormwater retention/detention wetland within a natural area of southern Bergen Beach on land owned by New York City Department of Parks and Recreation. This stormwater retention system would link to City plans to construct a new storm sewer and outfall along Avenue Y, providing stormwater flooding abatement for a low-lying, at-risk residential community, while also removing pollutants from stormwater that may otherwise enter nearby East Mill Basin.	Proposed Project	$500,000	N

Make the Power Supply More Resilient and Redundant

Power outages in the Planning Area, following Superstorm Sandy, varied in both location and duration, with some homes losing power prior to Superstorm Sandy's arrival and others experiencing outages after, lasting anywhere from a day to a week. Power serves as a necessary resource for emergency response, providing basic utilities including lights, water pumps, and refrigeration. Outages interrupted communication systems, limited access to key facilities, and impeded recovery efforts in the following days. This strategy addresses the need to improve system-level infrastructure and focuses on backup power and alternative sources of energy to ensure a redundant and resilient power supply during and following future weather-related events.

The majority of power outages in the Planning Area were caused by high winds and downed trees which damaged overhead wires. To protect against this in the long term, the Committee suggests greater protection of overhead service lines through tree maintenance and other methods of hardening and reinforcement, in addition to the hardening of power substations prevalent throughout the Planning Area.

In the short term, the Committee prioritized opportunities for backup and alternative forms of energy generation, creating a redundant and resilient power system in the Community. This could be achieved through increasing the supply of fixed backup generators, especially at Community assets that provide key services (e.g., community organizations and volunteer ambulance services). The Committee also recognizes the importance of alternative forms of energy generation for 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. Several large and privately-owned parking lots for big-box retailers and shopping centers throughout the Planning Area could act as central locations throughout the Community to install accessible resilient lighting and cellphone charging stations.

Large parking lots in the Southeast Brooklyn Waterfront NYRCR Planning Area serve as promising venues for the installation of alternative power infrastructure.

Table III–3: Strategy Table

STRATEGY: Make the Power Supply More Resilient and Redundant				
Project Name	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Alternative Power Hotspot	This Proposed Project would install alternative energy infrastructure along critical thoroughfares throughout the NYRCR Planning Area to serve as pilots for similar interventions in the neighborhood. Alternative power hotspots would provide a reliable source of lighting in the event of an outage and create a space where residents could meet and power mobile devices, while also accessing food and other services nearby. In locating the hotspots, the project would leverage the large number of big-box retailers and associated street-facing parking lots within the NYRCR Planning Area.	Proposed Project	$300,000	N

Enhance Emergency Preparedness and Response

Emergency preparedness and response in the Planning Area—before and after Superstorm Sandy—was marked by both a lack of coordination among response agencies and organizations, and a lack of information on existing resources and procedures among residents.

Residents report not knowing whether they needed to evacuate and where to go. Discrepancy between Federal and New York City assessments of flood risk and evacuation meant that few residents evacuated. Even though sections of the Planning Area, including Mill Basin and Bergen Beach, had been identified as being of moderate to high flood risk in Federal Emergency Management Agency's (FEMA) Special Flood Hazard Area maps, the City's hurricane evacuation maps labeled these neighborhoods as part of Hurricane Evacuation Zone B, which was not issued a mandatory evacuation order in advance of the storm. Additionally, for those who evacuated or wanted to evacuate, many thought that the closest City-designated overnight emergency shelter for the area was at Brooklyn College, when in actuality, it was at FDR High School. Both of these shelters are considerably far, with FDR High School located about four miles west of the Planning Area.

New York City and Federal emergency response efforts concentrated on other hard-hit areas in Brooklyn and Queens, leaving residents and business owners to fend for themselves in accessing supplies and aid. To fill this gap, local civic groups and religious institutions stepped in to provide information and supplies, as did local shopping centers. Religious organizations, including St. Bernard of Clairvaux, provided food and clothing to area residents, and opened their school's classes to students from hard-hit areas like the Rockaway Peninsula. The Kings Plaza Shopping Center, one of the largest indoor shopping centers in Brooklyn, and equipped with an independent power source, remained open during the storm, offering both complimentary charging stations, as well as free parking in their elevated, covered lot. This provided critical protection from flooding and falling trees for many car owners. Additionally, the shopping center, centrally located between Bergen Beach and Mill Basin, hosted representatives from New York City's Department of Finance to answer housing and insurance questions in the storm's aftermath.

In order to enhance preparedness and response in the Community, and thereby promote longer-term recovery, these informal centers can be formalized into the development of a network of local recovery centers. Centralized spaces would offer food, water, emergency supplies, and access to power. To ensure that critical health and social service providers are able to provide key emergency services, the Committee is also interested in pursuing funding programs to help these organizations make key facility upgrades to enhance their resiliency.

To provide the critical information that so many community members needed before, during, and after Superstorm Sandy, the Committee is also interested in funding informational resources, such as a printed guide and online hub. These resources could disseminate vital information around where to go to access supplies and food, and how to access help for vulnerable populations.

Table III–4: Strategy Table

STRATEGY: Enhance Emergency Preparedness and Response				
Project Name	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Emergency Preparedness Education Program	This Proposed Project would develop a printed local emergency preparedness and response guide, an online information hub, and educational programming to help inform community members of what to do before, during, and after a storm event. All resources created through the program would leverage material provided by the New York City Office of Emergency Management (NYC OEM) and aim to provide locally-tailored information to residents on how to prepare before a storm hits, evacuation procedures, and where to obtain supplies and information in the aftermath of a storm.	Proposed Project	$100,000	N
Recovery Community Centers	This Proposed Project would fund the development of Recovery Community Centers, to be based out of existing community facilities and organizations. Centers would facilitate disaster preparedness coordination across community-based organizations (CBOs) in advance of an event. Centers could provide power, information, and supplies for residents, among other services. These would be located outside of the floodplain, have a parking lot, and be compliant with the Americans with Disabilities Act (ADA).	Proposed Project	$1,500,000	N
Critical Facility Upgrades Program	This Proposed Project would help health and social services providers to make critical building-level capital improvements. Providers could include medical clinics, hospitals, voluntary emergency/ambulance organizations, and senior living facilities, among others. This would help to prevent disruption in essential health and social services due to power outages or structural damages in the event of a storm.	Proposed Project	$1,000,000	N

Improve Resiliency of Commercial Corridors and Critical Supplies Chain

In the immediate aftermath of Superstorm Sandy, the Planning Area suffered sporadic power loss, resulting in businesses and residents not being able to access essential supplies, including food and gas. In addition to losing power, some homes and businesses also experienced flooding and property damage. Vehicular access was constrained as primary access routes in the Planning Area, like Flatbush Avenue, experienced severe congestion due to emergency vehicles and residents using this corridor to travel to and from the hard-hit Rockaway Peninsula.

Commercial businesses located in low-lying areas near the waterfront, such as along Avenue U, remain vulnerable to storm surge and sewer backup. Grocery stores serving the area experienced disruptions due to the storm. Met Food, located on Quentin Road in Marine Park, experienced power loss, and the Key Food on Avenue U, which backs up against East Mill Basin, was flooded. While many of these commercial strips and stores have bounced back since Superstorm Sandy, Committee members have observed that some retail sites have not reopened.

The Southeast Brooklyn Waterfront NYRCR Planning Committee is interested in enhancing the resiliency of critical retailers like gas stations, in order to ensure continuity of service during severe weather-related events.

In order to improve coordination of emergency food and gas supply chain management after severe weather-related events, the City and State should continue to pursue efforts to correct bottlenecks. At a more local level, businesses that provide food and construction supplies (the Planning Area is home to both a Home Depot and a Lowe's) can be bolstered with backup and alternative power to enable continued access to these critical goods. Solar-powered cellphone charging stations could be installed in shopping centers and coupled with measures that reduce the risk of flooding while improving the overall aesthetics and safety of the area, including resilient streetscaping and lighting.

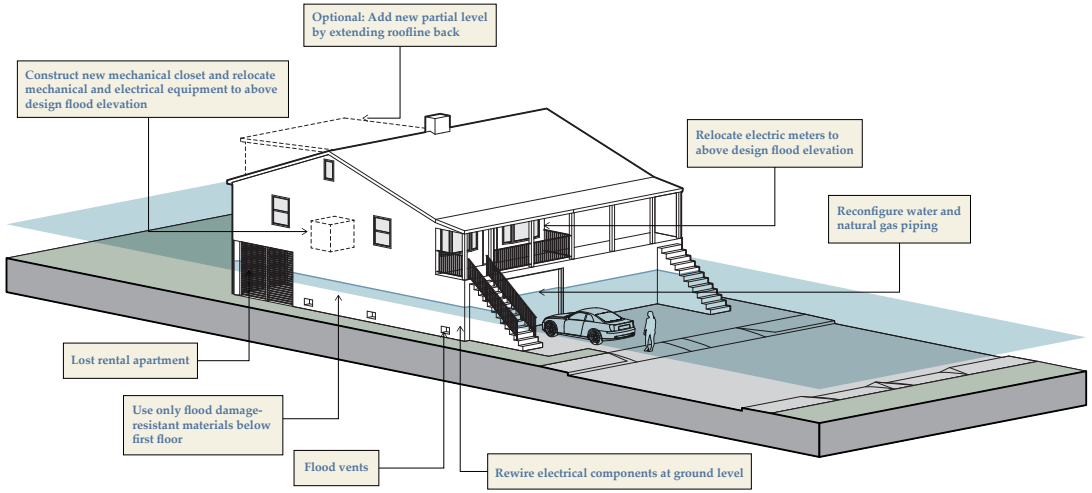
Table III–5: Strategy Table

STRATEGY: Improve Resiliency of Commercial Corridors and Critical Supplies Chain			
Recommendation Name	**Short Description**	**Cost Estimate**	**Regional (Y/N)**
Expand the FUEL NY Initiative	Expand the Fuel NY law and initiative to extend to gas stations located one mile from evacuation routes and highway exits, in order to include more critical gas stations in the floodplain.	N/A (legislative measure)	Y

Improve Residential Resiliency through Education, Technical Assistance, and Funding

Housing throughout the Planning Area experienced widespread damage from Superstorm Sandy, mostly as a result of basement flooding—from both surge and stormwater and wastewater backup. In the aftermath of the storm, many homeowners struggled to remediate this water damage, due to a lack of information around the proper repairs to undertake.

Residents are interested in improving the resiliency of their homes through enhancing individualized education and technical assistance around resiliency upgrades. This could be achieved through resiliency audits of homes, specifically around flooding, in order to provide homeowners with an assessment of risk and a list of repairs to mitigate that risk. This could include measures like installing check valves, and dry floodproofing basement spaces to make them watertight.



There are a variety of measures a homeowner can undertake to enhance their home's resiliency. *Arup and Architecture Research Office, report for FEMA and the NYC Housing Recovery Office.*

Table III–6: Strategy Table

STRATEGY: Improve Residential Resiliency through Education, Technical Assistance, and Funding				
Project Name	**Short Description**	**Project Category**	**Estimated Cost**	**Regional (Y/N)**
Homeowner Assistance Program	This Proposed Project would aim to enhance the resiliency of homes throughout the Planning Area and reduce homeowner risk, geared at both general homeowners and high-risk homeowners in the 100-year floodplain. This project would have three potential components: • Educational programming on retrofitting for resiliency, flood insurance, and other financial questions, for both general and high-risk homeowners • One-on-one counseling for both general and high-risk homeowners, to assess risk and resiliency options • Audits for high-risk homeowners, performed by specialized engineers, in order to recommend specific measures to enhance home resiliency.	Proposed Project	$2,000,000	N

The Kings Plaza Shopping Center has a covered parking garage that provided refuge for cars during Superstorm Sandy.

IV. Implementation—Project Profiles

Projects Overview

The Proposed and Featured Projects in the following pages are those projects that the Committee, with input from the public, has prioritized for funding with its CDBG-DR allotment of up to $4.38 million. The Committee developed these projects after a seven-month-long iterative process of identifying critical issues, needs, opportunities, and strategies for addressing needs. The main strategies that the Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) devised, with feedback from the public, focused on coastal protection; drainage and stormwater management; power; emergency preparedness and response; economic and supply chain resiliency; and residential resiliency. The projects that emerged from this process are those which best met major Southeast Brooklyn Waterfront NYRCR Community (Community) needs while weighing feasibility, funding, as well as risk reduction and cost-benefit concerns.

This section describes each project and the potential costs and benefits that would result from each project if funded. In addition to preliminary cost estimates, the project profiles discuss the projects' potential benefits:

- Health and social benefits
- Economic benefits

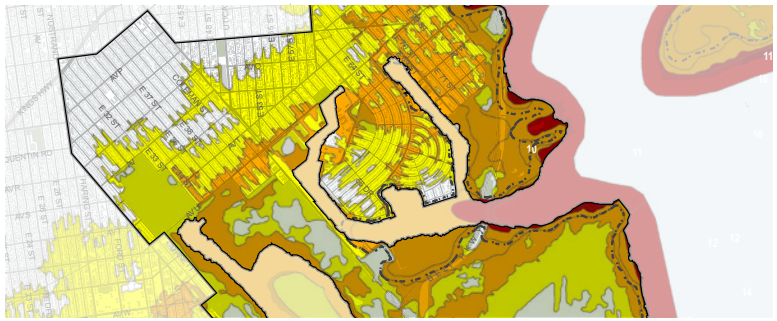
Coastal protection was a major priority in project development for the Southeast Brooklyn Waterfront NYRCR Planning Committee.

- Environmental benefits
- Ability to reduce future risk

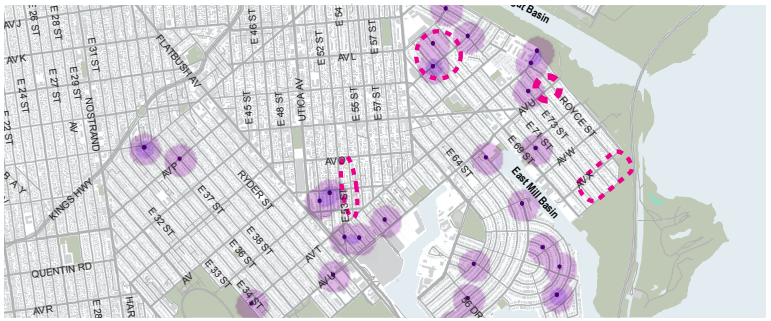
Finally, the descriptions delineate relevant implementation factors, including the likely timeline and the governmental jurisdiction for implementation of each project.

Project List

IV–4
Southeast Brooklyn Waterfront Coastal Protection Study



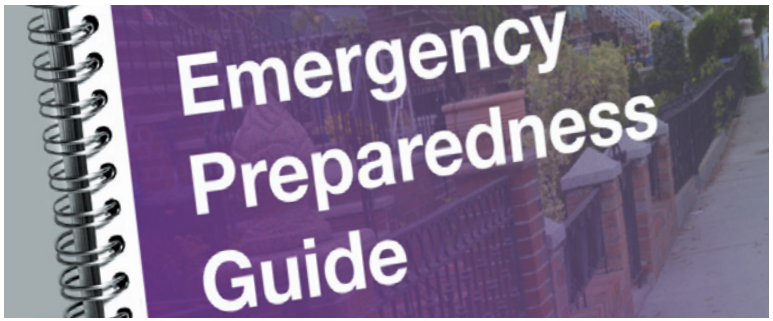
IV–8
Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects



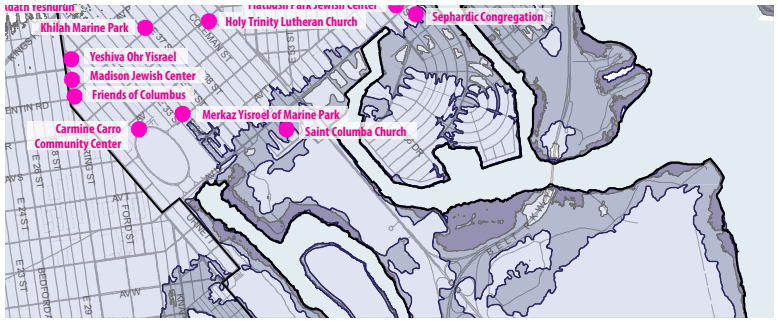
IV–14
Bergen Beach Stormwater Retention/Detention System

IV–20
Alternative Power Hotspot

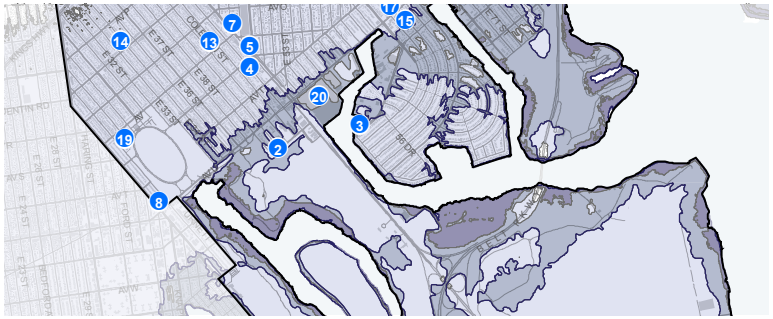
IV–26
Emergency Preparedness Education Program



IV–30
Recovery Community Centers



IV–36
Critical Facility Upgrades Program



IV–40
Homeowner Assistance Program

Southeast Brooklyn Waterfront Coastal Protection Study

Proposed Project

STRATEGY:
Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development at at-risk locations, and mitigating any potential negative impacts of new projects

Recovery Support Functions

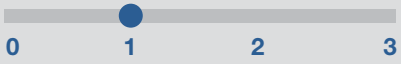
Infrastructure

Natural & Cultural Resources

Cost

$500,000

Timeline (in years)



There are several vulnerable points where flood waters entered into the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area). A feasibility study for protection of the Planning Area shoreline and basins could supplement New York City, New York State, and Federal agency efforts to create a comprehensive coastal protection strategy for the Southeast Brooklyn Waterfront NYRCR Community (Community).

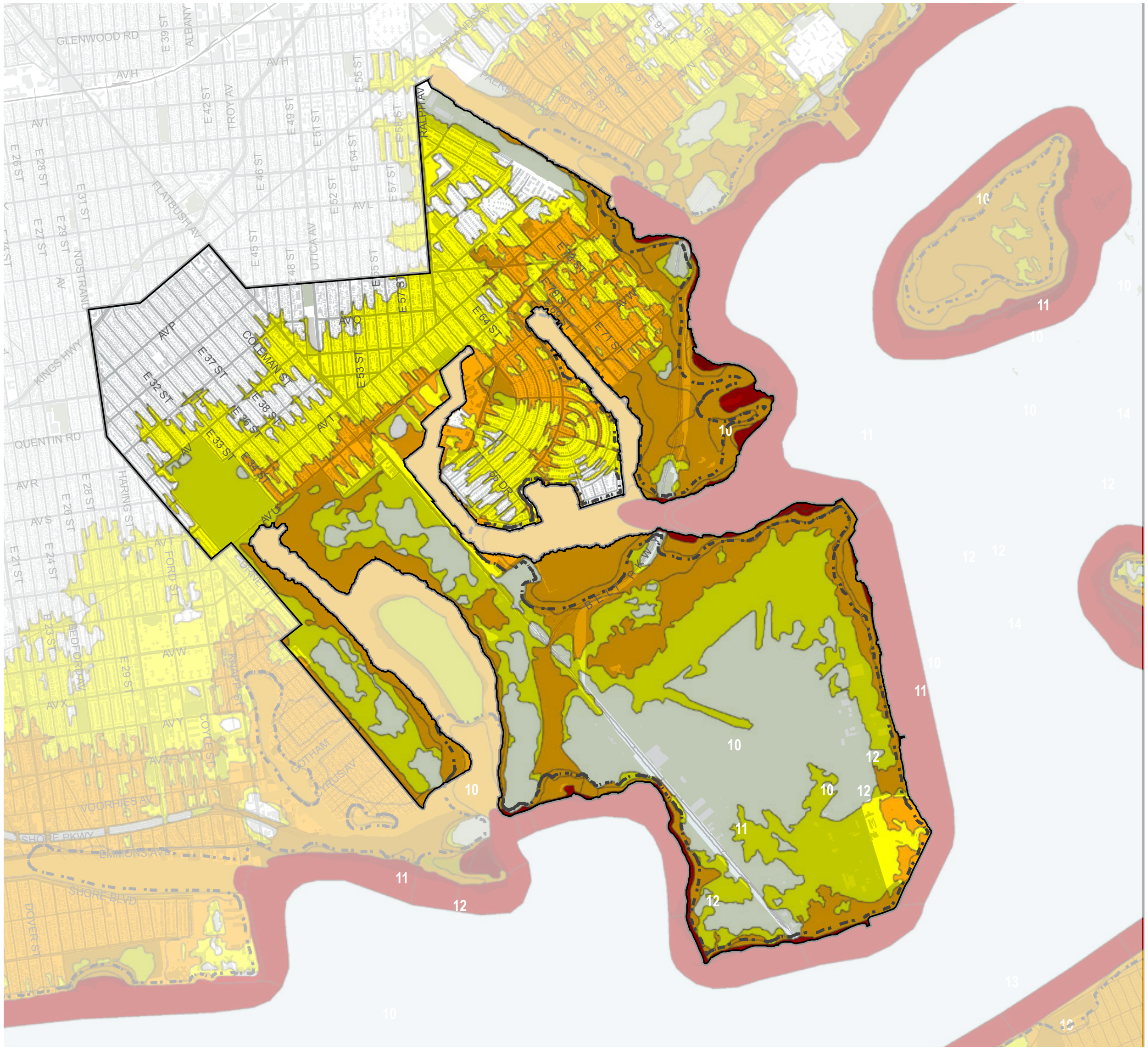
Project Description

With five creeks and basins located within the Planning Area (Marine Park Creek, Mill Creek, Mill Basin, East Mill Basin, and Paerdegat Basin), the potential storm surge entry points are plentiful and varied. Storm surge from each of these five creeks and basins affected the Community during Superstorm Sandy, and the risk of a similar storm surge event remains. This project would develop a study to determine the cost and feasibility of coastal protection measures along the Southeast Brooklyn Waterfront shoreline in order to protect the Community from a severe weather event. The scope of this study would include:

- Assessment of populated areas of the Planning Area that are most vulnerable to, and at risk from, coastal flooding, such as the neighborhoods of Bergen Beach and Mill Island;
- Comparison of potential alternatives, including berming, flood walls, and floodgates;
- Feasibility and cost-benefit analysis of identified alternatives;
- Conceptual design of potential coastal protection measures;
- Community engagement to ensure that developed public alternatives are responsive to local needs and priorities; and
- Agency coordination to ensure synergy with existing plans and adequate adherence to City, State, and Federal regulations.

The study would prioritize strategies that provide protection to high-risk residential neighborhoods while not negatively impacting adjacent areas. It also would prioritize strategies that complement existing Jamaica Bay planning efforts, by first examining coastal

Figure IV–1: FEMA Preliminary Flood Insurance Rate Map (FIRM)



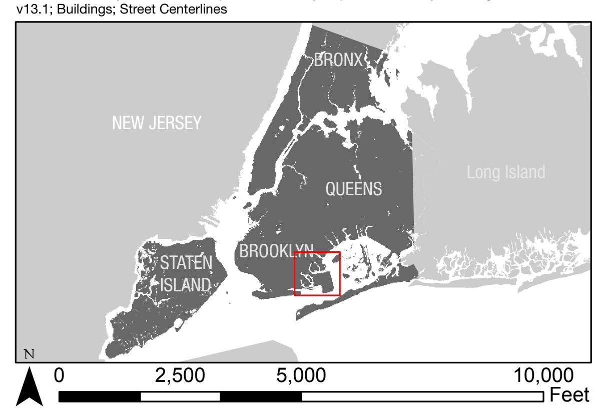
NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

FEMA Preliminary FIRM Flood Zone

- VE zone (waves > 3')
- 100 year floodplain (1% annual chance of flooding)
- 500 year floodplain (0.2% annual chance of flooding)
- Limit of moderate wave action (1'-3' waves)

Source:
FEMA Preliminary FIRM; Basemap: New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



protection studies and projects in development by the U.S. Army Corps of Engineers (USACE) and the City of New York. Enriched by discussions with these entities, the plan then would propose Planning Area-specific strategies that complement Jamaica Bay efforts.

Cost Estimate

$500,000

This conceptual-level cost estimate is based on planning and engineering experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined. This cost estimate covers the scope of analysis described above and does not include physical construction costs for any projects proposed in the study.

Benefit/Co-Benefits

Economic Benefits

This study could lead to the construction of coastal protection interventions for the Planning Area, which would help minimize economic losses, including losses to public facilities and private homes and businesses located adjacent to creeks and basins. Beyond damage to facilities and disruption of economic activity, the Community also faces rising flood insurance costs for the approximately 3,000 buildings within the ever-expanding 100-year floodplain. These rising costs could create economic hardships for residents and business owners. Addressing the Community's flood risk is critical to mitigating the impact of these rising costs and promoting long-term economic stability for residents.

Cost-Benefit Analysis

Neighborhood-wide protection from future coastal storm surge events is potentially costly for the neighborhood, with a built construction cost well beyond the Community's NYRCR Community Development Block Grant–Disaster Recovery (CDBG-DR) allotment. Still, physical flood risk reduction, implemented in a manner that respects existing community assets and goals and builds upon ongoing planning efforts, is a key priority for the Community.

While a study on physical risk reduction cannot be evaluated, the need for such an investment can be evaluated based on the magnitude of the risk to the Community.

In the Planning Area's 100-year floodplain, there are approximately 3,000 residential buildings, which include 4,400 residential units. Many of these units are of masonry or brick construction and/or have basements, making building-level flood adaptation, such as elevation, a challenge. While there are ongoing flood risk reduction and coastal protection planning efforts around Jamaica Bay, none are targeted specifically to the needs and priorities of the Community. Without a study, there is no clear understanding of potential flood protection options. A coastal protection strategy for the Planning Area is less likely to gain traction with prospective implementation and funding partners due to uncertainties surrounding its cost and feasibility. If the cost of the study ($500,000) were distributed among the 3,000 buildings within the 100-year floodplain, the cost per building would be only $167. The proposed study would be an important investment to ensure that planning for long-term physical flood risk reduction continues.

Anticipated Risk Reduction

While the study itself would not reduce risk to the Community's assets and population, it would lay the groundwork for strategies with high potential for risk reduction in the future. With the potential to reduce flood risk to 3,000 buildings in the 100-year floodplain and the 34 assets identified by the Community that are in high- or extreme-risk areas, the study would be a key next step toward a comprehensive coastal flood mitigation strategy. The study would also reduce the uncertainty in the effectiveness, feasibility, and cost of long-term flood risk reduction, putting forth strategies that would lower the risk score for every highly

valued Community asset within the Planning Area. While the study would develop coastal protection strategies to reduce the risk of coastal flooding from a 100- or 500-year storm, no coastal protection strategy will completely eliminate risk of coastal flooding. Residual risk remains, particularly as storms strengthen and sea level rises gradually over time.

Timeframe

The timeframe for completion of the study would be 9 to 12 months from the commencement of the study.

Regulatory Requirements

While there would be no regulatory review requirements for the feasibility study, it would require coordination with a variety of City, State and Federal agencies. Most notably, coordination with the USACE's ongoing Rockaway Inlet to East Rockaway Inlet Reformulation Study would be critical since the study's focus is on flood risk reduction strategies for the Rockaway Peninsula and all of Jamaica Bay. The project would also require coordination with the U.S. National Park Service (NPS), USACE, New York State Department of Environmental Conservation (NYS DEC), New York State Department of State (NYS DOS), and the New York City Office of Recovery and Resiliency (NYC ORR).

Jurisdiction

As a study, this project would not have any jurisdictional requirements. However, the plan would require direct coordination with the agencies indicated above.

Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects

Proposed Project

STRATEGY:
Improve stormwater and wastewater management to prevent flooding and sewer back-up

Recovery Support Functions

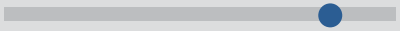
Infrastructure

Natural & Cultural Resources

Cost

$650,000

Timeline (in years)



During Superstorm Sandy, stormwater sewers overflowed throughout the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area), inundating streets and homes. Residents are still recovering from the effects of stormwater basement flooding, struggling to cover the costs of mold remediation and to install check valves and other measures to reduce backup flooding in the future. This project would help mitigate street stormwater flooding—and thus, basement flooding—through implementing pilot projects to capture excess stormwater that could otherwise overwhelm the sewer system and cause backup.

Project Description

This two-phase project first would fund a study to examine the feasibility, costs, and benefits for various stormwater capture and retention projects in the neighboring Southeast Brooklyn Waterfront and Canarsie NYRCR Planning Areas, to combat against stormwater runoff that inundated streets and homes during Superstorm Sandy and continues to be a problem during heavy rain events. A second phase then would implement recommended scalable pilot projects.

The interest among both the Southeast Brooklyn Waterfront and Canarsie Planning Committees for this project emphasizes the need both for such a study and for pilot projects to address stormwater management issues in the area.

Phase 1: Stormwater management and mitigation study

Phase 1 of this project would include a study of existing stormwater and groundwater issues facing both the Southeast Brooklyn Waterfront and Canarsie Planning Areas, as well as of potential stormwater capture and retention strategies to be applied within the Southeast Brooklyn Waterfront Planning Area. This, first, would entail identifying areas of highest need, such as the intersection of Royce Avenue and Avenue T in Bergen Beach and East 57th Street and Avenue T in Mill Basin. The study then would examine the feasibility, costs, benefits, and impacts of potential stormwater capture measures; develop proposals for governmental interventions to incentivize stormwater capture and retention; and suggest pilot projects.

Figure IV–2: Locations of Stormwater Flooding Complaints (via 311)

Stormwater Flooding Locations Identified by Comittee

311 Street Flooding Complaints for 1 Year
(07/01/13-07/01/14)

Street Flooding (237 complaints)

- Street Flooding Complaint

Low volume

High volume

NYC 311 Complaints
New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines

A bioswale absorbs excess stormwater from the street. *Chris Hamby.*[1]

Phase 2: Stormwater mitigation pilot projects
Phase 2 would implement targeted piloting strategies that are identified in Phase 1 as having the highest feasibility and impact. This may include the following:

- Measures such as bioswales and permeable paving (or other surface treatments) in areas with poor drainage and nonporous surfaces; and

- Improvements in and around public and open spaces to enhance area stormwater capture capacity and strengthen the resiliency of community assets.

This phase would give additional consideration to existing information on groundwater tables and would conduct borings on key vulnerable locations wherever groundwater information is unavailable.

Cost Estimate

$650,000

The Phase 1 study estimated cost is approximately $300,000, based on prior studies similar in scope and intent. Since this project would be jointly pursued by the Southeast Brooklyn Waterfront and Canarsie NYRCR Planning Committees, half of this cost ($150,000) would be covered by the Southeast Brooklyn Waterfront Planning Committee's allotment and the other half by the Canarsie Planning Committee's allotment. This would fund a study of the feasibility and applicability noted earlier and determine if and how stormwater capture and retention strategies would be applied within each Planning Area.

For Phase 2, the scalable cost of a typical green infrastructure stormwater capture measure is valued at approximately $25,000. The Southeast Brooklyn Waterfront Planning Committee envisions 20 of these measures (i.e., four per Planning Area neighborhood), implemented within at-risk areas in each Planning Area neighborhood to best evaluate effectiveness. Based on these considerations, a preliminary cost estimate for Phase 2 pilot projects is $500,000, bringing the total project cost to approximately $650,000.

This cost estimate is based on engineering experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined.

Benefit/Co-Benefits

Economic Benefits

This project is expected to produce modest economic benefits, including three full-time equivalent construction jobs associated with

the implementation of stormwater capture measures in Phase 2.[2] The implementation of green infrastructure projects along commercial corridors also has the potential to enhance the resiliency of local businesses through reducing street flooding and promoting beautification.

Environmental Benefits

While this project is expected to have modest environmental benefits in the short term, it could pave the way for a more comprehensive strategy for addressing Southeast Brooklyn Waterfront's stormwater flooding issues, resulting in better water quality in Jamaica Bay and its tributaries. A long-term stormwater management strategy—particularly one that leverages existing open park space and natural areas—would enhance and protect each Planning Area's natural environment.

The majority of the Southeast Brooklyn Waterfront and Canarsie Planning Areas are served by separated sewer systems. Rather than being piped to wastewater treatment plants, stormwater is generally discharged without treatment through storm sewers to surrounding waterbodies. To date, the focus of New York City's use of green infrastructure for stormwater management has been on reducing runoff into combined sewer systems and reducing combined sewer overflow (CSO) events. In areas with separated sewers, runoff from roads and other impervious surfaces carries many potential water pollutants. By capturing and filtering runoff before it enters the stormwater system, green infrastructure can improve the quality of the water entering surrounding waterbodies, thereby enhancing overall water quality. The use of native plants in green infrastructure projects can also provide urban habitat for birds and insects.

Health and Social Benefits

This project would benefit property owners who currently have to rely on their own financial and technical resources to address the damage and disruption caused by direct stormwater runoff. Stormwater management practices may also mitigate wastewater backup concerns by reducing stormwater infiltration into wastewater sewers, creating an important health benefit for those who experience wastewater backup in the basements of their homes and businesses.

Cost-Benefit Analysis

The proposed stormwater capture pilot projects would address stormwater flooding at multiple at-risk locations throughout both communities. The immediate costs of stormwater flooding, particularly on streets, include potential flooding and damage to adjacent private properties, as well as the additional time and maintenance required of City agencies to respond to the problem and address damage. Over time, these represent serious disruptions in basic community activities for residents, business owners, and employees.

According to an analysis by the New York City Comptroller for the 2012 Fiscal Year, 318 of the property damage claims, caused by sewer overflow and filed against the City, came from Brooklyn's Community District 18, which includes the Southeast Brooklyn Waterfront Planning Area neighborhoods of Mill Basin, and Bergen Beach, in addition to Canarsie.[3] These accounted for 28% of the 1,168 mappable claims, representing more than any other Community District in the city. While most claims do not have dollar values assigned to them, available values typically range between $250 and $5,000, which represents a cost to both the City and property owners. As an approximation, if each claim is valued at $5,000, this represents $1.6 million in damages by sewer overflow to properties within Community District 18.

In addition to the project's primary intended benefits of reducing street flooding and sewer backup, it may also offer potential water quality benefits by diverting stormwater runoff that would otherwise enter surrounding

waterbodies. New York State and New York City are currently investing over $100 million through 2020 in long-term control plans to improve water quality in Jamaica Bay. These interventions may offset or delay costs of other water quality investments by diverting direct runoff and enhancing the water quality of Jamaica Bay and its tributaries. The reasonably small investment recommended for this project, in relation to those proposed by the City to address water quality, stormwater flooding and sewer backup, suggests that this project would be a beneficial and cost-effective investment.

Anticipated Risk Reduction

Pilot projects implemented through Phase 2 are anticipated to provide a reduction in risk of flooding from heavy rain events within the localized area where they are implemented. The degree to which these measures mitigate localized flooding would depend largely on the size of the catchment area, quantity of rainfall, and in the case of bioswales, the depth to high groundwater and soil types. A sense of the magnitude of the issue—and thus, potential for risk reduction—is conveyed by the following statistics:

- The four specific locations identified by the Southeast Brooklyn Waterfront Community that experience regular reoccurring flooding; and
- The 237 complaints to 311 regarding street flooding that were logged in 2013.

Should the pilot projects prove effective, this project could pave the way for a large-scale stormwater strategy in Southeast Brooklyn Waterfront, reducing the risk of street flooding to at-risk areas within the overall Southeast Brooklyn Waterfront Planning Area. Depending on their locations, pilot projects would lower the risk scores of any nearby community assets by lessening their vulnerability to street flooding. This risk score reduction is likely to be minimal, as pilot projects would be designed to mitigate street flooding from stormwater overflow and not to provide meaningful protection against coastal storm surge.

Timeframe

Once the implementing entity has been determined, Phase 1 of this project could begin within 6 months, while Phase 2 would take anywhere from 3–5 years, depending on the scope of the projects identified in Phase 1 and the identification of appropriate partners.

Regulatory Requirements

While the Phase 1 study would not have any regulatory requirements, the stormwater capture and retention projects identified for implementation during Phase 2 would require review and approval of agencies including the New York City Department of Environmental Protection (NYC DEP) New York City Department of Transportation (NYC DOT), and New York City Department of Parks and Recreation (NYC DPR).

Jurisdiction

Jurisdiction over this project's proposed initiatives would depend on the types of initiatives implemented in Phase 2. Proposed improvements to street infrastructure and parks could involve NYC DEP, NYC DOT, and NYC DPR.

A bioswale absorbs excess stormwater from the street. *Steven Vance.*[4]

Bergen Beach Stormwater Retention/Detention System

Proposed Project

STRATEGY:
Improve stormwater and wastewater management to prevent flooding and sewer back-up

Recovery Support Functions

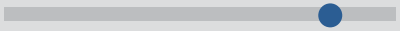
Infrastructure

Natural & Cultural Resources

Cost

$500,000

Timeline (in years)



After Superstorm Sandy, the homes along Avenue Y in Bergen Beach were surrounded by standing stormwater runoff for two days, preventing residents from accessing their homes and flooding many of their basements. Due to a lack of stormwater infrastructure along Avenue Y, these homes remain at risk of similar damage during future storm events. This project proposes the construction of a stormwater retention/detention system within a naturalized park area in southern Bergen Beach, tying into New York City plans to construct new storm sewers and an associated outfall in the area.

Project Description

This project would construct a stormwater retention/detention system within a natural wetland area of Bergen Beach, on land owned by New York City Department of Parks and Recreation (NYC DPR). This stormwater retention/detention system would link to City plans to construct a new storm sewer and outfall along Avenue Y, providing stormwater flooding abatement for a low-lying, at-risk residential community, while also removing pollutants from stormwater that may otherwise enter nearby East Mill Basin. By combining grey and green infrastructure, the project specifically would mitigate stormwater runoff in an area that recurrently experiences this issue.

This project would lessen street flooding that affects homes along Avenue Y that do not have nearby catch basins in the street, as well as homes along the low-lying southern portions of Bergen Avenue, East 74th Street, East 73rd Street, and East 72nd Street, among other nearby areas.

This stormwater retention system may also be employed in similar natural or underutilized areas throughout the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area). Some potential locations where a similar project may be replicated include:

- Parkland south of Avenue U between East 33rd and East 36th Streets; and
- Underutilized property on the southwest corner of the Avenue U and Mill Avenue intersection.

While further study would be required to

The Bergen Beach stormwater retention/detention system would entail the construction of a wetland to help absorb excess stormwater off of Avenue Y.

Existing conditions at Avenue Y and East 70th St. *Map Data: Google.*

determine the feasibility and permission of constructing a stormwater retention/detention system in any of these three locations, these areas remain underutilized and are in close proximity to where the Southeast Brooklyn Waterfront NYRCR Community (Community) reported stormwater flooding, making them strong initial candidates for this type of intervention.

Cost Estimate

$500,000

While the sewer infrastructure component of this project would cost upwards of $10 million, the Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) has elected to allot $500,000 of funding (5% of total cost) toward project implementation.

The remainder of the project cost would be covered by the City, leveraging the City's existing capital funding. Without the Committee's contribution, the City likely would design this project to the base standards of stormwater sewer construction in New York City, which includes the direct outflow of stormwater into East Mill Basin and Jamaica Bay. This project adds a green infrastructure element to the project, which would carry water quality benefits.

This 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.

This cost estimate will also vary depending on the size and type of the stormwater retention/detention system. This cost includes neither the initial study required to determine the feasibility of the project nor design and construction. Maintenance is not included in the cost.

Figure IV–3: Bergen Beach Stormwater Retention/Detention System Site Plan

Benefit/Co-Benefits

Economic Benefits

This project is expected to produce meaningful economic benefits, including 30 full-time equivalent construction jobs.[5] A reduction in street flooding in the southern portion of Bergen Beach additionally could lessen flood damage experienced by area homeowners, helping to protect residential assets and promote longer-term neighborhood economic vitality.

Environmental Benefits

The project would provide environmental benefits by eliminating nuisance local ponding and by improving the water quality of nearby East Mill Basin, consequently benefiting the water quality of the larger Jamaica Bay. The system would achieve this by removing pollutants, such as those found in sediment from stormwater runoff before it enters the basin. This project may also expand on its water quality benefits if sized to capture stormwater runoff from the neighboring Belt Parkway. Depending on the design of the stormwater retention system, this project also has the potential to increase biodiversity by introducing new target ecosystems.

Health and Social Benefits

This project would benefit residents of southern Bergen Beach who currently use their own funds and resources to address stormwater flooding, particularly when it affects the basements of their properties. In the long term, should City agencies replicate this system elsewhere in the Planning Area, stormwater management practices could also mitigate wastewater backup concerns by reducing stormwater infiltration into wastewater sewers, creating an important health benefit for those who experience wastewater backup in the basements of their homes and businesses.

Cost-Benefit Analysis

The Committee's allotment toward this project is intended to contribute a relatively small amount of Community Development Block Grant—Disaster Recovery (CDBG-DR) funding to a larger City capital project with the intention that the project would carry greater community benefits and occur within a shorter timeframe than it may otherwise. The immediate costs of stormwater flooding, particularly on streets, include potential flooding and damage to adjacent private properties, as well as the additional time and maintenance required of City agencies to respond to the problem and address damage. Over time, these represent serious disruptions in basic community activities for residents, business owners, and employees.

This project would provide stormwater capture benefit for approximately 12 acres of southern Bergen Beach, comprising 60 residential buildings within the proposed catchment area. Damage to these buildings caused by stormwater flooding may cost upwards of $5,000 per home. While the Committee's contribution of $500,000 to this project amounts to $8,300 per home, this cost includes the area's daily stormwater capture needs weighed against capture needs specific to a 50- or 100-year rainfall. The constructed wetland component of this project could reduce the costs of traditional grey infrastructure by allowing street runoff to discharge directly into the wetland, precluding the need for the construction of piping.

In addition to the primary intended benefits of the project to reduce street flooding and sewer backup, the significant water quality benefits derived from diverting stormwater that would have otherwise discharged into surrounding water bodies through a new outfall is important to consider. New York State and New York City are investing over $100 million through 2020 in long-term control plans to improve water quality in Jamaica Bay. These interventions may offset or delay costs of other water quality investments by diverting direct runoff and enhancing the water quality of the Bay and its tributaries. The reasonably small investment recommended for this project in relation to those of the City to address water quality, stormwater flooding, and

sewer backup suggests this project would be a beneficial and cost-effective investment.

Anticipated Risk Reduction

If feasible, this project would drastically reduce the risk of street flooding from stormwater overflow during heavy rain events for approximately 60 residential properties and 12 acres of land within southern Bergen Beach, reducing their vulnerability and therefore the risk score for those homes within the high risk area along Avenue Y. This project could also reduce the risk of street flooding for more northern areas of the Bergen Beach neighborhood (north of Avenue X) should the project include a means of pumping or channeling stormwater runoff from those areas into the area of the system. While this project has the potential to capture stormwater from up to a 100-year rainfall event, residual risk of stormwater street flooding remains, depending particularly on the catchment area and the capacity of the retention system, among other factors.

Timeframe

Once the implementing entity has been determined, this project could begin within a year and 6 months, with final construction completed in around 3-5 years, depending on the scope of the project.

Regulatory Requirements

This project would require the direct review and approval of the New York City Department of Environmental Protection (NYC DEP) and New York City Department of Parks and Recreation (NYC DPR). Additional input would be required from the New York City Department of Transportation. Since the project occurs within an existing wetland area, the New York State Department of Environmental Conservation (NYS DEC) would also need to approve final construction of this project.

Jurisdiction

This project would be located in Brooklyn, New York, and as such, would fall under the jurisdiction of New York City laws. This project builds off of an existing project led by New York City Department of Transportation in partnership with the NYC DEP. The green infrastructure component of this project occurs within NYC DPR property. As such, this project falls primarily within the jurisdiction of these three City agencies. Given that this project affects wetlands and water quality within Jamaica Bay, it must also meet the jurisdictional requirements of NYS DEC.

Alternative Power Hotspot

Proposed Project

STRATEGY:
Make the power supply more resilient and redundant

Recovery Support Functions

Infrastructure

Cost

$300,000

Timeline (in years)

Faced with recurring power outages in the aftermath of Superstorm Sandy, the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) is in need of more redundant and resilient power infrastructure. Residents, in particular, have cited a need for better lighting on streets, and for areas where they can charge cellphones in the event of a power outage in order to ensure communication with loved ones and with providers of critical support services. This project would help to meet that need through installing alternative energy infrastructure along critical thoroughfares throughout the Planning Area to serve as pilots for similar interventions in the neighborhood. Alternative power hotspots provide a reliable source of lighting in the event of an outage and create a space where residents can meet and power mobile devices, while also accessing food and other services nearby.

Project Description

This project would create a power hotspot or series of hotspots throughout the Planning Area. In siting the hotspots, the project would leverage the large number of big-box retailers and associated street-facing parking lots within the Planning Area. Potential locations may include the parking lots of retailers along major corridors like Avenue U, Royce Avenue, and Flatbush Avenue. The components of the hotspot could include:

- Solar- or wind-powered pedestrian-level lighting;
- Solar- or wind-powered cellphone charging station(s);
- Benches or other limited seating;
- Stormwater capture measures, such as permeable pavement; and
- Streetscape improvements as they relate to privately-owned sidewalks, parking lots, and streets.

Once alternative power infrastructure is installed, a subsequent phase may consider the implementation of permeable paving and/or other stormwater capture measures adjacent to the hotspots to increase the absorptive capacity of parking lots and reduce flooding, as well as opportunities to replicate hotspots in other areas. These hotspots may also serve as ideal locations to test the efficacy and reliability

Alternative power hotspots would entail the installation of alternative power infrastructure in large parking lots.

of alternative power technologies before they are rolled out on a neighborhood, or even city-wide, scale.

Cost Estimate

$300,000

Each hotspot is estimated to cost around $130,000–$200,000. This estimate includes:

- Four units of hybrid (wind- and solar-powered) lighting: $30,000;
- Three units of solar-powered charging stations: $30,000;
- 500 square feet of permeable pavement: $3,500;
- Two trees, benches, and trash receptacles: $8,500; and
- Construction and design contingencies: $60,000–$130,000.

The total cost for the project is variable, depending on the number of units for each hotspot component and the number of hotspots installed; this cost estimate assumes the above components, and could cover two hotspots. These costs include the manufacturing costs of the hotspots, including solar batteries, needed to ensure the resiliency of the hotspots during emergency events. This cost does not include continued maintenance of infrastructure.

Benefit/Co-Benefits

Economic Benefits

The hotspots would enhance the character of commercial corridors in the Planning Area, encouraging increased pedestrian traffic that could bolster local businesses. Furthermore, hotspot visitors may visit adjacent retailers, increasing economic activity. Solar power closely aligns with the goals of the New York City Regional Economic Development Council's Strategic Plan, which calls for a more diversified energy generation and distribution system.

Health and Social Services Benefits

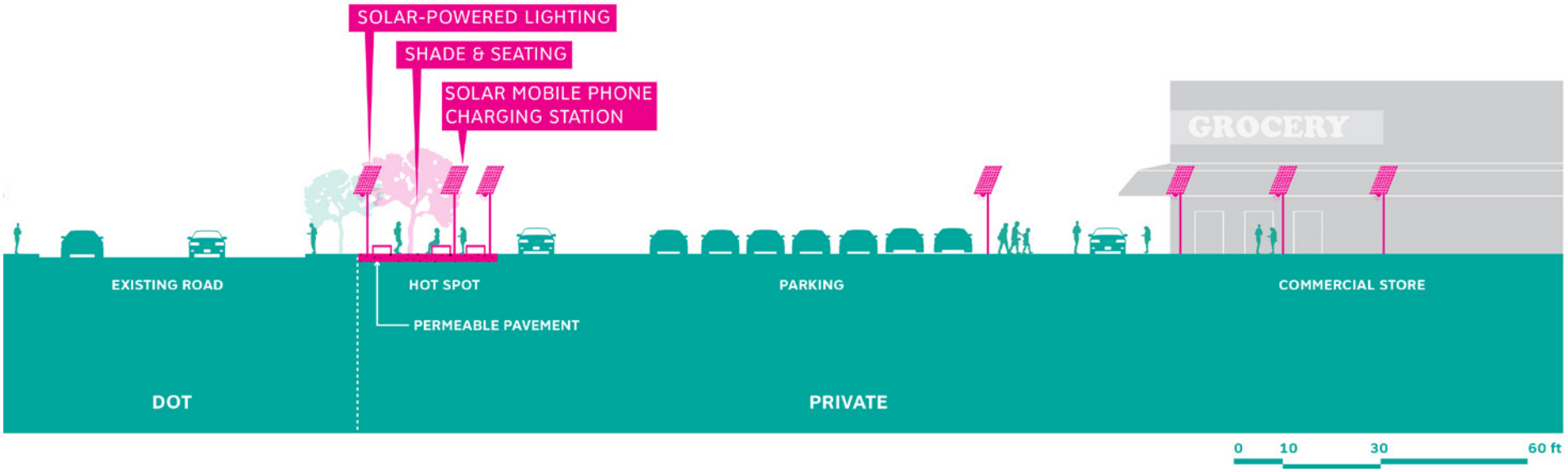
Hotspots throughout the Planning Area would provide a source of reliable power in the event of a larger grid failure. Following an emergency, lighting and charging stations would improve the safety and mobility of residents, providing greater access to health providers and emergency contacts, as well as goods and services.

Environmental Benefits

In addition to emergency functions, the hotspots could be used on a more regular basis, providing environmental benefits since solar power is a renewable and pollution-free energy source. The use of solar power reduces the demand for electricity procured from traditional power plants, which is a regional source of air pollution.

Cost-Benefit Analysis

The Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) has proposed an Additional Resiliency Recommendation (*see page V–4*) that Consolidated Edison harden existing power infrastructure within the Planning Area—a long-term and costly endeavor to enhance the resiliency of the Planning Area's power grid. Alternative power hotspots would help to promote power resiliency and redundancy in the short-term by providing an alternative form of power that would reduce the vulnerability of residents to power outages. During emergencies, solar-powered lighting and charging stations equipped with batteries could run from 12 hours up to several days without sunlight. This infrastructure would provide the Southeast Brooklyn Waterfront NYRCR Community's (Community) 53,000 residents with resilient lighting and charging stations during emergencies at a cost of approximately $14 per resident. This project would ensure reliable communication with critical emergency providers, and would provide lighting that increases the safety and mobility of residents to goods and services following an



Alternative power hotspots would be located in the parking lots of supermarkets and big-box retailers in the Southeast Brooklyn Waterfront NYRCR Planning Area.

emergency. During normal operations, alternative power hotspots would provide an environmentally friendly form of energy that enhances the character of commercial centers and promotes economic and pedestrian activity.

Anticipated Risk Reduction

This project is expected to generate high risk-reduction benefits in the short term. It would ensure a source of electricity for lighting as well as powering and charging mobile devices (including cellphones and laptops), enabling communication with critical emergency contacts and accessing information. Hotspots would be located near major thoroughfares, making resilient power accessible to residents throughout the Planning Area. During Superstorm Sandy, power outages forced the City to focus efforts on short-term fixes, such as setting up generator-powered streetlights. Resilient, non-grid light sources would allow recovery efforts to focus on helping people in the immediate aftermath of a storm and less on restoring light, increasing the City's emergency response capacity. Hotspots additionally could reduce the vulnerability of community assets located nearby, thereby lowering the risk scores of those assets. This could include key commercial corridors (Avenue N, Flatbush Avenue, Ralph Avenue, and Avenue U) and shopping centers (Kings Plaza, Ralph Avenue, Key Food, and Waldbaums Grocery) valued by the Community.

Timeframe

Once approved, this short-term project would require approximately 1-2 years to design, review, permit, and construct it.

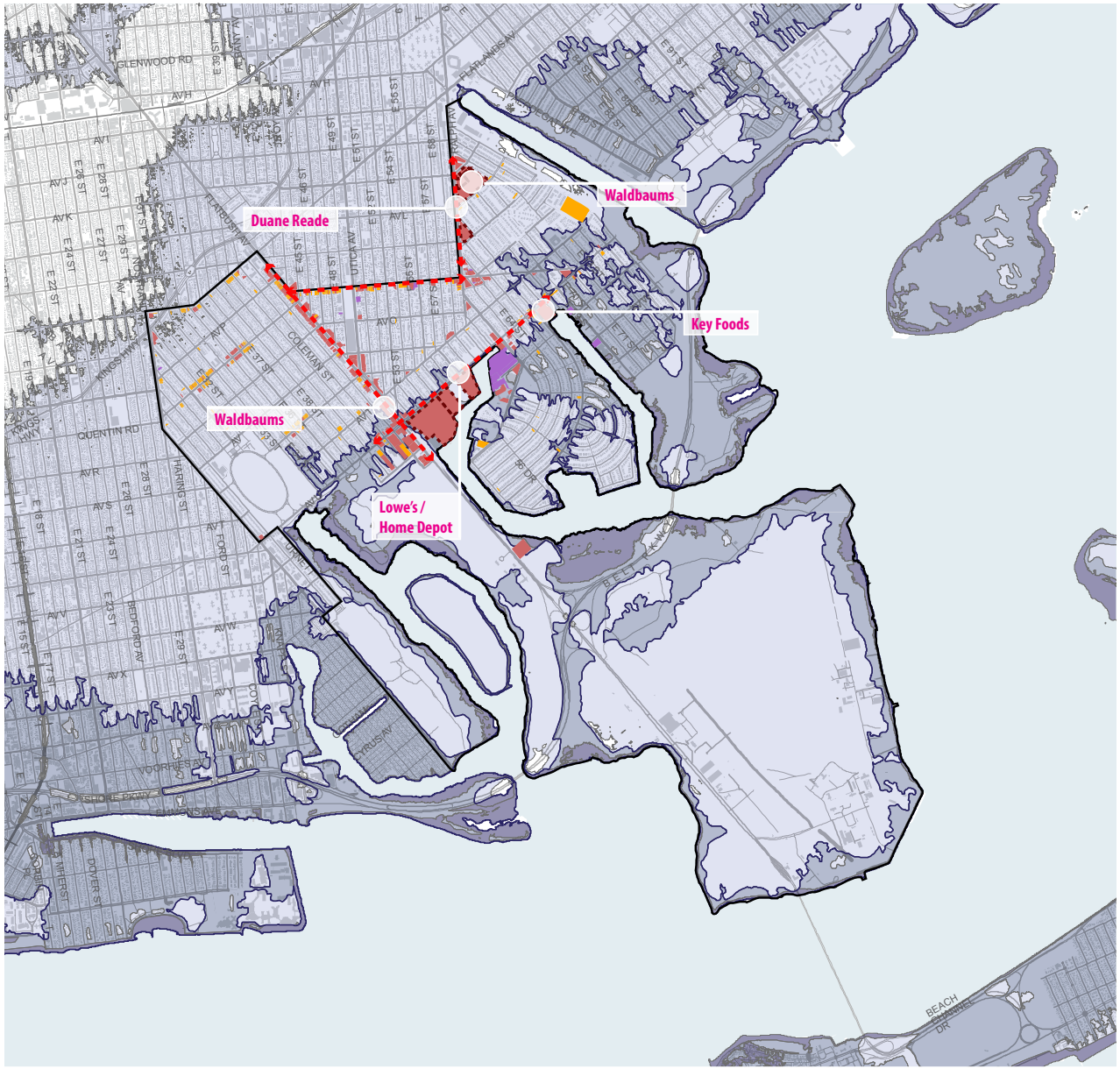
Regulatory Requirements

Since the project would be located on privately-owned sites, no agency oversight is expected other than permitting, as required, by the New York City Department of Buildings. Coordination with existing utilities companies may additionally be required.

Jurisdiction

As hotspots would be located in privately-owned parking lots, the project would not have any jurisdictional requirements other than compliance with New York City laws.

Figure IV–4: Potential Locations of Alternative Power Hotspots



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Areas

Economic Assets

Commercial Corridors (Flatbush Avenue, Avenue N, Avenue U, Ralph Avenue)

Shopping Centers

NYSDOS Risk Areas

Moderate

High

Extreme

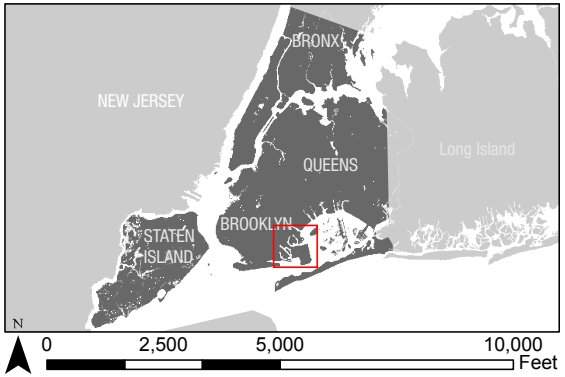
Economic Use

Mixed Residential & Commercial

Commercial & Office Buildings

Industrial & Manufacturing

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



Emergency Preparedness Education Program

Proposed Project

STRATEGY
Enhance emergency preparedness and response

Recovery Support Functions

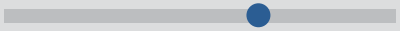
Health & Social Services

Community Planning

Cost

$100,000

Timeline (in years)



Before, during, and after Superstorm Sandy, residents lacked critical information on New York City evacuation protocol and where to go for help. Through several tools, this project would address the critical knowledge gap that existed during Superstorm Sandy and promote long-term recovery.

Project Description

This project would develop a guide on local emergency preparedness and response procedures, an online information hub, and educational programming. Resources created through the program would aim to provide locally-tailored information to residents on how to prepare before a storm hits, evacuation procedures, and where to obtain supplies and information in the aftermath of a storm. Material would leverage existing information developed by the New York City Office of Emergency Management (NYC OEM) on these topics.

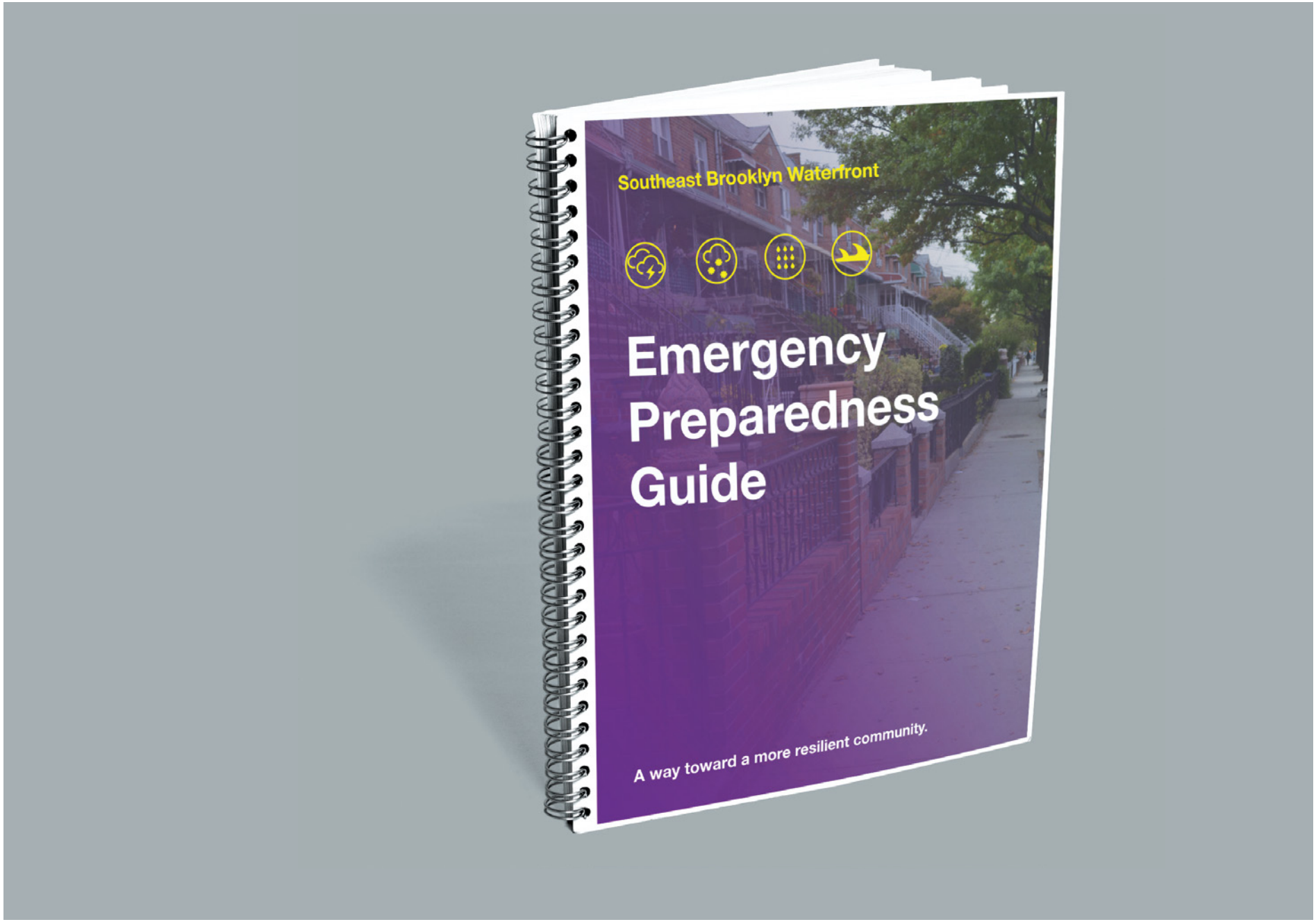
A **printed guide** would provide information on general preparedness best practices, such as tips on how to prepare a Go Bag and an Emergency Supply Kit.

An **online information hub** would provide up-to-date information on evacuation protocol and where to go to access supplies. This may include:

- City-designated evacuation zones, and where and how to evacuate;
- High-ground parking areas;
- Where to access food, hot water, power, and medical assistance; and
- How to get help if unable to self-evacuate.

Educational programming would accompany the printed guide and the online information hub, training the Southeast Brooklyn Waterfront NYRCR Community (Community) on these new resources. Programming would be designed for a broad community audience and could be held at community facilities, libraries, and health facilities across the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area).

The above resources would be developed by an implementing entity with prior experience producing community-relevant material on



The above image is a graphical representation of what a printed emergency preparedness guide may look like and is intended for illustrative purposes only.

emergency preparedness and response, and with capacity and responsibility for hosting and updating the online information hub and the printed preparedness guide. This organization would be selected through a competitive bidding process and would need to demonstrate a history of providing community programming and of existing relationships with the Community.

In the development of material, the implementing entity would work with NYC OEM to collect and provide information—on preparedness measures and evacuation protocol—and to supplement it with local information from civic associations, religious facilities, community centers, and senior living facilities, on where to access additional supplies and services. To gain a sense of the most critical topics to cover, the implementing entity may gather input through surveys and interviews, as well as test the efficacy of sample resources with residents and business owners.

Cost Estimate

$100,000

The estimated cost for this effort is approximately $100,000. This cost estimate assumes (over two years):

- Salary and benefits for one part-time equivalent program manager: $80,000; and
- Programming and materials: $20,000.

Benefit/Co-Benefits

Health and Social Benefits

This Proposed Project would increase resident awareness of where to access health services, supplies, and information before, and in the aftermath of, a storm event. As such, it would enhance access to these services and supplies and guard against unnecessary harm, particularly for vulnerable populations.

Cost-Benefit Analysis

This project would increase access to critical information for the 53,000 residents across the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area), where residents report that information is not currently distributed across the population effectively. It would do so at the low cost of $2 per resident, making available potentially life-saving information regarding evacuation routes, medical care, and where to find emergency assistance, particularly for those 75 and older, who represent 7% of the Planning Area's population. These localized resources would reduce the burden on government agencies and nonprofit organizations with limited funding and staffing capacity to provide this information. The small cost of this project is greatly outweighed by the benefits for community members, government agencies, and nonprofit organizations.

Anticipated Risk Reduction

Residents have said that one of the largest obstacles to community safety during Superstorm Sandy was the lack of information regarding access to resources. This project would ensure that information on resources and proper procedures reaches the Community effectively and is well-understood, thus reducing risk.

Timeframe

Once the Proposed Project has been formally initiated, project implementation would begin with a competitive bidding process, inviting local non-profit organizations and consultants to apply to administer the program. This is expected to take around 6 months. Funding toward distributing the guide, establishing the online hub, and implementing programming would then be allotted through the Community Development Block Grant—Disaster Recovery (CDBG-DR) program for a 2-year period. After this time, the implementing entity would need to identify other sources of funding to maintain the guide, hub, and programming, or to absorb the costs into their existing budgets.

Regulatory Requirements

It is anticipated that no regulatory review would be needed for the execution of this project; however, New York City Office of Emergency Management would be consulted to ensure coordination with citywide emergency preparedness efforts.

Jurisdiction

This program has no jurisdictional requirements other than compliance with New York City laws.

Recovery Community Centers

Proposed Project

STRATEGY
Enhance emergency preparedness and response

Recovery Support Functions

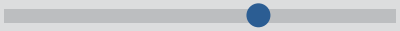
Health & Social Services

Community Planning

Cost

$1.5 MILLION

Timeline (in years)



After Superstorm Sandy, several community-based organizations (CBOs) in the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) opened their facilities to distribute food, supplies, and information to residents. While these efforts provided substantial help to the Southeast Brooklyn Waterfront NYRCR Community (Community), residents have reported they were not extensive enough, and that residents often did not know the locations of these informal relief efforts beforehand. This project would take a first step at meeting a need for a more formalized network of support by funding the development of Recovery Community Centers to be based out of existing community facilities and organizations. Centers would provide emergency preparedness-related programming on a regular basis, as well as emergency-related supportive services, such as food and supplies, in the immediate aftermath of a severe weather event.

Project Description

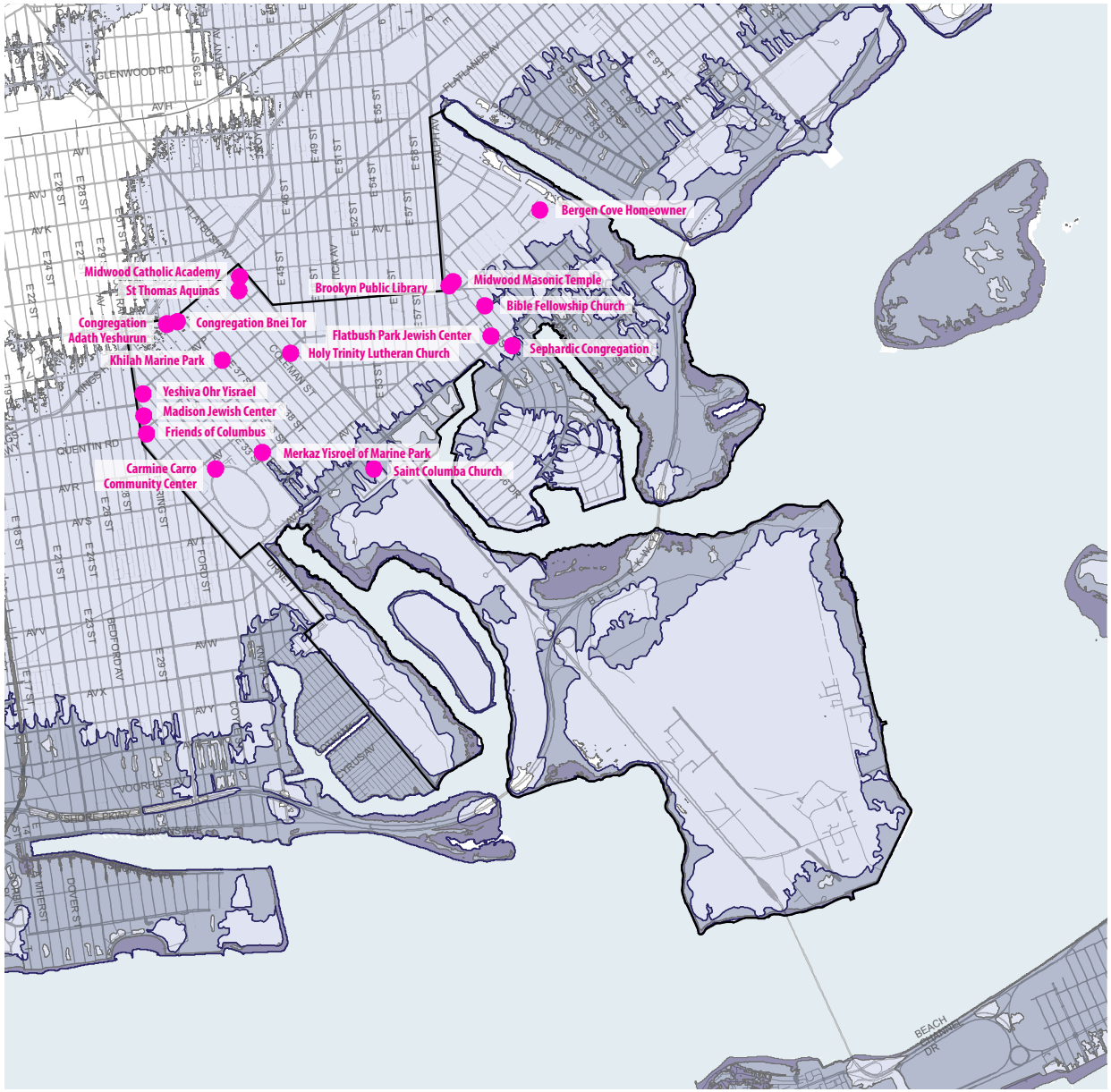
This project would fund the creation of Recovery Community Centers (Centers) to house the distribution of emergency services following a disaster, such as access to power, food, water, basic medical services, and information. Centers would be large community spaces outside of the floodplain, equipped with backup power, where supplies and services could be distributed. As such, the program would not just provide funding to organizations for programming, but also for building-level capital improvements, such as backup power installation.

The array of services to be provided by Centers could include:

- Access to food, water, heating and cooling, and basic supplies;
- Access to power and charging stations for cellphones;
- Information about citywide emergency response activities and local efforts;
- Non-urgent medical services (e.g., first aid, mental health services); and
- Social services (e.g., legal or financial counseling, childcare).

Centers would be housed within existing

Figure IV–5: Potential Locations of Recovery Community Centers



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Areas

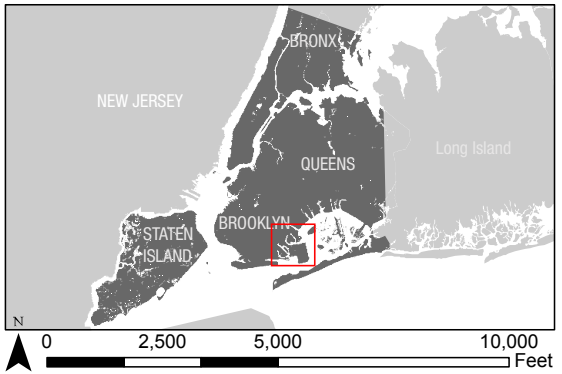
NYSDOS Risk Areas

Moderate

High

Extreme

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



buildings and organizations that provide year-round community services. Eligible sites and participating organizations would be selected through a competitive bidding process. This process would prioritize organizations both with a past history of running community programming in the Planning Area, and with sufficient organizational and facility capacity to administer the program.

In selecting organizational facilities for housing Centers, the program would prioritize the following physical criteria:

- Capacity for reliable source of power and heat/cooling;
- American with Disabilities Act (ADA)-compliance, or capacity to be made compliant;
- Potable water system;
- Restrooms;
- Large space on ground floor;
- Ease of approachability and accessibility from street;

Recovery Community Centers would collect and distribute food and supplies to community members, as did the Flatlands Volunteer Ambulance Corps after Superstorm Sandy. *Photograph by Steve Solomonson.*

- Location near an evacuation route; and
- Location outside of the floodplain

Based on needs identified by the Southeast Brooklyn NYRCR Planning Committee (Committee), the ideal host organization would exhibit some or all of the following criteria:

- Active in post-Superstorm Sandy response efforts;
- History of community engagement and strong community ties;
- Regular community programming and capacity to provide emergency-related programming;

- Demonstrated ability to conduct outreach to vulnerable populations;
- Capacity to provide social and/or health services;
- Long-term occupancy agreement or ownership of the building;
- Business continuity plan in place;
- Financial stability; and
- Ability to fund the purchase of basic emergency supplies and equipment, including radios or push-to-talk phones, or fuel for backup generators (which cannot be funded with the Community's Community Development Block Grant-Disaster Recovery (CDBG-DR) funding allotment).

Cost Estimate

$1.5 MILLION

Each center is estimated to cost between $500,000 and $700,000, depending on the level of capital upgrades needed to harden the building and make it ADA-compliant, as well as the number of people the center is anticipated to serve. This cost estimate includes (over 2 years):

- Backup power: $200,000-$300,000;
- Accessibility upgrades: $0-$100,000;
- Salary and benefits for one full-time equivalent program manager and part-time equivalent program support staff: $240,000; and
- Programming and materials: $60,000.

The total project cost is scalable, depending on the number of Centers the Committee would like to fund. The Committee ultimately decided to allot funding for two to three Centers, at a total amount of $1,500,000.

Benefit/Co-Benefits

Health and Social Benefits

By bolstering a number of existing buildings to serve as Centers, this project would improve the ability of community organizations to operate during an emergency. The network would coordinate and share information about the location and availability of critical social and health services and could also provide on-site medical and legal counseling, and other services to residents.

Cost-Benefit Analysis

Enhancing accessibility and organization of relief activities has been cited as a primary need in the Community. In helping to meet this need for the 53,000 residents throughout the Planning Area, this project would carry substantial risk reduction benefits—and at the low project cost of $28 per resident.

Providing a distributed network of supportive services also would increase access to these services for vulnerable populations. This includes the approximately 3,700 residents over the age of 75 (7% of the population) and the approximately 10,500 residents under the age of 18 (20% of the population).

The creation of Centers additionally would bolster the financial and professional capacity of host CBOs and promote their continued service to the Community. For host organizations that may have informally provided relief services out of their own operations budgets in the aftermath of Superstorm Sandy, this project now would provide financial support for offering related services and programming, as well as creating one full-time equivalent job and one part-time equivalent job. By funding the installation of backup power supply, the project would additionally prevent disruptions in organizational activity due to power outages.

Anticipated Risk Reduction

A Recovery Community Center network would reduce risk to residents by providing publicly

accessible backup power, a centralized source for information, social and support services, and food and supplies. For the entire Community, formalizing a network of locations to provide coordinated relief supplies and support services would reduce risks to health and safety following a disaster. Specifically, Centers could reduce the risk of:

- Sickness, discomfort, injury, or death related to lack of access to medical attention, food, water, power, and other necessities;
- Emotional or psychological distress; and
- Displacement of children, relatives, and friends who might need to relocate to receive services.

Vulnerable populations such as seniors and physically impaired residents stand to benefit the most, given that they are most likely to need assistance, yet less likely to have reliable and convenient access to critical supplies and services.

The project would also reduce vulnerability and increase the operational capacity of CBOs that provide resiliency programming. Backup power would allow these organizations to continue to operate in the wake of emergency events, thereby reducing business interruption. Further, the funding provided by this program would increase the capacity of CBOs to conduct emergency preparedness outreach and planning, and their overall ability to support the Community.

Timeframe

Once the project has been formally initiated, it would take approximately 1–2 years to implement. The key issues that could impact the timeframe are: (1) the length and format of the selection process; and (2) physical challenges that may emerge with building-level improvements.

Project implementation would begin with a competitive bidding process, inviting local organizations that meet certain criteria—including those mentioned above—to apply to participate in the program. This process would take into account existing conditions, emergency planning efforts, organizational capacity, and other community characteristics. It is estimated that this process—from initial survey of existing conditions to the release of the solicitation—would take approximately 2–4 months. Subsequently, a program manager would be hired and implementation of capital improvements would begin. Depending on the scope of work, this construction phase could take up to 6 months.

Regulatory Requirements

Implementation would require permitting from the New York City Department of Buildings (NYC DOB) and coordination with several additional entities, including the Fire Department of New York, Consolidated Edison, National Grid, and the Bureau of Electrical Control. New York City Office of Emergency Management would be consulted to ensure coordination with citywide emergency preparedness efforts.

Jurisdiction

The jurisdictional requirements for this project would vary, depending on whether centers were located in publicly- or privately-owned facilities. Any capital improvements for publicly-owned facilities could fall under the jurisdiction of agencies like the New York City Department of Parks and Recreation, New York City Department of Design and Construction, and New York City Department of Education. For private facilities, there would be no further jurisdictional requirements other than compliance with New York City laws.

Recovery Community Centers would collect and distribute food and supplies to community members, as did the Flatlands Volunteer Ambulance Corps after Superstorm Sandy. *Photograph by Steve Solomonson.*

Critical Facility Upgrades Program

Proposed Project

STRATEGY
Enhance emergency preparedness and response

Recovery Support Functions

Health & Social Services

Community Planning

Cost

$1 MILLION

Timeline (in years)

During both Superstorm Sandy and its aftermath, health and social service providers in the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) experienced service disruptions due to lack of backup power and structural damage from flooding. This project would aim to prevent these disruptions by helping health and social service providers make building-level capital upgrades.

Project Description

This project would fund building-level capital improvements at critical health and social services facilities. Providers could include medical clinics, hospitals, voluntary emergency/ambulance organizations, and senior living facilities, among others. These organizations may face service disruption as a result of power outages or structural damages brought upon by a severe weather-related event. Funding for resiliency improvements would help to avoid a disruption in the critical services these organizations provide.

Potential capital improvements may include:

- Backup power, with priority on natural gas-powered backup generators due to lower cost (in comparison to solar/hybrid-powered); and
- Floodproofing measures, such as elevating mechanicals and applying waterproof coatings to the basement and ground floor, among other measures.

To receive funding, the facility/organization would need to demonstrate past involvement in community disaster recovery and make a formal commitment to providing such services in the future.

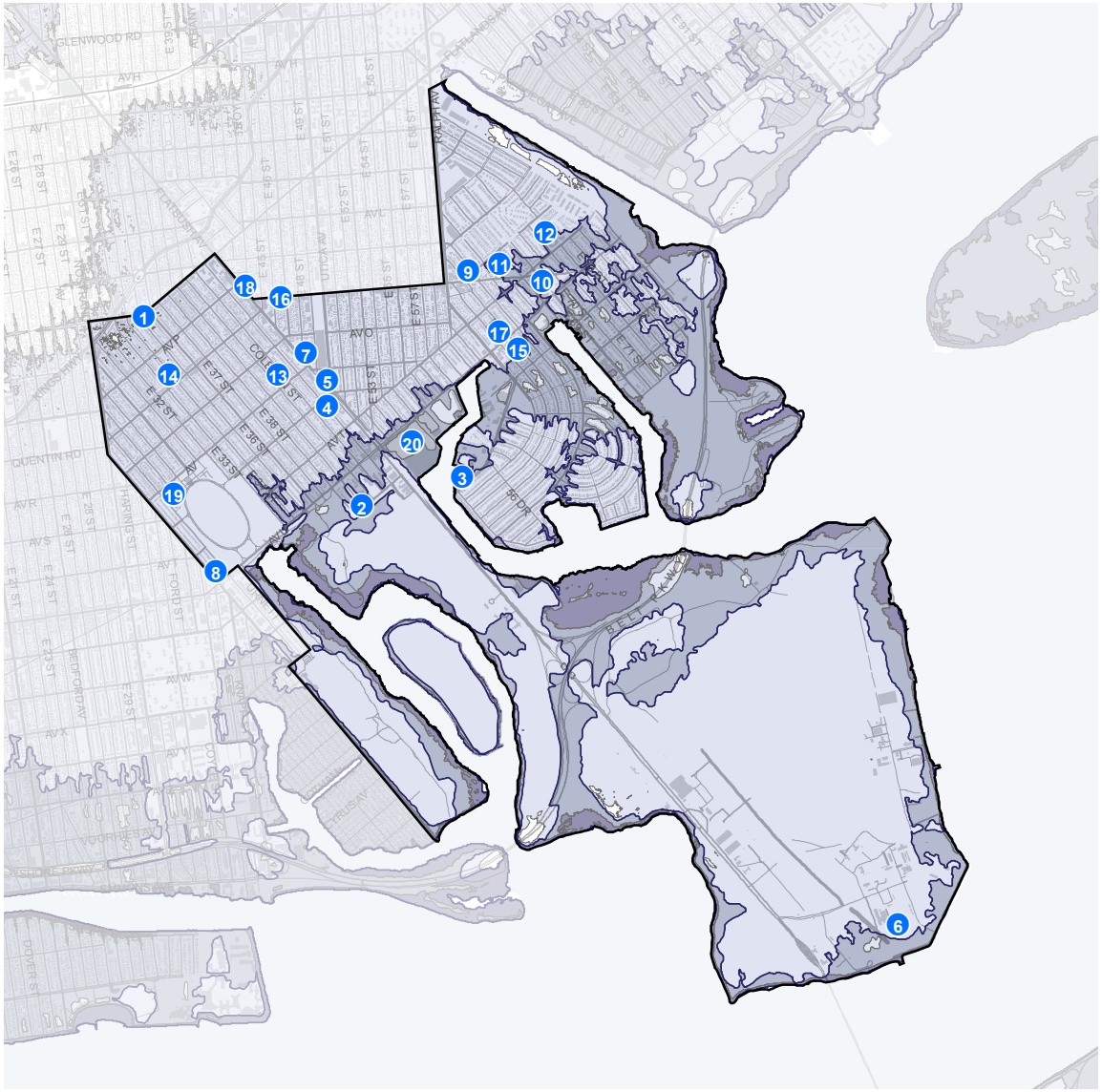
Cost Estimate

$1 MILLION

The cost estimate for this Proposed Project is scalable, depending on the type of improvements funded and level of financial support provided. The Southeast Brooklyn Waterfront NYRCR Planning Committee (Committee) has allotted $1 million to this project, which could support 3–10 recipient organizations, depending on the type of upgrade(s), and level of support.

The purchase and installation of a generator is one example of a facility upgrade. A fixed generator for an approximately 5,000-square-foot building

Figure IV–6: Health and Social Services Asset Map



NY Rising Community Reconstruction Program
Southeast Brooklyn Waterfront Planning Area

Planning Area

Extent of High & Extreme Risk Zones

Health and Social Service Assets

Health,Social Service, and Emergency Response Assets

NYSDOS Risk Areas

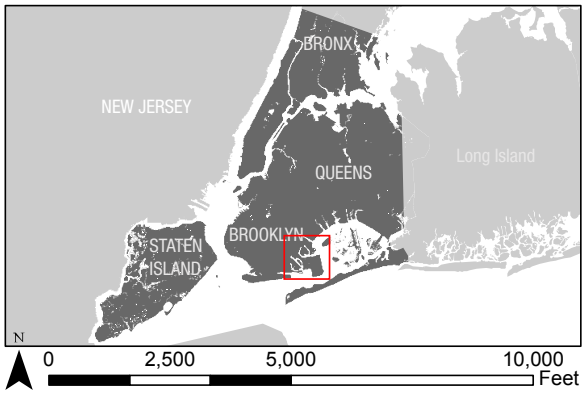
- Moderate
- High
- Extreme

1 PHYSICARE FAMILY HEALTH CENTER
2 SOUTH BROOKLYN NEPHROLOGY (DIALYSIS) CENTER
3 SUNRISE SENIOR LIVING CENTER
4 RITE AID PHARMACY
5 WALGREENS PHARMACY
6 ARMED FORCES RESERVE CENTER
7 FDNY ENGINE 309, LADDER 159
8 FDNY ENGINE 321
9 FDNY ENGINE 323
10 SAINT BERNARD OF CLAIRVAUX PARISH AND SCHOOL
11 JUNIOR HIGH SCHOOL 78 ROY H MANN
12 PUBLIC SCHOOL 312 (BERGEN BEACH)
13 PUBLIC SCHOOL 207 ELIZABETH G LEARY
14 PUBLIC SCHOOL 222 KATHERINE R SNYDER
15 PUBLIC SCHOOL 236 (MILL BASIN)
16 FLATLANDS VOLUNTEER AMBULANCE CORPS
17 HATZOLAH OF MILL BASIN
18 JCC OF MARINE PARK
19 JUNIOR HIGHSCHOOL 278 MARINE PARK
20 KINGS PLAZA SHOPPING CENTER

OUTSIDE OF THE PLANNING AREA:

21 CVS PHARMACY
22 MADISON HIGH SCHOOL
23 PUBLIC SCHOOL 203
24 PUBLIC SCHOOL 251
25 SOUTH SHORE EDUCATIONAL COMPLEX
26 KINGS COUNTY HOSPITAL CENTER
27 NY COMMUNITY HOSPITAL
28 CONEY ISLAND HOSPITAL
29 MOUNT SINAI BETH ISRAEL HOSPITAL

Source: New York State Department of State (DOS) Risk Assessment Areas; New York City Department of City Planning, MAPPluto v13.1; Buildings; Street Centerlines



is estimated to cost $200,000 to $300,000. This estimate is based on engineering experience with projects of similar scope and scale, and would likely vary as the project is further developed and refined. It is based on the assumption that electrical equipment is conducive to required alterations and connections, and that there is excess available space in the facility for the installation of new equipment.

Floodproofing measures are estimated to cost $50,000–$60,000 for a small facility of the same size as above. These could include, depending on the facility's flood risk, applying waterproof coatings to the basement and ground-floor, elevating mechanicals, and installation of flood barriers at ground-floor entrances.

Benefit/Co-Benefits

Health and Social Benefits

This project would ensure that critical providers have power and are more floodproof in order to continue serving local residents during and after emergencies, improving access to health and social services.

Economic Benefits

This project would reduce economic loss after a disaster by enabling selected providers to continue operations.

Example of fixed backup generators. *Flickr user Jemimus.*[6]

Cost-Benefit Analysis

This program could benefit 3-to-10 health and social service providers in the Southeast Brooklyn Waterfront NYRCR Community (Community) that serve residents throughout the Planning Area. With no major hospitals located within the Planning Area, health clinics, senior living facilities, and voluntary ambulance services fill a vital gap. For a minor project cost of $18.80 per resident, these critical health and social services providers could avoid service disruptions during and after an extreme weather event, as well as minimize expenditures on critical operations budgets. In the end, this would help to ensure continuity of vital services, particularly during and after severe events when residents often need such services.

Anticipated Risk Reduction

This project would result in decreased vulnerability to power loss and structural damage in several key health and social services facilities. Promoting continuity of operations for these key service providers in the Community would reduce adverse health impacts among residents that may be caused by service disruptions, and help to facilitate quick recovery for the Community.

Timeframe

Implementation would begin with a competitive bidding process for organizations meeting certain established criteria in order to select the most appropriate organizations and facilities to receive support. This process could take 3–6 months. Appropriate flood proofing measures could be identified and performed within 3 months of facility identification, while a generator of the size specified above could be procured and installed within 1 year of site identification.

Regulatory Requirements

Implementation would require permitting from the New York City Department of Buildings (NYC DOB) and coordination with several additional entities, including the Fire Department of New York, Consolidated Edison, National Grid, and the Bureau of Electrical Control.

Jurisdiction

Through this program, capital improvements would be funded at privately-owned facilities, and as such, the project has no jurisdictional requirements other than compliance with New York City laws, including compliance with the NYC DOB building code.

Homeowner Assistance Program

Proposed Project

STRATEGY
Improve residential resiliency through education, technical assistance, and funding

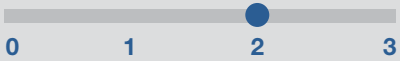
Recovery Support Functions

Housing

Cost

$2 MILLION

Timeline (in years)



Many residents throughout the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area), and particularly in the 100-year floodplain, incurred substantial flood damage during Superstorm Sandy, largely as a result of stormwater sewer backup. Residents have reported lacking the technical knowledge to make the necessary repairs that would both remediate this damage and enhance their homes' resiliency to future storm events. This project would aim to meet this critical need for homeowner education and technical assistance through funding resiliency educational programming, one-on-one counseling, and audits for homeowners in the Planning Area. The education and counseling components would aim to eliminate confusion around retrofitting for resiliency, flood insurance, and other financial questions. The audit component would then fund resiliency audits for high-risk homeowners through which specialized engineers would identify specific measures to enhance a home's resiliency.

Project Description

This project would fund educational programming, one-on-one counseling, and audits for homeowners living in the high-risk zone of the Planning Area.

- The **education program** would aim to eliminate confusion around retrofitting for resiliency, flood insurance, and related financial questions.
- For residents who need more personalized assistance, **individual counseling** would offer financial, insurance, and resiliency experts for one-on-one consultations. Counseling would also identify homeowners in the 100-year floodplain eligible for audits through the program.
- **Audits** performed by specialized engineers would recommend specific measures to enhance home resiliency.

A community-wide **education program** would be an effective way to disseminate information to all residents while raising awareness about the physical and financial impact of future disasters. General education could be offered to the Southeast Brooklyn Waterfront NYRCR Community (Community) in the form of online

Counselors would provide one-on-one assistance to homeowners on technical and financial questions. *Courtesy of the Center for NYC Neighborhoods.*

courses, in-person classroom courses, or as community workshops. Information covered in general education classes could include:

- Understanding basic resiliency retrofits and costs, including elevating building or mechanicals, installing backflow prevention devices, and waterproofing doors and windows;
- Obtaining and understanding adequate insurance coverage, particularly flood insurance coverage;
- Financing retrofits and repairs to mitigate storm damage; and
- Identifying products and providers for building resiliency improvements.

After Superstorm Sandy, many homeowners were forced to spend significant amounts of money to repair damaged property or pay rising flood insurance premiums. I**ndividual counseling** could help guide homeowners to resolve existing issues and understand and prepare for future risk. For residents and business owners who need more personalized assistance than what the general education program would offer, individual counseling would provide financial, insurance, and resiliency experts for one-on-one consultations. Counseling services could be offered as drop-in advising hours or through scheduled appointments. Counseling would also identify at-risk homeowners in the 100-year floodplain eligible for audits.

Individual counseling could include flood, homeowner and property insurance, financial management, and individually-tailored rebuilding and resiliency support for property owners.

Audits would focus on providing homeowners with a list of feasible improvements to reduce their flood risk and enhance the resiliency of their homes. An audit would involve a specialized engineer conducting a walk-through of a home and identifying potential retrofits and actions to mitigate future storm damage and potentially lower insurance premiums. For single-family homes, these measures may include:

- Installation of sewer check valve(s);
- Installation of a backup power source (e.g., on-site generator);
- Elevation and protection of mechanical systems;
- Floodproofing of basement spaces; and
- Elevation of homes, or filling-in of basement spaces.

The program would be administered by a Citywide or borough-based organization with a history of providing housing counseling and informational resources to New York City residents. This organization would be responsible for developing program curricula and materials. Qualified counselors would deliver the education programs and one-on-one counseling at a single location or multiple locations in the Planning Area. Though resiliency education and counseling would be made available to all residents in the Community, outreach for the audit component would be focused on at-risk residents in the 100-year floodplain.

Cost Estimate

$2 MILLION

This is a partially-scalable project, with a cost estimate dependent on the number of audits performed and the related level of staff support needed to coordinate the program. An estimate of $2 million includes a $1.65 million cost estimate for the audit component and $350,000 estimate for the education and counseling component.

Assuming that audits may cost $500 to $1,000 per home, depending on home size, $1.65 million would support 1,650 to 3,300 audits (up to all of

the approximately 3,000 homes in the 100-year floodplain).

The $350,000 cost estimate for the education and counseling component would include (over 2 years):

- Salary and benefits for one full-time equivalent program manager to coordinate the program: $160,000;
- Salary and benefits for one part-time equivalent counselor: $80,000;
- Materials development: $60,000; and
- Programming: $50,000.

Benefit/Co-Benefits

Economic Benefits

The proposed program would give homeowners the tools to protect major economic assets, and avoid significant repair costs in the future. Actions like home elevation may also bring down insurance premiums, and thus enable residents to afford to remain in their homes. This would carry the benefit of maintaining market attractiveness to potential new buyers, contributing to longer-term neighborhood economic vitality. Helping the Community achieve a more stable financial outlook can promote diverse and thriving neighborhoods and improve residents' quality of life.

Audits would entail specialized engineers performing an assessment of a home's resiliency needs and potential improvements. *Michael Rieger/FEMA.*

Health and Social Benefits

Through reducing risk to their homes, this project would benefit all residents, including senior and disabled populations who reside in the Planning Area. Without improvements to homes, residents face risk of injury and the inability to evacuate due to basement flooding and power outages. Efforts to address these concerns would reduce risk to vulnerable resident populations.

Cost-Benefit Analysis

This project would provide much-needed information, counseling, and technical support to the estimated 20,000 homeowners in the Planning Area, approximately 3,000 of whom have properties in the 100-year floodplain. The audit component of the program could provide subsidized audits for up to 3,000 homes (i.e., up to 100% of those in the 100-year floodplain), depending on the size of the homes provided audits and thus cost.

Using the average Federal Emergency Management Agency 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 over $800 per home in any given year, meaning the homeowner would realize the value of their investment within 11 years. 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 individual audits, support of one full-time equivalent staff person and one part-time equivalent staff person, as well as programming and materials costs. The costs are minimal compared to the value of avoiding future potential flood damage.

Anticipated Risk Reduction

This project would help homeowners make informed decisions about how to best protect their properties from future flooding and storm damage. If owners choose to implement the suggested storm mitigation measures, retrofits would help protect the Community's housing stock, making buildings safer for all residents who own, operate, or live in them.

Timeframe

Project implementation is estimated to take 6 months. This process would begin with the identification of a large non-profit organization to administer the project. Once the administering entity has been selected, it would take 6 months to launch the program, which includes the selection processes for identifying service providers and establishing program parameters.

The administering entity would begin a competitive bidding process, inviting neighborhood organizations who meet certain criteria to apply to participate as service providers in the program. The selection of service providers would take into account history of providing similar services in Brooklyn, proximity to at-risk homeowners, and organizational capacity. It is estimated that the selection process would take approximately 2 to 4 months or could be completed on a rolling basis by neighborhood.

In addition, the administering entity would begin a separate competitive bidding process for engineering and technical services firms who could provide resiliency audits to eligible homeowners. This is estimated to take 3 months.

Regulatory Requirements

This project would require coordination with the New York City Department of Buildings on a discretionary basis to oversee or certify building resiliency audits, though the project would not require permitting since no capital construction would be directly funded by the program. The New York City Department of Housing Preservation and Development and New York City Housing Recovery Office additionally may be consulted in the development of educational programming and the outreach strategy.

Jurisdiction

No direct capital improvements on publicly-owned land would be funded through this program. The program has no jurisdictional requirements other than compliance with New York City laws.

V. Additional Materials


Emergency Preparedness and Response
Emergency Preparedness and Response

Table V–1: Additional Resiliency Recommendations

Strategy	Project Name	Short Description	Estimated Cost	Regional (Y/N)
Improve stormwater and wastewater management to prevent flooding and sewer back-up	Assessment of Area's Sewer System	Recommend that the New York City Department of Environmental Protection examine vulnerabilities of the Planning Area's sewer system and determine improvements to enhance the resiliency of the system.	$3–10 million	Y
Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development of at at-risk locations, and mitigating any potential negative impacts of new projects	U.S. Army Corps of Engineers Coastal Protection Recommendation	Ensure that existing coastal protection plans for Jamaica Bay include measures to enhance coastal protection in the Southeast Brooklyn Waterfront NYRCR Planning Area.	>$10 million	Y
Make the power supply more resilient and redundant	Harden Area Power Infrastructure	Ensure that Consolidated Edison protects vulnerable substations and hardens all overhead power lines within the Southeast Brooklyn Waterfront NYRCR Planning Area.	>$10 million	N
Improve residential resiliency through education, technical assistance, and funding	Revise National Flood Insurance Program (NFIP)	Expand eligible floodproofing measures recognized by the NFIP to better accommodate urban contexts where elevation may be infeasible.	N/A (legislative measure)	Y
Improve resiliency of commercial corridors and critical supply chains	Expand the FUEL NY Initiative	Expand the Fuel NY law and initiative to extend to gas stations located one mile from evacuation routes and highway exits, in order to include more critical gas stations in the floodplain.	N/A (legislative measure)	Y
Enhance emergency preparedness and response	Provide Local High Tide / Surge Warning	Encourage the City to include localized alerts/warning via phone calls and/or text messages of an impending high tide or surge event that may pose flood risk.	$500,000–$3 million	N

Table V–2: Master Table of Projects

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development at at-risk locations, and mitigating any potential negative impacts of new projects	Southeast Brooklyn Waterfront Coastal Protection Study	This Proposed Project would develop a study to determine the cost and feasibility of coastal protection measures along the Southeast Brooklyn Waterfront shoreline in order to protect the Community from a severe weather event.	Proposed Project	$500,000	Y
Improve stormwater and wastewater management to prevent flooding and sewer back-up	Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects	This Proposed Project would fund: • A study to examine the feasibility, costs, and benefits for various stormwater capture and retention projects in the joint NYRCR Planning Areas of Southeast Brooklyn Waterfront and neighboring Canarsie. • The implementation of those pilot projects in the Southeast Brooklyn Waterfront NYRCR Planning Area that were identified in the study as having the highest feasibility and impact. May include measures such as bioswales, permeable paving, and improvements in and around public and open spaces to enhance area stormwater capture capacity.	Proposed Project	$650,000	Y
Improve stormwater and wastewater management to prevent flooding and sewer back-up	Bergen Beach Stormwater Retention/ Detention System	This Proposed Project would construct a stormwater retention/detention wetland within a natural area of southern Bergen Beach on land owned by New York City Department of Parks and Recreation. This stormwater retention system would link to City plans to construct a new storm sewer and outfall along Avenue Y, providing stormwater flooding abatement for a low-lying, at-risk residential community, while also removing pollutants from stormwater that may otherwise enter nearby East Mill Basin.	Proposed Project	$500,000	N

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Make the power supply more resilient and redundant	Alternative Power Hotspot	This Proposed Project would install alternative energy infrastructure along critical thoroughfares throughout the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area) to serve as pilots for similar interventions in the neighborhood. Alternative power hotspots would provide a reliable source of lighting in the event of an outage and create a space where residents could meet and power mobile devices, while also accessing food and other services nearby. In locating the hotspots, the project would leverage the large number of big-box retailers and associated street-facing parking lots within the Planning Area.	Proposed Project	$300,000	N
Enhance emergency preparedness and response	Emergency Preparedness Education Program	This Proposed Project would develop a printed local emergency preparedness and response guide, an online information hub, and educational programming to help inform community members of what to do before, during, and after a storm event. All resources created through the program would leverage material provided by the New York City Office of Emergency Management (NYC OEM) and aim to provide locally-tailored information to residents on how to prepare before a storm hits, evacuation procedures, and where to obtain supplies and information in the aftermath of a storm.	Proposed Project	$100,000	N
Enhance emergency preparedness and response	Recovery Community Centers	This Proposed Project would fund the development of Recovery Community Centers to be based out of existing community facilities and organizations. Centers would facilitate disaster preparedness coordination across community-based organizations (CBOs) in advance of an event. Centers could provide power, information, and supplies for residents, among other services. These would be located outside of the floodplain, have a parking lot, and be compliant with the Americans with Disabilities Act (ADA).	Proposed Project	$1.5 million	N
Enhance emergency preparedness and response	Critical Facility Upgrades Program	This Proposed Project would help health and social services providers to make critical building-level capital improvements. Providers could include medical clinics, hospitals, voluntary emergency/ambulance organizations, and senior living facilities, among others. This would help to prevent disruption in essential health and social services due to power outages or structural damages in the event of a storm.	Proposed Project	$1 million	N

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Improve residential resiliency through education, technical assistance, and funding	Homeowner Assistance Program	This Proposed Project would aim to enhance the resiliency of homes throughout the Planning Area and reduce homeowner risk, geared at both general homeowners and high-risk homeowners in the 100-year floodplain. This project would have three potential components: • Educational programming on retrofitting for resiliency, flood insurance, and other financial questions, for both general and high-risk homeowners • One-on-one counseling for both general and high-risk homeowners, to assess risk and resiliency options • Audits for high-risk homeowners, performed by specialized engineers, in order to recommend specific measures to enhance home resiliency.	Proposed Project	$2 million	N
Improve stormwater and wastewater management to prevent flooding and sewer back-up	Assessment of Area's Sewer System	Recommend that the New York City Department of Environmental Protection examine vulnerabilities of the Planning Area's sewer system and determine improvements to enhance the resiliency of the system.	Additional Resiliency Recommendation	$3–10 million	Y
Reduce neighborhood flooding through stabilizing the coastal edge, discouraging development of at at-risk locations, and mitigating any potential negative impacts of new projects	U.S. Army Corps of Engineers Coastal Protection Recommendation	Ensure that existing coastal protection plans for Jamaica Bay include measures to enhance coastal protection in the Southeast Brooklyn Waterfront NYRCR Planning Area.	Additional Resiliency Recommendation	>$10 million	Y
Make the power supply more resilient and redundant	Harden Area Power Infrastructure	Ensure that Consolidated Edison protects vulnerable substations and hardens all overhead power lines within the Southeast Brooklyn Waterfront NYRCR Planning Area.	Additional Resiliency Recommendation	>$10 million	N

Strategy	Project Name	Short Description	Project Category	Estimated Cost	Regional (Y/N)
Improve residential resiliency through education, technical assistance, and funding	Revise National Flood Insurance Program (NFIP)	Expand eligible floodproofing measures recognized by the NFIP to better accommodate urban contexts where elevation may be infeasible.	Additional Resiliency Recommendation	N/A (legislative measure)	Y
Improve resiliency of commercial corridors and critical supply chains	Expand the FUEL NY Initiative	Expand the Fuel NY law and initiative to extend to gas stations located one mile from evacuation routes and highway exits, in order to include more critical gas stations in the floodplain.	Additional Resiliency Recommendation	N/A (legislative measure)	Y
Enhance emergency preparedness and response	Provide Local High Tide / Surge Warning	Encourage the City to include localized alerts/warning via phone calls and/or text messages of an impending high tide or surge event that may pose flood risk.	Additional Resiliency Recommendation	$500,000–3 million	N

Public Engagement Process

As a community-driven planning process, public engagement has been central to the iterative development of the Southeast Brooklyn Waterfront New York Rising Community Reconstruction (NYRCR) Plan. Over the course of six months, more than 150 residents, elected officials, and other local stakeholders participated in NYRCR events, including three Public Engagement Events and nine Planning Committee (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 Community's priorities for rebuilding and resiliency.

Planning Committee

The Planning Committee is comprised of seven volunteer Committee Members and two volunteer Co-Chairs who represent various constituencies within the Southeast Brooklyn Waterfront NYRCR Planning Area (Planning Area), including, but not limited to, homeowners, civic leaders, and business owners. Committee Members serve as ambassadors of the NYRCR process and are instrumental in ensuring that Community voices are heard throughout the public planning process. The Committee helped to facilitate the community engagement process by identifying avenues for outreach and developing a strategy for effectively soliciting public feedback.

Planning Committee Meetings were the central venue for Committee discussion and decision-making. Specific tasks and discussions held at the meetings involved: 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, and Additional Resiliency Recommendations. Planning Committee Meetings were open to the public and held at local community centers, including the Carmine Carro Community Center and John Malone Community Center. The NYRCR Committee website *http://stormrecovery.ny.gov/nyrcr/community/southeast-brooklyn-waterfront* served as the official portal of information for Committee meetings, and provided meeting times, locations, presentations, and post-meeting summaries.

Public Engagement Process

Public Engagement Events were designed to be highly interactive and maximize public 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 rotated between easily-accessible community facilities to encourage attendance among residents of each neighborhood within the Planning Area. At Public Engagement

A Bergen Beach resident locates areas that regularly experience sewer backup at Public Engagement Event #1.

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. Following each Public Engagement Event, community feedback was aggregated and analyzed in order to guide discussion during subsequent Planning Committee meetings. The Committee also spearheaded additional outreach efforts to supplement the Public Engagement Events. Presentations were held at three Civic Associations– Bergen Beach, Marine Park and Mill Basin– to introduce the NY Rising process to the individual communities. A survey—distributed online and in hard print—and a dedicated NY Rising voicemail line ensured that the Planning Committee captured additional public feedback from residents unable to attend the Public Engagement Events.

Community members provided feedback on Reconstruction and Resiliency Strategies at Public Engagement Event #2.

Public Engagement Event Outreach

Extensive outreach was undertaken in advance of the three Public Engagement Events. Planning Committee members leveraged community distribution channels— particularly local civic organizations—to distribute printed meeting advertisements in the form of flyers and storefront posters. E-mail blasts with event information were disseminated to civic associations, local schools, religious institutions, elected officials, and businesses. Online and print advertisement campaigns were launched through two media outlets serving the Planning Area. Additionally, for Public Engagement #3, the Committee targeted local schools and distributed backpack mailers to students.

Online Engagement and Social Media Outreach

The NYRCR website, located at *www.stormrecovery.ny.gov/nyrcr*, served as a valuable public resource. The NYRCR page featured announcements, meeting dates and locations, as well as materials produced by the

Local residents discuss project ideas with a member of the Planning Team at Public Engagement Event #3.

Planning 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 (July 29, 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 held at the Carmine Carro Community Center in Marine Park showcased the NYRCR program scope and presented the Planning Committee's preliminary community vision, assessment of community assets, critical issues, and needs and opportunities. The Public Engagement Event began with a formal presentation to the Community that introduced the NYRCR Program and its objectives. Following the presentation, an open house-style event was held with Committee members, facilitating group discussions and inviting community input on the community vision, community assets, critical issues, and needs and opportunities, as featured on the display boards. While the public engaged in conversation, 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. Residents from the five neighborhoods comprising the Planning Area attended the event and contributed valuable feedback that guided subsequent Committee discussions.

Public Engagement Event #2 (September 10, 2014)

Summarized feedback from Public Engagement Event #1; Presentation of and community feedback on List of Strategies

The second Public Engagement Event, held at the John Malone Community Center in Bergen Beach, solicited public responses to the priority

resiliency strategies presented by the Planning Committee and members of the public. The event followed a similar format to the first Public Engagement Event and featured an introductory presentation, an open house with display boards, and a wrap-up. Members of the community not only engaged with Planning Committee members staffing the display boards, but were additionally encouraged to vote for three of their preferred resiliency strategies via a sticker voting board. Community feedback and voting on the strategies were analyzed and directly shaped the Planning Committee's conversation during the formulation of Proposed and Featured Projects.

Public Engagement Event #3 (November 12, 2014)

Presentation of and community feedback on Proposed and Featured Projects, and Additional Resiliency Recommendations

The third Public Engagement Event, held at the St. Bernard Parish School in Bergen Beach, provided a critical opportunity to share the Proposed and Featured Projects with the Community and obtain feedback on these projects. The event featured an open house with educational boards on the Proposed and Featured Projects staffed by Committee members. A central component of the open house was the project voting board through which attendees were able to indicate their support for up to three projects. By the end of the event, the voting board featured an array of feedback and was used to guide the selection of Proposed and Featured Projects.

Public Engagement Event #4 (January 14, 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 Planning Committee will present the Proposed Projects and the NYRCR Plan to the public.

Table V–3: Community Asset Inventory

Asset Information							Landscape Attributes							Risk			
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
AVE N COMMERCIAL CORRIDOR	Moderate	Economic	Employment Hub	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**3**	**14**
FLATBUSH AVE COMMERCIAL CORRIDOR	High	Economic	Employment Hub	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
RALPH AVE COMMERCIAL CORRIDOR	Moderate	Economic	Employment Hub	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
AVE U COMMERCIAL CORRIDOR	High	Economic	Employment Hub	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**23**
GEORGETOWN SHOPPING CENTER	Moderate	Economic	Downtown Center	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
KINGS PLAZA SHOPPING CENTER	High	Economic	Downtown Center	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
RALPH AVE SHOPPING CENTER	Moderate	Economic	Downtown Center	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
KEY FOODS	High	Economic	Grocery/Food Suppliers	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
WALDBAUMS GROCERY	Moderate	Economic	Grocery/Food Suppliers	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**2**	**12**
PHYSICARE FAMILY HEALTH CENTER	Moderate	Health_and_Social_Services	Healthcare Facilities	Yes	Yes, FEMA	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**2**	**9**
SOUTH BROOKLYN NEPHROLOGY (DIALYSIS) CENTER	High	Health_and_Social_Services	Healthcare Facilities	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**

Meaning of Risk Scores

Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk			
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
SUNRISE SENIOR LIVING CENTER	Moderate	Health_and_Social_Services	Daycare and Eldercare	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
RITE AID PHARMACY	Moderate	Health_and_Social_Services	Healthcare Facilities	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**2**	**9**
WALGREENS PHARMACY	Moderate	Health_and_Social_Services	Healthcare Facilities	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**2**	**12**
ARMED FORCES RESERVE CENTER	Moderate	Health_and_Social_Services	Military Installations	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
FDNY ENG 309, LAD 159	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
FDNY ENG 321	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**3**	**14**
FDNY ENG 323	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
SAINT BERNARD SCHOOL	High	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**23**

Asset Information							Landscape Attributes							Risk			
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
JUNIOR HIGH SCHOOL 78 ROY H MANN	High	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
PUBLIC SCHOOL 312 (BERGEN BEACH)	High	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
PUBLIC SCHOOL 207 ELIZABETH G LEARY	Moderate	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**2**	**9**
PUBLIC SCHOOL 222 KATHERINE R SNYDER	Moderate	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**2**	**9**
PUBLIC SCHOOL 236 (MILL BASIN)	Moderate	Health_and_Social_Services	Schools	Yes	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**2**	**12**
FLATLANDS VOLUNTEER AMBULANCE CORPS	Moderate	Health_and_Social_Services	Public Works Facilities	No	No	High	No	No	Yes	No	No	No	0.5	**3**	**1.00**	**2**	**6**
HATZOLAH OF MILL BASIN	Moderate	Health_and_Social_Services	Public Works Facilities	No	No	High	No	No	Yes	No	No	No	0.5	**3**	**1.00**	**2**	**6**
JCC OF MARINE PARK	Moderate	Health_and_Social_Services	Public Works Facilities	No	No	High	No	No	Yes	No	No	No	0.5	**3**	**1.00**	**2**	**6**

Meaning of Risk Scores

Severe (>70)
High (24-53)
Moderate (6-23)
Residual (<6)

Asset Information							Landscape Attributes							Risk			
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
JUNIOR HIGH SCHOOL 278 MARINE PARK	Moderate	Health_and_Social_Services	Public Works Facilities	No	No	High	No	No	Yes	No	No	No	0.5	**3**	**1.00**	**2**	**6**
GAS STATION (#1)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24**
GAS STATION (#2)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**4**	**18**
GAS STATION (#3)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24**
GAS STATION (#4)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**4**	**30**
GAS STATION (#5)	High	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**2.00**	**4**	**24**
GAS STATION (#6)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**4**	**18**
GAS STATION (#7)	Moderate	Infrastructure_Systems	Liquid Fuels	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**4**	**30**
SUBSTATION (#8)	Moderate	Infrastructure_Systems	Power Supply	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**4**	**18**
SUBSTATION (#9)	Moderate	Infrastructure_Systems	Power Supply	No	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**4**	**18**
SUBSTATION (#10)	Moderate	Infrastructure_Systems	Power Supply	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**4**	**30**
BELT PARKWAY	Extreme	Infrastructure_Systems	Transportation	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**2**	**24**

Asset Information							Landscape Attributes							Risk			
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
FLATBUSH AVE BUS DEPOT (MTA)	Moderate	Infrastructure_Systems	Transportation	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
MILL AVE SCHOOL BUS DEPOT	High	Infrastructure_Systems	Transportation	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
NYPD AIR OPERATIONS (FLOYD BENNETT FIELD)	High	Infrastructure_Systems	Transportation	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
STRICKLAND AVE SCHOOL DEPOT LOT	High	Infrastructure_Systems	Transportation	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
CON EDISON TRANSFORMER (#1)	Moderate	Infrastructure_Systems	Power Supply	No	No	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**3**	**18**
CON EDISON TRANSFORMER (#2)	High	Infrastructure_Systems	Power Supply	No	No	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**3**	**23**
PAERDEGAT BASIN COMBINED SEWER OVERFLOW RETENTION CENTER	Moderate	Infrastructure_Systems	Wastewater	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.00**	**3**	**27**
HISTORIC AIRCRAFT RESTORATION PROJECT	Moderate	Natural_and_Cultural_Resources	Museums, Performing Arts Centers,	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
AVIATOR SPORTS	Moderate	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**2**	**12**
BERGEN BEACH GATEWAY NATIONAL RECREATION AREA	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**2**	**27**

Meaning of Risk Scores

- Severe (>70)
- High (24-53)
- Moderate (6-23)
- Residual (<6)

Asset Information							Landscape Attributes							Risk			
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
BERGEN BEACH PLAYGROUND	High	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
FLOYD BENNETT FIELD GATEWAY NATIONAL RECREATION AREA	High	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**2**	**21**
FOUR SPARROW MARSH	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**2**	**24**
HICKMAN PLAYGROUND	High	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
JAMAICA BAY GREENWAY	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**2**	**24**
LINDOWER PARK	High	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
MARINE PARK	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**2**	**27**
MCGUIRE FIELDS	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**2**	**27**

Asset Information							Landscape Attributes							Risk			
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
PAERDEGAT BASIN ECOLOGICAL PARK (UNDER CONSTRUCTION)	Moderate	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.00**	**2**	**18**
PAERDEGAT BASIN PARK	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**2**	**27**
WHITE ISLAND	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**2**	**27**
DEAD HORSE BAY	Extreme	ultural_Resources	Water Bodies	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**1**	**12**
EAST MILL BASIN	Extreme	Natural_and_Cultural_Resources	Water Bodies	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**1**	**12**
MILL BASIN	Extreme	Natural_and_Cultural_Resources	Water Bodies	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**1**	**12**
PAERDEGAT BASIN	Extreme	Natural_and_Cultural_Resources	Water Bodies	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**1**	**12**
MARINE PARK CREEK & MILL CREEK	Extreme	Natural_and_Cultural_Resources	Water Bodies	No	No	High	No	Yes	Yes	Yes	Yes	No	2	**3**	**4.00**	**1**	**12**

Meaning of Risk Scores

- Severe (>70)
- High (24-53)
- Moderate (6-23)
- Residual (<6)

Asset Information							Landscape Attributes							Risk			
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
CARMINE CARRO COMMUNITY CENTER	Moderate	Natural_and_Cultural_Resources	Community Centers	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18**
ST. COLUMBA CHURCH	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**2**	**12**
CHURCH OF ST. THOMAS AQUINAS	Moderate	ultural_Resources	Religious Establishments	Yes	No	High	No	No	Yes	No	Yes	No	1	**3**	**1.50**	**2**	**9**
JOHN MALONE COMMUNITY CENTER	High	Natural_and_Cultural_Resources	Community Centers	No	No	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**2**	**15**
BERGEN BEACH/GEORGETOWN HOUSING IN HIGH AND EXTREME RISK AREAS	High	Housing	Single-Family Residence	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
MILL ISLAND HOUSING IN HIGH RISK AREAS	High	Housing	Single-Family Residence	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
MILL ISLAND HOUSING IN EXTREME RISK AREAS	Extreme	Housing	Single-Family Residence	No	No	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54**
MILL BASIN HOUSING IN HIGH RISK AREAS	High	Housing	Single-Family Residence	No	No	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
MARINE PARK HOUSING IN HIGH RISK AREAS	High	Housing	Single-Family Residence	No	No	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**3**	**23**

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 ESRI. "Census 2010 Summary Profile: Southeast Brooklyn Waterfront." 2010 U.S. Census. U.S. Census Bureau, 2010. Web. 3 September 2014.

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6 311. "311 Online Service Request Map." City of New York. 15 Oct 2014. <http://www1.nyc.gov/apps/311srmap/>.

7 FEMA Enterprise Coordination & Information Management (FEMA ECIM). "Housing Assistance Program." Federal Emergency Management Agency. 22 Apr 2014. <http://www.fema.gov/media-library/assets/documents/30714>.

8 Mayor's Office of Immigrant Affairs. "Hurricane Sandy Resources and Services for Affected New Yorkers." 8 Nov 2012. <http://www.humanservicescouncil.org/documents/Sandy%20Resources_11.08.2012.pdf>

Section II

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3 NYC DPR. "Marine Park." Web. 15 Oct 2014. http://www.nycgovparks.org/parks/marinepark

4 New York City Department of Environmental Protection (NYC DEP). "Paerdegat Basin Natural Area Park and Ecology Park." 6 May 2014. Web. 15 Oct 2014. http://www.slideshare.net/ecowatchers/paerdegat-basin-restoraion-update-may-6-2014

5 NYC DEP. "Wastewater Resiliency Plan." 29 Oct 2013. Web. 15 Oct 2014. http://www.nyc.gov/html/dep/html/about_dep/wastewater_resiliency_plan.shtml

6 A bioswale is a shallow planted area that incorporates sloping and other design measures to collect stormwater runoff from adjacent streets and sidewalks.

7 Paving that features a surface and subsurface layer, allowing water to seep through the surface and collect at the subsurface layer.

8 NYC DEP. http://www.nyc.gov/html/dep/html/press_releases/11-30pr.shtml#.U-wdFPldVQE

9 NYC DPR. "Greenstreet: Firefighter Gregory T. Saucedo Triangle." Web. 15 Oct 2014. http://www.nycgovparks.org/parks/greenstreet-bz30/history

10 Con Edison. "Fortifying the Future in New York City." 28 May 2013. Web. 15 Oct 2014 http://www.coned.com/newsroom/news/pr20130528.asp.

Section III

1 NYC Special Initiative for Rebuilding and Resilien-

cy. 2013. A Stronger, More Resilient New York.

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Section IV

Southeast Brooklyn Waterfront and Canarsie Stormwater Study and Pilot Projects

1 Licensed under Creative Commons BY 2.0, https://www.flickr.com/photos/.chrisham-by/9152150158/.

2 Planning Team analysis of Bureau of Labor Statistics. "May 2013 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates." May 2013. Web. 3 Dec 2014. http://www.bls.gov/oes/current/oes_35620.htm#47-0000.

3 New York City Comptroller. 2014. "Sewer Overflow Claims by Community District." ClaimStat. http://comptroller.nyc.gov/reports/claim-stat/#sewerclaims.

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Bergen Beach Stormwater Retention/ Detention System

5 Planning Team analysis of Bureau of Labor Statistics. "May 2013 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates." May 2013. Web. 3 Dec 2014. http://www.bls.gov/oes/current/oes_35620.htm#47-0000.

Critical Facility Upgrades Program

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Glossary

ACS
United States Census Bureau American Community Survey
A continuous survey provided by the United States Census Bureau that provides demographic data between decennial censuses.

ADA
Americans with Disabilities Act
A United States law enacted by Congress prohibiting discrimination against people with disabilities in employment, transportation, public accommodation, communications, and government activities.

BEC
Bureau of Electrical Control
The New York City government office within the Department of Buildings (NYC DOB) responsible for administering electrical inspections and maintaining records of electrical work conducted in buildings.

BRIP
New York City Business Resiliency Investment Program
A $110 million Community Development Block Grant-Disaster Recovery (CDBG-DR)-funded program that will be implemented by New York City Economic Development Corporation (NYCEDC) and will provide funds to both business tenants and building owners to make improvements that enhance resiliency to severe weather-related events.

CBO
Community-Based Organization
A not-for-profit organization that operates within a local community.

CDBG-DR
Community Development Block Grant-Disaster Recovery
Federal grants administered by the United States Department of Housing and Urban Development (HUD) and allotted to cities, counties, and states to facilitate rebuilding and recovery of disaster-impacted areas as designated by the President of the United States.

CRP
Comprehensive Restoration Plan
A master plan developed among stakeholders to facilitate ecosystem restoration within a defined area.

CSO
Combined Sewer Overflow
Water pollution caused by large variations of flow in a sewer system that collects both sanitary sewage and stormwater runoff in a single pipe system.

CUNY
City University of New York
The public university system of New York City.

FDNY
Fire Department of the City of New York
The New York City government agency responsible for providing first responders to fires, public safety and emergency situations, disasters, and acts of terrorism.

FEMA
Federal Emergency Management Agency
An agency within the United States Department of Homeland Security responsible for the coordination of the response to a state-of-emergency-declared disaster.

FIRM
Flood Insurance Rate Map
The official map of a community used by the Federal Emergency Management Agency (FEMA) to delineate a community's base flood elevations, flood zones, and floodplain boundaries.

FTE
Full-Time Equivalent
As defined by the United States Small Business Administration (SBA), the aggregation of employees comprising the workload of a full-time employee.

GMP
General Management Plan
A plan developed and implemented by the United States National Park Service (NPS) concerning the

preservation, protection, and management of a national park.

HRE
Hudson Raritan Estuary
An estuary within the boundaries of New York State and New Jersey State that includes Jamaica Bay, Lower Bay, Arthur Kill, Kill Van Kull, Newark Bay, Hackensack River and Passaic River, Lower Hudson River, Harlem River, East River, Western Long Island Sound, and Upper Bay.

HRE CRP
Hudson Raritan Estuary Comprehensive Restoration Plan
A plan developed in 2009 by the United States Army Corps of Engineers (USACE) and the Port Authority of New York/New Jersey that established a vision, master plan, and strategy for future ecosystem restoration in the New York/New Jersey Harbor.

HUD
United States Department of Housing and Urban Development
The United States Federal government executive department responsible for executing federal policies concerning housing and metropolises.

JBRWG
Jamaica Bay Regional Working Group
A collection of representatives from the NY Rising Community Reconstruction NYRCR Communities closest to Jamaica Bay tasked with reviewing the NYRCR Final Plan.

NDRF
National Disaster Recovery Framework
A guide provided by Federal Emergency Management Agency (FEMA) that provides a flexible, recovery-support structure for disaster-impacted areas.

NFIP
National Flood Insurance Program
A Federal Emergency Management Agency (FEMA)-run program that provides government-sponsored flood insurance to homeowners, renters, and business owners.

NOAA
National Oceanic and Atmospheric Administration
A scientific agency within the United States Department of Commerce responsible for monitoring the condition of the environment, including the oceans and the atmosphere.

NPS
United States National Park Service
The United States Federal government executive department responsible for the management of national parks and monuments, as well as historic properties.

NYC DCP
New York City Department of City Planning
The New York City government agency responsible for the strategic development of the City's physical and socioeconomic planning.

NYC DDC
New York City Department of Design and Construction
The New York City government agency responsible for building critical infrastructure facilities and municipal institutions, as well as managing the City's capital construction projects.

NYC DEP
New York City Department of Environmental Protection
The New York City government agency responsible for providing the City's water supply; managing the City's wastewater system; and regulating the City's environment, including air quality, hazardous waste, and quality of life issues.

NYC DOB
New York City Department of Buildings
The New York City government agency responsible for the enforcement of building codes and zoning regulations, the issuance of building permits, and the inspection of new and existing buildings.

NYC DOF
New York City Department of Finance
The New York City government agency responsible for tax collection, property investment, property records, the municipal treasury, tax exemptions and abatements, parking ticket enforcement, and law enforcement representation on behalf of the City, as well as overseeing the Mayor's Office of Pensions and Investments and assisting the City's Banking Commission.

NYC DOT
New York City Department of Transportation
The New York City government agency responsible for managing the City's transportation infrastructure.

NYC DPR
New York City Department of Parks and Recreation
The New York City government agency responsible for the management of City parks, monuments, and historic house museums; the preservation of the City's ecological diversity; and the provision of recreational and athletic facilities and programs.

NYC HPD
New York City Department of Housing Preservation and Development
The New York City government agency responsible for the development and maintenance of the City's housing stock.

NYC OEM
New York City Office of Emergency Management
The New York City government agency responsible for preparation, coordination, and education concerning emergency response and recovery.

NYC ORR
New York City Office of Recovery and Resiliency
The New York City government agency, established in March 2014, responsible for implementation of citywide initiatives set forth in A Stronger, More Resilient New York (SIRR Report), as well as assisting the New York City Mayor's Office of Long-Term Planning and Sustainability (OLTPS) with enacting long-term goals established in 2007 by the PlaNYC initiative.

NYC REDC
New York City Regional Economic Development Council
One of ten regional councils, created by Governor Andrew M. Cuomo, tasked with developing long-term strategic plans for economic growth in New York City.

NYCEDC
New York City Economic Development Corporation
The City's official economic development organization charged with leveraging the City's assets to promote economic growth.

NYPD
New York City Police Department
The New York City government agency responsible for the City's law enforcement.

NYRCR
NY Rising Community Reconstruction
A New York State program established by Governor Andrew M. Cuomo to provide additional rebuilding and revitalization assistance to communities damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee.

NYS DEC
New York State Department of Environmental Conservation
The New York State government agency responsible for the conservation, improvement, and protection of natural resources; the management of State-owned lands; and the regulation of environmental laws and regulations.

NYS DOS
New York State Department of State
The New York State government agency responsible for strategic investment in regional revitalization and economic growth.

OLTPS
New York City Mayor's Office of Long-Term Planning and Sustainability
The New York City government agency, instituted within the Mayor's Office in 2008, responsible for en-

acting short-term strategies and approving long-term studies for enhancing quality of life, responding to climate change, and promoting sustainability, as well as for putting forth the PlaNYC initiative.

PlaNYC
A report published in 2007 and overseen jointly by the New York City Mayor's Office of Long-Term Planning and Sustainability (OLTPS) and the New York City Office of Recovery and Resiliency (NYC ORR) that seeks to increase the City's sustainability and resiliency in the face of climate change by proposing strategies to be accomplished by the year 2030. Progress will be reported annually and the plan will be revised every four years.

PTE
Part-Time Equivalent
As defined by the United States Small Business Administration (SBA), a figure indicating the proportion of hours worked in comparison with those of a full-time employee.

SBA
United States Small Business Administration
The United States Federal agency, created in 1953, responsible for protecting the interests of small businesses by providing financial assistance, counseling, and training; promoting and guiding subcontractor procurement opportunities; advocating for legislation and fair treatment; conducting research; and supporting businesses of underserved subsets.

SIRR
New York City Special Initiative for Rebuilding and Resiliency
A special task force convened by the City in December 2012 to assess damage in the wake of Superstorm Sandy and consider implications for climate change and sea level rise as they might affect the City moving forward.

SIRR Report
A Stronger, More Resilient New York
A comprehensive citywide plan released in 2013 and commissioned by the City detailing actionable recommendations for rebuilding and increasing the resiliency of communities and infrastructure impacted by Superstorm Sandy.

USACE
United States Army Corps of Engineers
The United States Federal agency, under the Department of Defense, composed of civilian and military personnel and responsible for providing public and military engineering services.

WWTP
Wastewater Treatment Plant
A facility designed to remove biological or chemical waste products.

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NY RISING
COMMUNITIES