Gerritsen Beach and Sheepshead Bay
NY Rising Community Reconstruction Plan

NY Rising Community Reconstruction Program March 2014

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Cover: View of Sheepshead Bay, Plumb Beach, and Gerritsen Beach

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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 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 empowers the State's most impacted communities with the technical expertise 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 $650 million planning and implementation process 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.

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between $3 million and $25 million to implement 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]

Forty-five NYRCR Communities, each comprising one or more of the 102 localities, were created and led 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 500 New Yorkers represent their communities by serving on Planning Committees. More than 400 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's NYRCR Program team to develop community reconstruction plans and identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 125-plus Public Engagement Events attracted thousands of community members, who provided feedback on the NYRCR planning process and 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 NYRCR Program's website (www.stormrecovery.ny.gov/nyrcr), providing several ways for community members and the public to submit feedback on materials in progress.

[1] Five of the 102 localities in the program—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.

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

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises 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.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over $650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including best use of technology in the planning process, best approach to resilient economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional $3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new 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 Regional Economic Development Council's State Agency Review Teams (SARTs), comprised of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Communities. 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 NYRCR Planning Committees, passionately committed to realizing brighter, more resilient futures for their communities.

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 NYRCR Community's prioritization of these projects and actions. **Proposed Projects** are projects proposed for funding through a NYRCR Community's allocation 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 official 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.

The NYRCR Gerritsen Beach/Sheepshead Bay Community is eligible for up to $13.3 million in CDBG-DR implementation funds.[2]

While developing projects for inclusion in this NYRCR Plan, 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 fall into a Federally-designated eligible activity category, fulfill a national objective (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

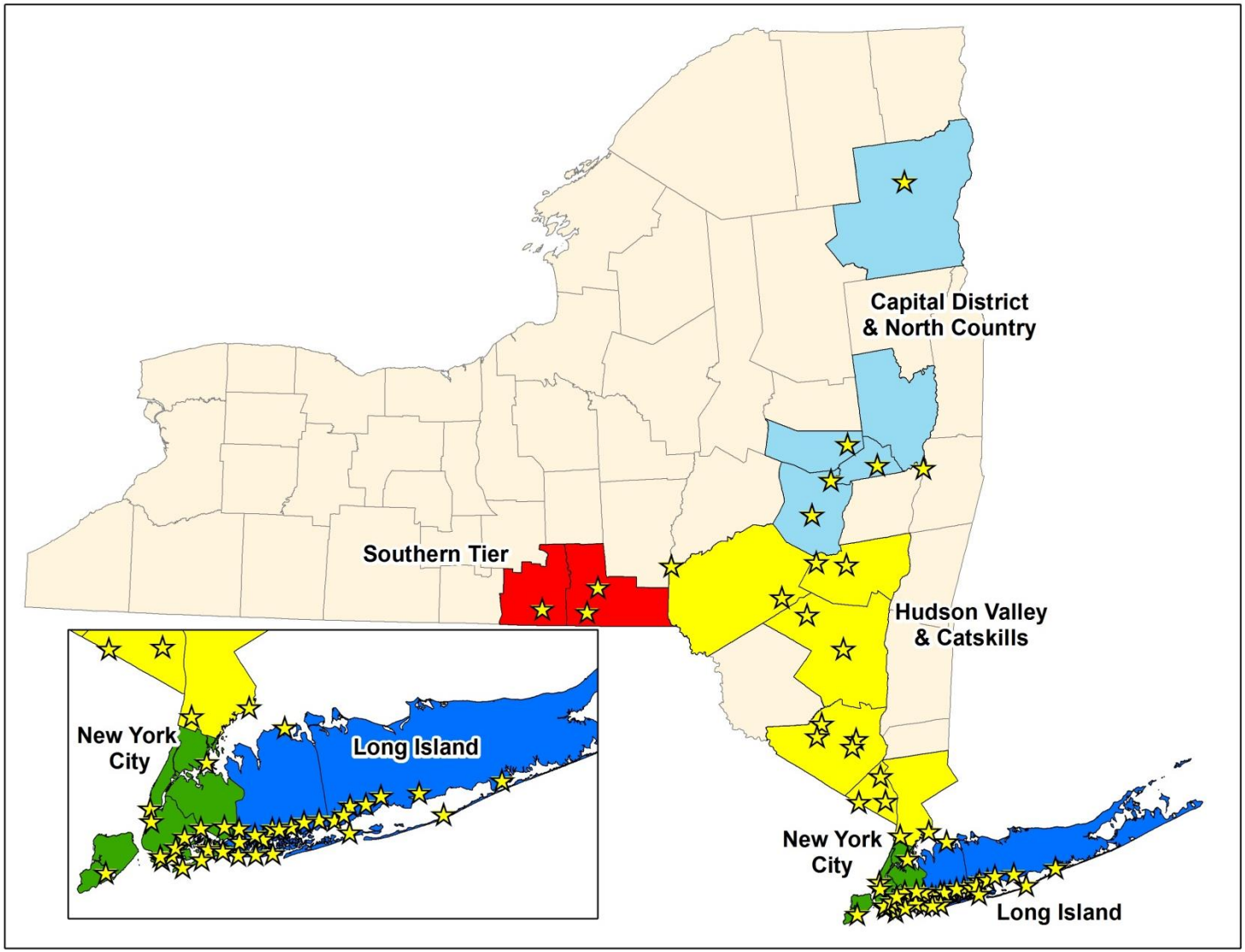
[2] The following localities' allocations comprise the NYRCR Community's total allocation: Gerritsen Beach – $6.7 million; Sheepshead Bay – $6.6 million.

among the factors that the Governor's Office of Storm Recovery 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 Community's CDBG-DR allocation 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 (ADA). 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. The Governor's Office of Storm Recovery will actively seek to match projects with funding sources.

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.

NYRCR Communities



Find out more at

StormRecovery.ny.gov/Community-Reconstruction-Program

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Note: Unless otherwise noted, the photographs in this report were generously provided by a resident of Sheepshead Bay, Brooklyn.

Executive Summary

A. Overview

The NY Rising Community Reconstruction (NYRCR) Program was established to provide rebuilding and revitalization assistance to communities severely damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. The NYRCR Program enabled communities to identify resilient and innovative reconstruction projects and other needed actions based on community-driven plans that consider current damage, future threats, and the community's economic opportunities.

Gerritsen Beach and Sheepshead Bay are neighboring communities located on the southern shore in Brooklyn, NY, which were severely impacted by Superstorm Sandy. Gerritsen Beach is on a peninsula with water on three sides, and Sheepshead Bay has an extensive waterfront along its southern boundary, with much of its eastern boundary adjacent to Plumb Beach Channel.

The neighborhoods have water access to Sheepshead Bay, Rockaway Inlet, Jamaica Bay, New York Harbor, and the Atlantic Ocean, and both have a long-term maritime history. The neighborhood shorelines are not protected by extensive dunes or seawalls, and the communities are built on low-lying ground. The NYRCR Gerritsen Beach/Sheepshead Bay Community (Community) has developed an NYRCR Plan that addresses repairing damage from the storms, mitigating future threats to the Community, and fostering its economic future. The State of New York has allocated up to $13.3 million in Federal Community Development Block Grant Disaster Recovery (CDBG-DR) monies to fund eligible projects identified in this NYRCR Plan.

Storm Impacts

On October 29, 2012, Superstorm Sandy—one of the largest storms to land ashore in New York's recorded history—wreaked havoc on Gerritsen Beach and Sheepshead Bay. The storm made landfall during an extra-high full moon tide. The communities were battered by a massive storm surge, with water levels 9 to 12 feet above normal tides. The results were widespread property and infrastructure damage, personal injury, and displacement of residents.

In New York State, Superstorm Sandy took 48 lives and severely damaged or destroyed over 300,000 homes, caused catastrophic flooding in subways and tunnels, and damaged major power transmission systems[1]. Governor Andrew M. Cuomo estimated the damage to New York State to be $42 billion. Superstorm Sandy produced the greatest damage ever experienced by Gerritsen Beach and Sheepshead Bay. Homes, business, and streets were overwhelmed by floodwater and sewage backflow. The stormwater infrastructure and conveyance system were overtaxed, which compounded the damage from direct overland flooding.

Gerritsen Beach was almost entirely engulfed in storm surge flooding. More than half the housing in Gerritsen Beach, a predominantly residential community, suffered significant damage from the 8 to 10 feet of tidal surge. The narrow courts in the "old section," south of the Gotham Avenue inlet, are at low ground elevations and were substantially flooded. Damage to housing units was most heavily concentrated in Gerritsen Beach south of Devon Avenue, where 1,378 of 1,601 (86.1%) of all housing units sustained some level of damage, including 195 units where flooding to first floor living space exceeded 4 feet.

Flooding was widespread in Sheepshead Bay, with the southern third of the community under water. Hit particularly hard were a concentration of homes known locally as "the courts." Between East 29th Street, Coyle Street, the Belt Parkway, and the waterfront, there are over 220 homes grouped in six courts that are located about 5 feet below the street level of Emmons Avenue and are not connected to city drainage infrastructure. In combination with the courts' sunken elevation relative to the surrounding neighborhood, this lack of connectivity to municipal stormwater infrastructure greatly increased the duration of floodwater on site and the resulting damage.

Multi-story and supportive housing in Sheepshead Bay was greatly affected by flooding. Damage to mechanical systems, electrical panels, and elevators, located in the basements and on the first floors, made buildings uninhabitable or greatly reduced their habitability for extended periods after the storm. Even in areas where flooding levels on the street were minimal, basement levels were deeply flooded, causing loss of contents, severe damage to building mechanical systems, and extended displacement of residents. Thus, many upper-floor units not directly flooded were uninhabitable for extended periods after the storm. Many basement-level apartments were entirely flooded, with loss of personal property and furnishings, the loss of housing for tenants, and the loss of critical rental income for property owners.

Flooding, sustained power outages, and the temporary dislocation of their customer bases led to prolonged or permanent closure of many businesses on key commercial corridors. Up to six months after the storm, as many as 40% of the businesses on Emmons Avenue remained closed. Damage occurred to mechanical systems, inventory, and building interiors and contents. Superstorm Sandy created an unprecedented quantity of debris, including large items such as boats, cars, and building materials, including a bar from Mill Basin that broke free from its foundation at Gateway Marina and floated more than a mile west before landing on residential street on the western side of Gerritsen Beach. The disaster debris was removed by the extensive efforts of volunteers and emergency responders in the weeks after the storm. Sand and other small debris infiltrated stormwater systems, impeding their function, as evidenced by the increase in nuisance flooding during high tides and small storms that have occurred since Superstorm Sandy.

More than a year after Superstorm Sandy's wrath, recovery efforts have been made but great needs remain and opportunities exist for creating a more resilient Community to avoid future devastation.

Critical Issues

Superstorm Sandy was an unprecedented event. The experience brought to light both local and city-wide weaknesses and needs, including:

- Lack of comprehensive emergency response plans to protect vulnerable populations, evacuate the public, and recover from the disaster;
- Vulnerable community assets, including homes, schools, and cultural and civic structures, which are ill-equipped to handle severe flooding and storm surge;
- Fragile local economy, for which business suffered greatly (e.g., physical damage, inventory loss, revenue decline) and not all have recovered;
- Inadequate infrastructure, such as low-lying roadways that hampered evacuation, and sewer systems failure that exacerbated flooding;
- Loss of power infrastructure for weeks after the storm; and
- Inadequate planning and processes to meet the needs of the Community's significant vulnerable populations, of which:
  - 21,495 (16%) are over the age of 65;
  - 16,140 (12%) are disabled; and
  - 70,943 (54%) speak a language other than English, with nearly 60% of foreign language speakers reporting that they speak English "less than very well." (U.S. Census, 2010, and American Community Survey)

These factors can complicate advance planning and preparedness measures at a community level and require special attention during and after an emergency, particularly in the evacuation phase.

The NYRCR Plan responds to these weaknesses, or critical issues, to recover from Superstorm Sandy and to make Gerritsen Beach and Sheepshead Bay more resilient to future storms.

B. Community-Driven Process

The NYRCR Plan was collaboratively developed by the NYRCR Planning Committee (Committee) with input from the residents, business owners, and members of civic associations of Gerritsen Beach and Sheepshead Bay. Local

uniqueness and diversity were accounted for in creating a vision, to rebuild in a manner that increases resilience, sustainability, and prosperity.

"Our vision is to restore and build upon the historic uniqueness and diversity of our waterfront communities by promoting resilient, prepared, and deeply rooted neighborhoods that will ensure a stronger, safer, and brighter quality of life for future generations."

Public Outreach

The Gerritsen Beach and Sheepshead Bay communities were provided a range of opportunities for collaboration during the planning process, which began in September 2013 and concluded in March 2014. Three Public Engagement Events (in October and November 2013, and February 2014) were held to solicit feedback from the Community on the NYRCR planning process, to help in the identification of local needs and priorities, to gather information used in the development of projects to address these needs, and to provide feedback on the proposed projects. A wide-ranging public outreach campaign was conducted using print and online media, flyer and poster distribution, e-mail, and word of mouth to inform Community residents of the meetings and opportunities to provide feedback through other methods, such as comment cards and on-line surveys.

The Committee held 12 Planning Committee Meetings between September 18, 2013, and February 27, 2014. During this extensive planning process, the Committee provided input on local issues, opportunities, and methods of public outreach; created strategies and projects that respond to the critical issues and storm effects of Superstorm Sandy; and worked with the public during Committee meetings and at the three Public Engagement Events to help them understand the planning process, and to gather valuable insights from the public on the plan development and the project proposals.

First Public Engagement Events

Public Engagement Events were held on October 7 and October 8 2013, and attended by more than 150 residents of the two Communities. The October 7th event was held in Sheepshead Bay, and the October 8th event was held in Gerritsen Beach. Both events opened with an introduction of the Committee. An overview of the NYRCR planning process was provided, followed by a report on the Committee's progress to date. Most of the meeting time was devoted to facilitated breakout sessions at multiple tables, during which participants were asked for feedback on the Vision Statement, needs and opportunities, key strategies, community assets, and ideas for potential projects. The feedback helped guide the Committee and was incorporated into the NYRCR Gerritsen Beach/Sheepshead Bay Conceptual Plan, particularly with respect to needs and opportunities, key strategies, and project ideas.

Second Public Engagement Event

The second Public Engagement Event was held on November 20, 2013, at the Brooklyn Amity School in Sheepshead Bay and had approximately 100 public attendees. The purpose of this event was to share key elements of the NYRCR Conceptual Plan, with a focus on resiliency strategies and potential projects. The meeting format included a short presentation; small, structured working groups; and a short open house session.

Public Engagement Meeting on October 7, 2013
(Source: Elizabeth Graham)

Third Public Engagement Event

The third Public Engagement Event was held on February 27, 2014, at the Brooklyn Amity School in Sheepshead Bay and had approximately 55 attendees. The open house format included:

- A Welcome Station with program history and work to date;
- A Project Evaluation Station with an overview of the criteria, ranking, inventory process, and any other factors that went into the ranking process;
- Nineteen Project Stations, including Proposed Projects and Featured Project Boards; and
- An Exit Station at which participants could map their address and submit feedback forms.

Additionally, an electronic version of the survey was posted online and shared through social media outlets. Over 50 additional feedback forms were completed online and through additional outreach, and the information was compiled and shared with the Committee. Overall, post-meeting feedback was aligned with the feedback received during the meetings.

The final Public Engagement Event, to be held in spring 2014, will solicit additional input on the implementation of strategies and projects presented in the NYRCR Plan.

C. Blueprint for Implementation

Throughout the planning process, the Gerritsen Beach/Sheepshead Bay Planning Committee emphasized the following critical needs: identification of measures to reduce future flood impacts; repair and retrofit of homes, businesses, and key community facilities; and increasing the ability of local emergency management groups to perform pre-event planning and response activities during and after disasters. Members of the Community agreed with this identification of needs and provided valuable information that was used to help develop strategies to address them. The Committee relied on residents' specific local knowledge of, and personal experience with, the impacts of Superstorm Sandy. In many cases, this local knowledge was supplemented by the perspective of community groups, nonprofits, City and State agencies, and elected officials.

Implementation of these strategies will be pursued through a series of projects, also developed by the Committee with extensive public input, which are categorized in three groups: Proposed Projects, Featured Projects, and Additional Resiliency Recommendations.

- ***Proposed Projects:*** Proposed Projects are proposed for funding through a community's allocation of CDBG-DR funding.
- ***Featured Projects:*** Featured Projects are innovative projects for which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding, and regulatory reforms and other programs that do not involve capital expenditures.
- ***Additional Resiliency Recommendations:*** Additional Resiliency Recommendations are resiliency projects and actions the Planning Committee would like to highlight that are not categorized as Proposed or Featured Projects.

The table below provides a list of strategies, paired with the Proposed and Featured Projects that will execute them. The project list includes:

- Infrastructure enhancements to reduce direct effects of flooding
- Reconnaissance studies for large-scale flood risk reduction measures
- Retrofit measures to individual buildings
- Plans to increase local emergency response capabilities

The order of appearance is not a reflection of project priority or ranking.

Strategies and Projects

Identify methods to reduce future flood risk and damage

Reconnaissance Study for Storm Surge Reduction and Flood Barrier Systems (Proposed)
Evaluate options for reducing flooding in Gerritsen Beach, Sheepshead Bay, and the neighboring Manhattan Beach.

Identify methods to mitigate chronic sewer-related damage

Installation of Backflow Prevention Measures on City Infrastructure (Proposed)
Install valves or flap gates at stormwater outfall locations and modify catch basins to maximize capacity to prevent overflow.

Installation of Sewer Connection Cut-Off Valves (Proposed)
Install sewer connection cut-off valves in homes, businesses and community facilities.

Emmons Avenue, *Complete Streets* (Proposed)
This project would replace Sandy-destroyed street trees and plantings, and improve stormwater drainage infrastructure

Repair and improve Community infrastructure

Study of Street and Drainage Infrastructure Repair Needs, Gerritsen Beach (Proposed)
Identify needed repairs and modifications to streets and drainage infrastructure throughout Gerritsen Beach.

Repair and Reconstruction of Canton Court Bulkhead (Proposed)
Repair the bulkhead at the southern end of Canton Court in Gerritsen Beach.

Ensure adequate evacuation routes and advance planning

Evacuation Planning for Gerritsen Beach (Proposed)
Determine evacuation capacity of existing road network in Gerritsen Beach, where there is one road leading out of the neighborhood.

Increase community preparedness and emergency response capabilities

Identification and Retrofit of a Building for Use as an Emergency Response and Recovery Center in Sheepshead Bay (Proposed)

Designate and modify a facility for "one-stop-shop" information and resource headquarters in case of emergency.

Retrofitting of Vollies Hall and Gerrittsen Beach Fire Department Station (Proposed)

Retrofit the existing emergency response and recovery centers to prevent damage to the buildings in case of another event.

Supplemental Community-Driven Emergency Response Programs (Featured)

Enhance local emergency response capabilities in Sheepshead Bay.

Foster a thriving and resilient small business community

Establish Merchants Associations (Featured)

Increase coordination and support among small businesses in Sheepshead Bay and Gerritsen Beach.

Retrofitting of Key Businesses and Community Services Assets (Proposed)

Install flood prevention measures and elevate mechanical systems of businesses and community facilities.

Installation of Backup Generators at Key Community Facilities (Proposed)

Install onsite power generation and storage equipment.

Support a resilient housing stock

Elevation and Retrofitting of Homes (Proposed)

Provide financial assistance for home elevation and/or retrofit of homes in high-risk areas to increase resiliency in future events.

Feasibility Study to Improve the Resiliency of the Courts in Sheepshead Bay (Proposed)

Identify retrofit solutions for "the courts" of Sheepshead Bay in relation to home raising and connection to City sewer system.

Homeowner Education Program (Featured)

Provide information and technical support to homeowners in high-risk areas.

Restore and improve recreational opportunities

Support the Resiliency and Maintenance of Plumb Beach (Featured)

Establish understanding of maintenance responsibilities at Plumb Beach to support the maintenance and protective features.

Construct a Resilient Comfort Station at Brigham Park (Featured)

Expand on current construction plans at Brigham Park in Sheepshead Bay to include a flood-resilient comfort station.

Section I:
Community Overview

Section I: Community Overview

The NY Rising Community Reconstruction (NYRCR) Program was established to provide rebuilding and revitalization assistance to communities severely damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. The NYRCR Program enabled communities to identify resilient and innovative reconstruction projects and other needed actions based on community-driven plans that consider current damage, future threats, and the community's economic opportunities.

The NYRCR Gerritsen Beach/Sheepshead Bay Community (Community) used the process to develop an NYRCR Plan that addresses repairing damage from the storms, mitigating future threats to the Community, and fostering its economic future. In a manner consistent with the National Disaster Recovery Framework, NYRCR Plans include needs, risks, and opportunities related to assets in six Recovery Support Functions: Community Planning and Capacity Building, Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources.

Additionally, the NYRCR Plan for this Community:

- Involves a locally driven grassroots planning process;
- Provides a Community Vision that addresses regional and community recovery and resilience;
- Assesses each Community's vulnerability to the negative effects of future natural hazards;
- Assesses the need for economic development; and
- Describes cost-effective strategies, projects, and actions that will increase the resilience of the two communities, provide protection to vulnerable populations, and promote sound economic development by protecting the communities' assets.

View of Sheepshead Bay, NY, 2012, with Belt Parkway in middle

The State of New York has allocated $13.3 million in Federal Community Development Block Grant Disaster Recovery (CDBG-DR) monies to fund eligible projects identified in this NYRCR Plan. Additionally, the NYRCR Plan identifies other potential funding sources for project implementation that range from Federal agency grants and low-interest loans to State funding sources, foundation grants, and private-sector contributions.

A. Geographic Scope of NYRCR Plan

The NYRCR Gerritsen Beach/Sheepshead Bay Planning Committee used the Community Board mapping of the Gerritsen Beach and Sheepshead Bay neighborhoods as the basis for identifying the geographic scope of the plan. In addition, the Committee decided to include the immediately adjacent Plumb Beach peninsula as part of the Sheepshead Bay neighborhood. Plumb Beach is large open park area lying to the east of the Emmons Avenue waterfront and directly south of the Gerritsen Beach peninsula. Plumb Beach provides a degree of protection to the area because of beaches and dunes, which may reduce direct impacts from waves and floodwaters. The peninsula supports the Belt Parkway as it heads east to the Gerritsen Inlet bridge. Thus, it is an important natural resource and protective feature for the Community.

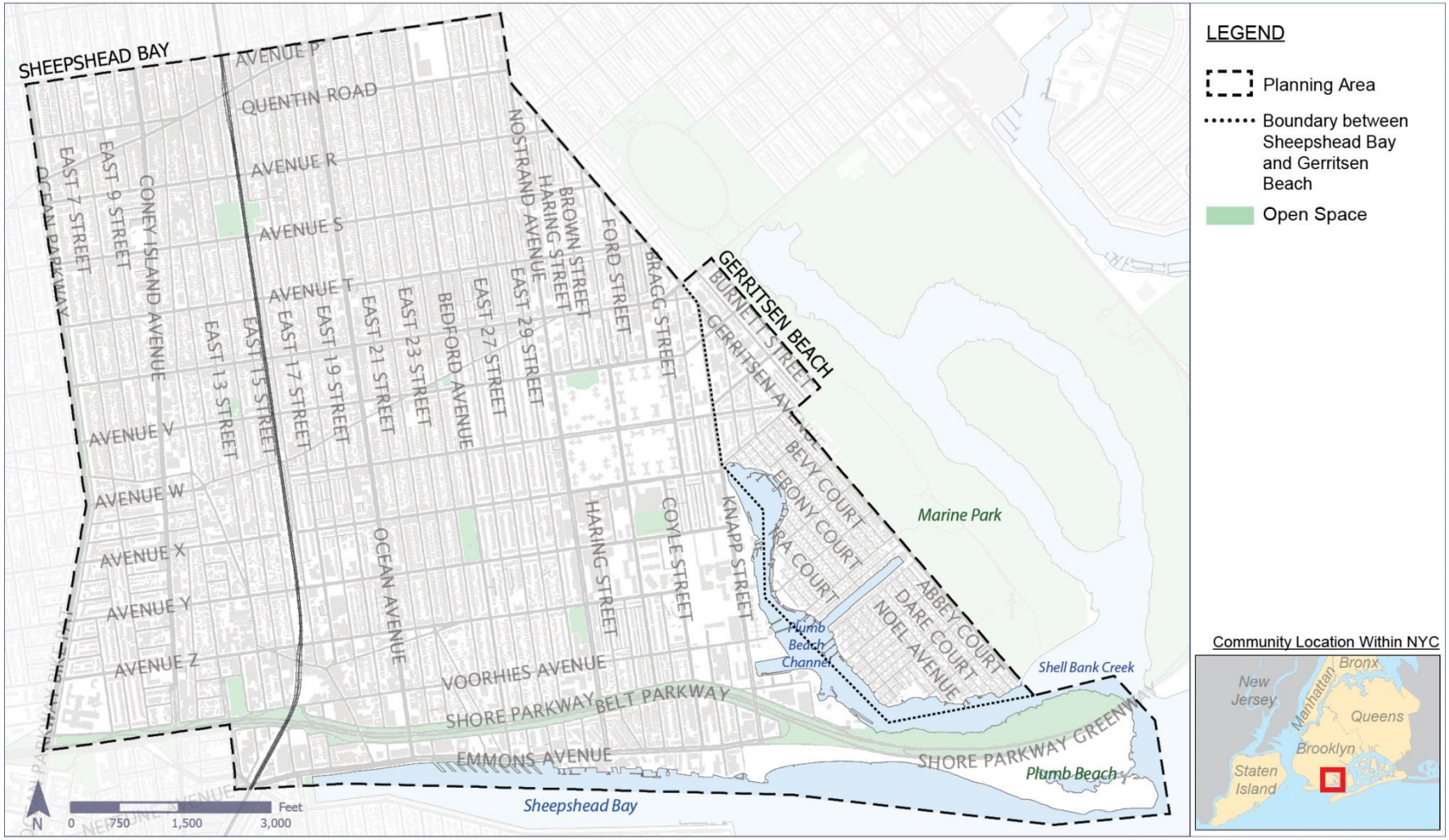
The combined area containing Gerritsen Beach, Sheepshead Bay, and Plumb Beach is the geographic scope of the NYRCR Plan (also referred to as the NYRCR Community) is shown in Figure I-1. The boundaries of the Planning Area are Avenue P to the north, Gerritsen Avenue to the east, Emmons Avenue and Plumb Beach to the south, and Ocean Parkway to the west.

The Planning Area is on the southern shore of Brooklyn, with water access to Rockaway Inlet, Jamaica Bay, New York Harbor, and the Atlantic Ocean. The Southern Brooklyn Peninsula, consisting of Sea Gate, Coney Island, Brighton Beach, and Manhattan Beach, lies to the southwest of Sheepshead Bay. To the west of the Planning Area across Ocean Parkway is the neighborhood of Gravesend, with the neighborhood of Midwood to the north of Avenue P. To the east of Gerritsen Avenue is the Marine Park neighborhood, the New York City Parks facility known as Marine Park, and the National Park Service's Gateway National Recreation Area, which includes Floyd Bennett Field. The Rockaway Peninsula, which includes the neighborhoods of Breezy Point, Roxbury, Belle Harbor, Rockaway Park, and Rockaway Beach, lies to the south across Rockaway Inlet.

View from southern end of Gerritsen Avenue, looking toward Plumb Beach, Belt Parkway, and Gerritsen Inlet bridge
Source: URS

Gerritsen Beach | Sheepshead Bay

NYRCR Gerritsen Beach and Sheepshead Bay Planning Area



Source: NYC Department of City Planning, MapPLUTO

Figure I-1: NYRCR Gerritsen Beach and Sheepshead Bay Planning Area

Gerritsen Beach

Gerritsen Beach, with a population of approximately 6,700, is situated on a peninsula that extends between Avenue U to the north, Burnett Street and Gerritsen Avenue to the east, Plumb Beach Channel to the south, and Shell Bank Creek and Knapp Street to the west. Knapp Street is considered the boundary line between Gerritsen Beach and Sheepshead Bay.

The Gotham Avenue Canal extends eastward to Gerritsen Avenue, dividing the neighborhood to the north and south between Gotham Avenue and Bartlett Place. Local residents often refer to the portion of the neighborhood north of the canal as the "new section" while the portion to the south is called the "old section."

Gerritsen Beach was predominantly marshland until the 1920s when it was developed as a planned seasonal community with hundreds of bungalows. As marshlands were filled in for development purposes, flood storage capacities have decreased, resulting in an increased risk of flooding. These filled-in marshlands remain at low ground elevations, further increasing the flood risk to properties. By the 1930s, Gerritsen Beach had more than 1,500 homes.

Today, Gerritsen Beach is a year-round residential community with homes that sit between narrow streets and the water's edge. Most of Gerritsen Beach is residential; however, there are pockets of commercial uses along Gerritsen Avenue and Knapp Street. The Gerritsen Creek estuary supports recreational fishing and is also a major spawning ground for various aquatic species.

Marina in Gerritsen Beach on Plumb Beach Channel
Source: URS

Businesses on Gerritsen Avenue
Source: URS

Gotham Avenue Inlet, Gerritsen Beach
Source: URS

Gerritsen Beach is almost entirely composed of one- and two-family homes. Residences are typically detached with front and side yards, backyards, and driveway.

Gerritsen Beach is vulnerable to flooding and storm surge for several reasons:

- Structures and infrastructure in Gerritsen Beach were built prior to enactment of the National Flood Insurance Program (NFIP) and before Flood Insurance Rate Maps (FIRM), and as a result were constructed at elevations below the base flood elevation (BFE), making them vulnerable to flooding.
- Buildings constructed in Gerritsen Beach before 1980 were based on BFEs that did not account for wave action, making them vulnerable to surge damage. Additionally, most of homes and businesses were built before modern construction codes, which require flood-resistant building materials, design, and construction practices. These structures were not built per floodplain management ordinances, which require that the lowest finished floor elevation (FFE) be above the BFE.
- Gerritsen Beach is densely developed and now populated year-round, increasing the number of people and buildings vulnerable to flood and surge impacts. There is now a greater likelihood of major property damage and loss of access to critical assets and community services.

Homes on Dare Court, Gerritsen Beach
Source: URS

Bungalows on Stanton Court, Sheepshead Bay
Source: URS

Sheepshead Bay

Sheepshead Bay is defined as the area bounded to the south by the water body of Sheepshead Bay, to the west by Ocean Parkway, to the north by Avenue P, and to the east by Knapp Street and the Plumb Beach Channel.

Sheepshead Bay began developing in the late 1870s and 1880s, partly because it became easier to travel between the then-separate municipalities of Brooklyn and City of New York after the construction of the Manhattan Beach branch of the Long Island Railroad; the Brooklyn, Flatbush, and Coney Island Railroad (known as the BMT Brighton Line); the Ocean Parkway; and the Brooklyn Bridge. The surrounding area was a thriving seasonal bungalow community, anchored by the Coney Island Jockey Club's construction of its flagship racetrack in Sheepshead Bay in 1880. The State of New York banned gambling in 1924 and the racetrack subsequently closed. However, the Sheepshead Bay neighborhood was well-established by this time and continued to expand after the closure of the track.

In the early 1930s, the City of New York took control of Jamaica Bay and began developing the waterfront by expanding Emmons Avenue and redesigning the piers, which are still used today for daily party-boat fishing tours. Year-round habitation was extensive by the 1930s. The Shore Parkway was extended into the area in the 1940s, which improved access and made the area more desirable to commuters. After World War II, a significant housing shortage led to increased residential construction.

Today, Sheepshead Bay is a much larger neighborhood and its demographics, economics, and land uses vary to a much greater degree. Sheepshead Bay has a population of 124,500, who live in a mixed building stock that includes single-family homes, newer multi-family dwellings, senior care facilities, and New York City Housing Authority (NYCHA)-operated public housing. The NYCHA Sheepshead Bay/Nostrand Houses includes a four-block complex consisting of 34 six-story buildings bounded by Nostrand Avenue, Bragg Street, Avenue V, and Avenue X. Sheepshead Bay also has a larger commercial sector, with primary corridors along Emmons Avenue, Sheepshead Bay Road, Nostrand Avenue, and Avenue U.

Similar to structures in Gerritsen Beach, the bungalows, many homes, and the water-dependent businesses were developed before the enactment of contemporary building codes and standards. These pre-FIRM and pre-modern code constructed structures and facilities are at risk to flooding and storm surge damage and destruction due to construction below the BFE, inaccurate FIRMs used for land use decisions, and noncompliance with modern flood damage-resistant building materials, design, and construction standards.

Sheepshead Bay has numerous bungalows located along "courts" (pedestrian walks) north and south of Emmons Avenue, one of the main commercial corridors. Some courts are as much as 5 feet below the street grade, are at risk of inundation from storm surge, and are frequently subject to nuisance flooding from stormwater run-off. The courts, as shown in **Figure I-2**, include: Canda, Lake, Dunne-Mesereau, and Stanton, which are located south of Shore Parkway and north of Emmons Avenue between East 29th Street and Batchelder Street; and Weber and Shale-Bogardus, which are located south of Emmons Avenue and north of the Sheepshead Bay.

Source: NYC Department of City Planning, MapPLUTO

Figure I-2: Sheepshead Bay Courts

Commercial uses in Sheepshead Bay are found along Kings Highway, Emmons Avenue, Nostrand Avenue, Avenue U, Ocean Avenue, and Sheepshead Bay Road. Although much of the micro-economy of Emmons Avenue is based on water-dependent and water-enhanced uses such as boat docking, storage, and charter fishing operations, and tourism-related businesses such as restaurants, cafes, and three hotels, the other commercial corridors in Sheepshead Bay include an array of businesses such as health care and social assistance, retail and food services, and professional, scientific, and technical services. Based on North American Industry Classification System (NAICS) 2011 Business Pattern[2] data for the ZIP codes 11229 and 11235 (which include Sheepshead Bay and Gerritsen Beach, as well as Brighton Beach and Manhattan Beach), 74% of the 4,421 business establishments in the area have 1-4 employees. This is reflected in many of the businesses along the commercial corridors in Sheepshead Bay away from the waterfront, and emphasizes the importance of small businesses to the local economy.

The Sheepshead Bay Marina along the Emmons Avenue waterfront is operated by the New York City Department of Parks and Recreation, and is a popular fishing, boating, and recreational area. However, the marina is also a working waterfront and, thus, the maintenance of navigational facilities (channels, piers, etc.) is required for safe operation.

Sheepshead Bay Road commercial corridor, looking towards Sheepshead Bay Road subway station
Source: URS

Sheepshead Bay Marina along the Emmons Avenue waterfront
Source: URS

Mixed-use commercial and apartment building on Coyle Street, Sheepshead Bay
Source: URS

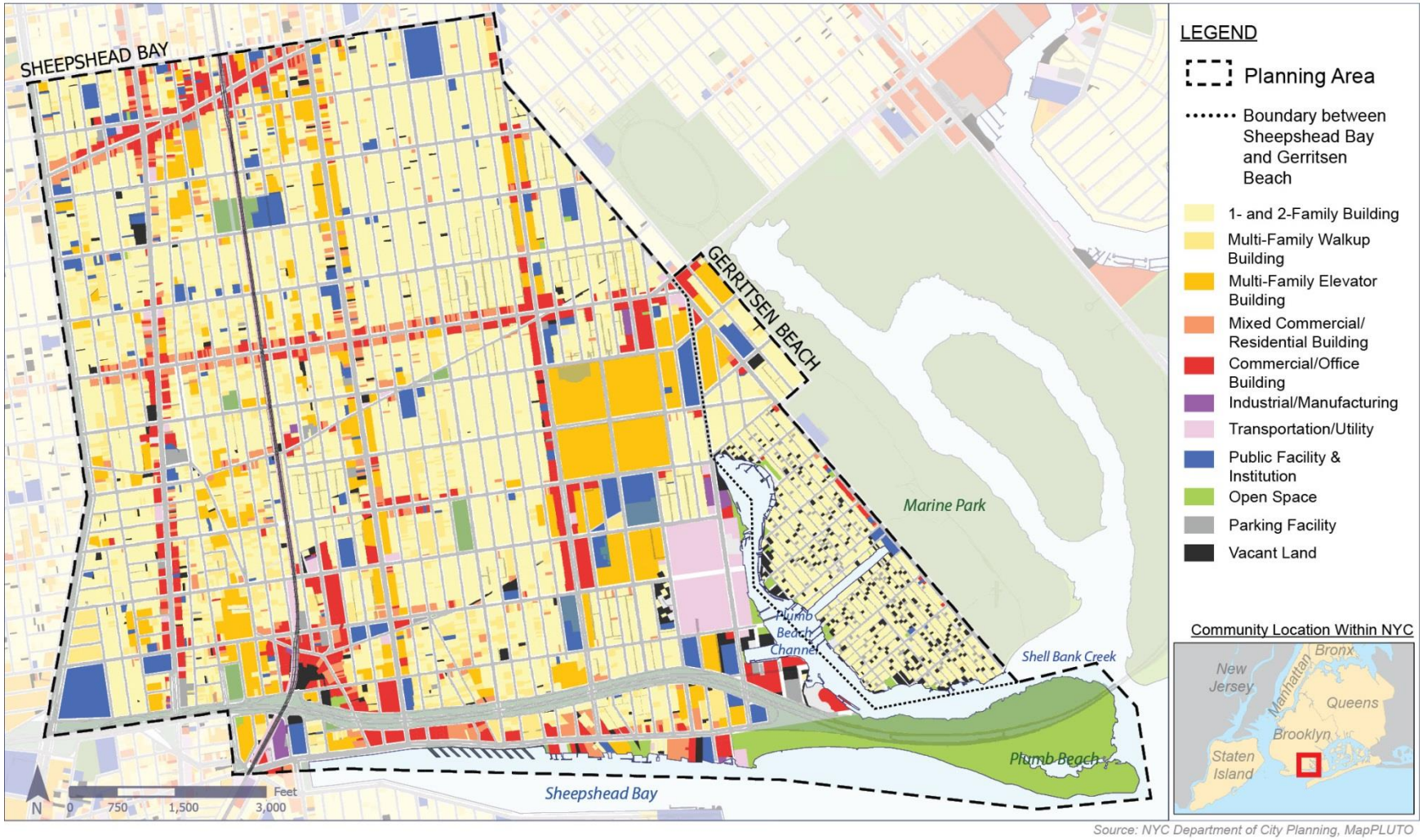
Avenue U commercial corridor
Source: URS

Land Use

Land uses in the Planning Area are shown in Figure I-3. There is a wide range of land uses, with housing, commercial, and utility uses occupying the majority of the area. There are substantial open space areas in Plumb Beach and in Marine Park, adjacent to the eastern boundary of the Planning Area.

Gerritsen Beach | Sheepshead Bay

Land Use



Source: NYC Department of City Planning, MapPLUTO

Figure I-3: Land Use

B. Description of Storm Damage

Superstorm Sandy struck the New York area on October 29, 2012, bringing a storm surge of 9 to 12 feet above normal tide levels from Kings Point on the western end of Long Island Sound to the Battery on the southern tip of Manhattan. It was one of the largest storms in New York's recorded history to land ashore.

The storm's effects were devastating, causing widespread damage to lives, homes, businesses, core infrastructure, government property, and an economy just beginning to recover from a financial crisis.

As detailed in the National Hurricane Center report on the storm,[1] Superstorm Sandy had the following impacts on New York State: 48 fatalities, severe damage or destruction of over 300,000 homes, catastrophic flooding in subways and tunnels, and damage to major power transmission systems and widespread power outages.

Firefighters responding to Superstorm Sandy on Shore Parkway at Brown Street, Sheepshead Bay, October 2012

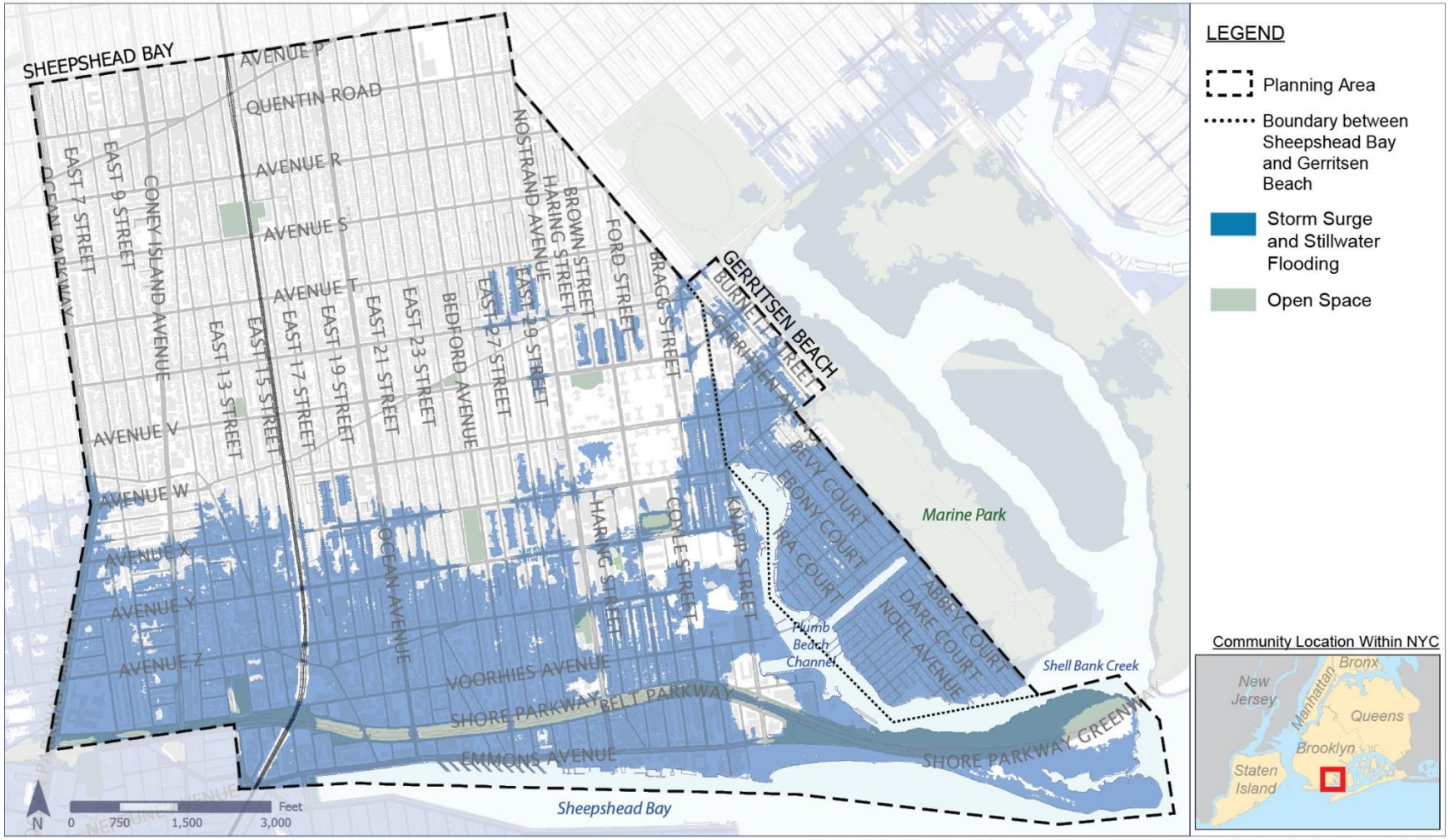
Fourteen counties in New York State were declared Federal disaster areas.[3] Economic losses as a result of Superstorm Sandy are estimated to be between $30 and $50 billion, with an estimated $10 to $20 billion in insured losses.[4] New York Governor Andrew M. Cuomo stated the storm would cost the State nearly $42 billion, with the vast majority of damage centered on the City of New York and Long Island.[5]

In Gerritsen Beach and Sheepshead Bay, Superstorm Sandy caused the greatest damage ever experienced in the history of the neighborhoods. Flooding and ensuing damage to homes, businesses, and personal property was widespread in both neighborhoods, with storm surge causing a rapid inundation of widespread areas. In advance of the storm surge, a substantial volume of floodwater entered both communities through stormwater outlets without flap valves or check gates. When water levels rose in Sheepshead Bay and the water bodies around Gerritsen Beach (Shell Bank Creek and Plumb Beach Creek) before the storm surge, water surcharged the outlets and flooded streets and homes. Storm surge and floodwater entered Gerritsen Beach, overflowed a low-lying area along the Belt Parkway at Plumb Beach, and passed through the Belt Parkway Bridge into the inlet. In Sheepshead Bay, storm surge flowed over Emmons Avenue and into adjacent areas. (See Figure I-4, Superstorm Sandy Flood Inundation.) The flooding caused widespread displacement of residents throughout the Community, with many forced to seek shelter and alternate housing for extended periods after the storm.

The stormwater infrastructure and conveyance system were flooded and damaged. The Coney Island Waste Water Treatment Plant, located on Knapp Street, experienced numerous problems. Debris clogged parts of the plant, causing a power outage. Water from Shell Bank Creek overtopped the plant's bulkheads and flooded the building, and the plant was shut down for 2 hours on the night of October 29, 2013. To compound matters, a 72-inch outfall pipe had been previously shut down for repairs, further reducing capacity at the plant.[6] An estimated 213 million gallons of raw sewage and combined sewer overflow (CSO) overflowed from the plant, in addition to another 284 million gallons that escaped with only a reduction in secondary treatment. [7]

Gerritsen Beach | Sheepshead Bay

Superstorm Sandy Flood Inundation



Source: Federal Emergency Management Agency (FEMA), NYC Department of City Planning, MapPLUTO

Figure I-4: Superstorm Sandy Flood Inundation

Gerritsen Beach was not included in the "Zone A" evacuation zone prior to Superstorm Sandy. On October 29, 2012, City of New York Mayor Michael Bloomberg issued a mandatory evacuation order for Zone A prior to Sandy's landfall. Zone A was defined as encompassing "all areas that will be inundated with storm surge in a Category 1 hurricane and all areas abutting the Atlantic coast." At the time, Gerritsen Beach was mapped as Zone B, which "encompasses all Category 2 inundation areas." As a result, the evacuation order that affected other areas of the City of New York was not mandatory in the neighborhood and was not widely heeded by residents. The storm surge thus trapped many residents in their homes, with some having to seek refuge on the second floor.

Over half the housing in Gerritsen Beach suffered significant damage, as a tidal surge of 8 to 10 feet washed through the neighborhood in 10 minutes during the storm. The U.S. Department of Housing and Urban Development (HUD) provided the following statistics on the damage. Damage to housing units was most heavily concentrated in Gerritsen Beach south of Devon Avenue, where 1,378 of 1,601 (86.1%) of all housing units sustained some level of damage, including 195 units where flooding to first floor living space exceeded 4 feet. The narrow courts in the "old section" (the area south of the Gotham Avenue inlet) of Gerritsen Beach are at low ground elevations, and were substantially flooded during Superstorm Sandy. These roadways are constructed of a thin layer of asphalt over a sand foundation and are subject to shifting, potholing, and cracking. These conditions were worsened by inundation during Superstorm Sandy.

Flooding was extremely widespread and damaging in Sheepshead Bay, as shown in Figure I-4. Buildings and streets were inundated across the entire southern portion of the neighborhood, extending inland past Avenue X. Floodwaters and storm surge came from multiple locations, including the waterfront along Emmons Avenue and then flowing north through the streets, proceeding through the overpasses in the Belt Parkway to areas north of the roadway. Plumb Beach was directly inundated by storm surge and waves, and Plumb Beach Channel overflowed its banks and flooded areas along Knapp St. Areas not receiving direct inundation experienced flooding due to stormwater backflow in the municipal stormwater and sanitary system; this occurred in areas north of Avenue X, and in particular, between Avenues V and T, from East 26th Street east to Knapp St.

The storm surge and flooding from Superstorm Sandy devastated the bungalow courts along Emmons Avenue in Sheepshead Bay. Between East 29th Street, Coyle Street, the Belt Parkway, and the waterfront, there are over 200 homes grouped in six courts. These courts are located about 5 feet below the street level of Emmons Avenue and are not connected to city drainage infrastructure. Without connection to municipal drainage, residents had to pump out the trapped floodwaters. Ponding and nuisance flooding are common during and after heavy rains. In combination with the courts' sunken elevation relative to the surrounding neighborhood, this lack of connectivity to municipal stormwater infrastructure greatly increased the duration of floodwater on site and the resulting damage.

Multi-story and supportive housing in Sheepshead Bay was greatly affected by flooding. Damage to mechanical systems, electrical panels, and elevators, located in the basements and on the first floors, made buildings uninhabitable or greatly reduced their habitability for extended periods after the storm. Thus, many upper-floor units not directly flooded were uninhabitable for extended periods after the storm.

Flooding, sustained power outages, and the temporary dislocation of their customer bases led to prolonged or permanent closure of many businesses on key commercial corridors. Up to 6 months after the storm, as many as 40% of the businesses on Emmons Avenue remained closed. Damage occurred to mechanical systems, inventory, and building interiors and contents. While many businesses have repaired and reopened, throughout the Community there are businesses that have not reopened or have not fully recovered from their storm damage and resulting business interruptions.

Numerous basements, including basement apartments, were flooded throughout the community. Even in areas where flooding levels on the street were minimal, basement levels were deeply flooded, causing loss of contents, severe damage to building mechanical systems, and extended displacement to residents.

A structural damage assessment conducted by Federal Emergency Management Agency (FEMA) for Gerritsen Beach and Sheepshead Bay following Superstorm Sandy classified building damages into four categories: destroyed, major damage, requires repair to be inhabitable, and affected. Figure I-5 depicts the areas falling into each category. The assessment was based on aerial imagery from the National Oceanic and Atmospheric Agency (NOAA), Civil Air Patrol (CAP) photographs, and media images captured from immediately after Superstorm Sandy until Nov. 18, 2012.

The damage categories are defined as follows, by degree of damage to impacted residences[8]:

- Destroyed – total loss of structure, structure is not economically feasible to repair, or complete failure to major structural components (e.g., collapse of basement walls/foundation, walls or roof);
- Major Damage – substantial failure to structural elements of residence (e.g., walls, floors, foundation), or damage that will take more than 30 days to repair;
- Requires Repair to be Inhabitable – home is damaged and uninhabitable, but may be made habitable in short period of time with repairs; and
- Affected – some damage to the structure and contents, but still habitable.

It should be noted that the damage classification in Figure I-5 is part of an ongoing work product and thus does not represent a final determination on the damage level of any structure.

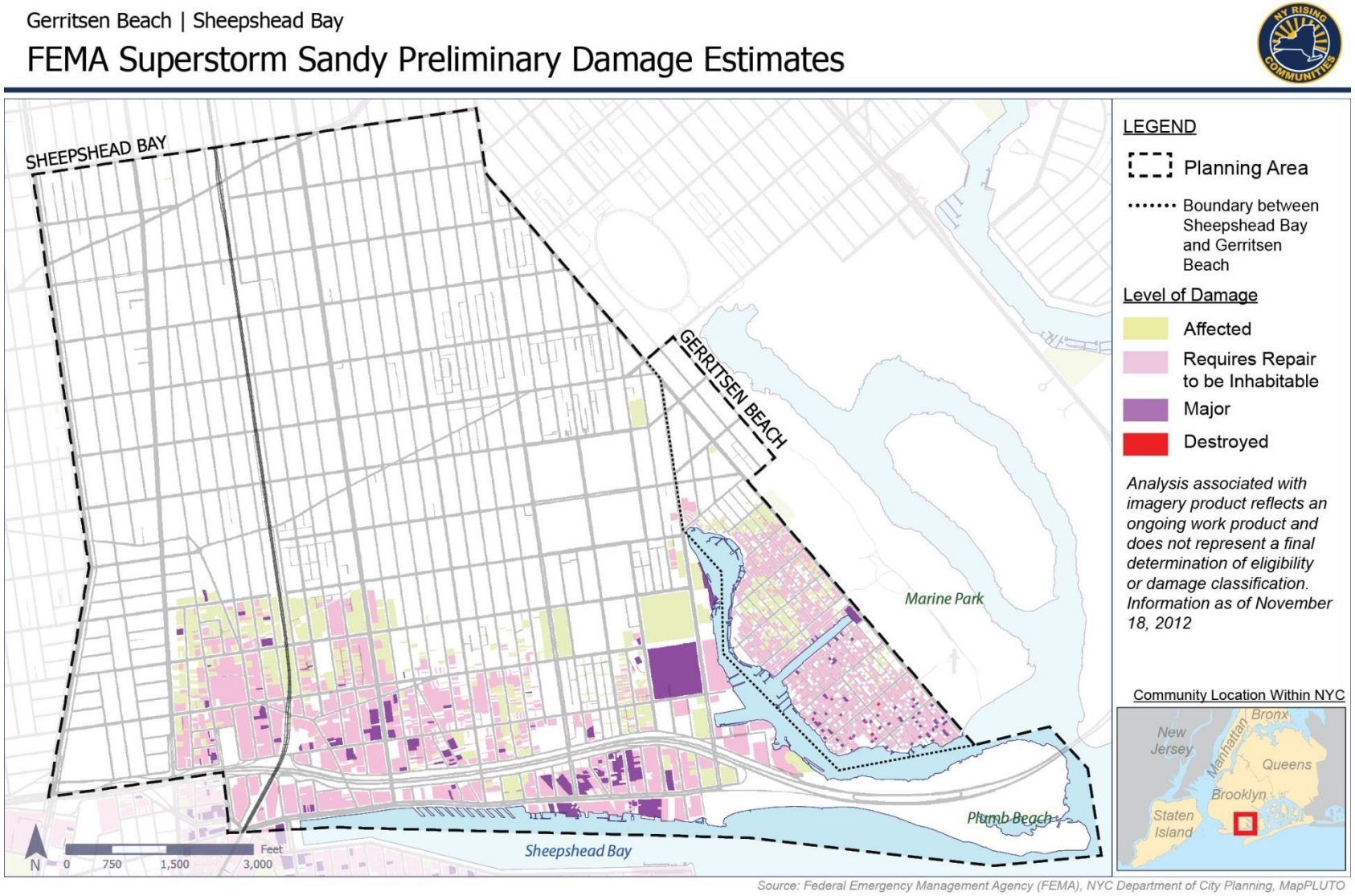


Figure I-5: FEMA Superstorm Sandy Preliminary Damage Estimates

Sewer backflow from Superstorm Sandy inundates the basement of a Gerritsen Beach home, October 2012
Source: Linda Cupo

Superstorm Sandy damage in the Courts, Sheepshead Bay
Source: https://www.flickr.com/photos/occupysandy/8223577421/

Damaged home after Superstorm Sandy
Source: https://www.flickr.com/photos/occupysandy/8224652496

Flood debris from inundated homes awaiting removal
Source: Kathy Flynn

C. Critical Issues

The risks resulting from Superstorm Sandy exposed numerous weaknesses within the Gerritsen Beach and Sheepshead Bay communities. This final NYRCR Plan aims to respond to these weaknesses, or critical issues, to recover from Superstorm Sandy, and to make Gerritsen Beach and Sheepshead Bay more resilient to future storms.

Critical issues were derived from numerous meetings and discussions about the storm, including 12 Committee meetings and three Public Engagement Meeting Events (October 7–8, 2013, November 20, 2013, and February 27, 2014).

One of the most pressing issues communicated through the NYRCR process was the lack of a comprehensive emergency response to the storm. The Committee and the public feel that the overall emergency response was inadequate, and that specific local plans to protect vulnerable populations, evacuate the public, and recover from the disaster need to be created.

Superstorm Sandy also highlighted the vulnerabilities of the Community's assets, including homes, schools, and cultural and civic structures. These assets are ill-equipped to handle severe flooding and storm surge, and increasing the resilience of these assets has become a hallmark issue for the Community.

The Community has expressed support for protection of the local economy after the storm. Local businesses suffered greatly, and many have yet to fully recover. Businesses suffered physical damage to their brick and mortar facilities, inventory was damaged, and the general lack of economic vitality hurt businesses' bottom line. According to the Brooklyn Community Foundation, in "Sheepshead Bay, 40% of businesses – majority immigrant-owned – will not return, jeopardizing economic vitality in the neighborhood."[9]

Existing infrastructure, such as roadways and sewer systems, proved vulnerable and inadequate during the storm. Resilience of these key assets is important to the Committee and the public, and strategies and project ideas to protect these assets have been proposed. Low-lying roadways, including certain sections of the Belt Parkway, were flooded, making it difficult for residents to evacuate quickly. Protection of power infrastructure is important as well, as many sections of the Community were without power for weeks after the storm.

According to the U.S. Census (2010), there are significant numbers of the population who fall into vulnerable categories, due to age or language limitations:

- 21,495 residents (16% of the population) are over 65 years old, a number that is expected to increase by 28% by 2020.
- 16,140 residents (12% of the population) are disabled. Of this population, 61% are 65 years or older.
- 70,943 (54%) of people in the planning area speak a language other than English at home, with nearly three-fifths of foreign-language speakers reporting that they speak English "less than very well."

These factors can complicate advance planning and preparedness measures at a community level, and require special attention during and after an emergency, particularly in the evacuation phase.

D. Community Vision

This section describes the Committee's Vision Statement for the NYRCR Plan and how Gerritsen Beach and Sheepshead Bay will rebuild stronger, smarter, and safer.

Gerritsen Beach and Sheepshead Bay residents, business owners, and civic association leaders were active members of the Committee. Together, they collaborated in developing a blueprint to reconstruct their neighborhoods in a sustainable and resilient manner.

Using a consensus-based approach at September 2013 Planning Committee Meetings, the Committee worked together to create a draft Vision Statement, which was then presented to the public for input and feedback at the October 7–8, 2013 Public Engagement Events. The public reviewed the draft statement and provided their thoughts and preferred language. This input was used to create the final Vision Statement, presented below. (Details of the public engagement process are provided in Section V.)

"Our vision is to restore and build upon the historic uniqueness and diversity of our waterfront communities by promoting resilient, prepared, and deeply rooted neighborhoods that will ensure a stronger, safer, and brighter quality of life for future generations."

E. Relationship to Regional Plans

City and regional planning documents, both pre- and post-Superstorm Sandy, were reviewed to avoid duplicating ongoing planning efforts and to identify how the NYRCR plan could best fill existing gaps.

These plans include resiliency and Superstorm Sandy recovery plans, along with hazard mitigation, waterfront, and sustainability plans. The analysis and recommendations included in these plans contributed valuable information and ideas to the NYRCR planning process.

Existing plans with direct or indirect connections to the Community were reviewed to identify Community goals and ongoing or proposed projects. Some of the plans were at least 4 years old and did not address the lingering financial effects of the recession that began in 2008, or the effects of Hurricane Irene in 2011 or Superstorm Sandy in 2012. Significant work related to planning has been completed since Superstorm Sandy, and the City of New York has developed several documents related to the storm and post-storm recovery.

The most relevant existing plans, studies, and projects are summarized below, including key analysis and lessons learned. The section details how the NYRCR Plan relates to or builds on these plans, and how the Committee incorporated the information into this planning effort.

Regional Plans

NYRCR Jamaica Bay Regional Working Group

From Sea Gate on the western edge of the Southern Brooklyn Peninsula, to South Valley Stream at its headwaters in Nassau County, communities in and around Jamaica Bay suffered enormous damage from Superstorm Sandy. The Bay, known as a unique ecosystem in an urban landscape, is famous for its salt marsh islands, intertidal flats, horseshoe crabs, and migratory birds that use the area as a critical refuge during their seasonal travels. Beyond the water, Jamaica Bay is surrounded by woodland and forests that host a wide array of wildlife. This dynamic system has attracted people for generations, and many of its surrounding communities are partially defined by their close proximity to Jamaica Bay's waters. However, this proximity also served as a hazard during Superstorm Sandy. At the height of the storm, the Bay swelled and water surged up through a network of creeks and streams, infiltrating neighborhoods and inundating homes, businesses and roadways.

As described in the *Description of Storm Damages* section of this Plan, Superstorm Sandy had a devastating impact on communities, and individual NYRCR Committees have developed strategies to rebuild and become resilient to future storm risks. At the same time, communities in and around Jamaica Bay realize the need for collaboration. Understanding that projects and other actions in one area can have profound impacts across the estuary, these communities have sought to create a unified, collective voice in support of resiliency efforts throughout the Bay. Mindful of the communities' call for cooperation, the Governor's Office of Storm Recovery created the Jamaica Bay Regional Working Group (JBRWG), a collection of representatives from the NYRCR communities closest to Jamaica Bay, shown in Figure I-6. The JBRWG views this final plan as the vehicle for its collective voice in support of ongoing and emerging resiliency efforts by stakeholders in Jamaica Bay.

The JBRWG believes that collaboration with agencies active in Jamaica Bay, namely the U.S. Army Corps of Engineers (USACE) and the National Park Service (NPS) is paramount. Through various habitat restoration projects, in addition to coastal protective measures along the Rockaway Peninsula, USACE has long been a committed partner in the sustainability of Jamaica Bay. Moreover, because of its management of the Gateway National Recreation Area, NPS has an ongoing interest as a responsible steward of its federally protected lands.

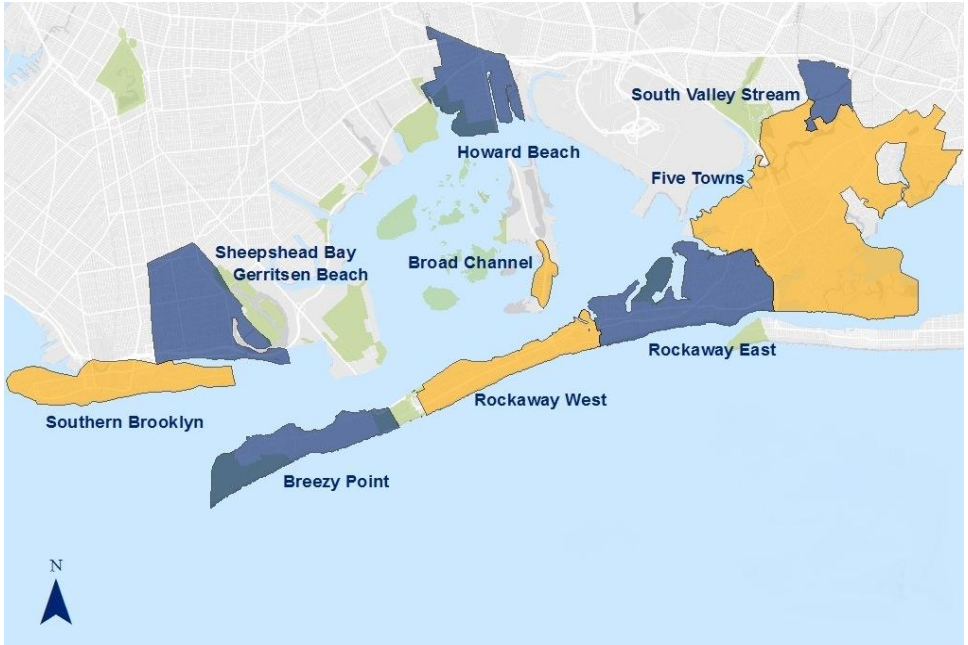


Figure I-6: Jamaica Bay Regional Working Group

The JBRWG is comprised of members from the following NYRCR Committees: Breezy Point/Roxbury, Rockaway West, Rockaway East, Broad Channel, New, Old Howard Beach and Hamilton Beach, Gerritsen Beach and Sheepshead Bay, the Southern Brooklyn Peninsula (which includes Brighton Beach, Coney Island, Manhattan Beach, and Sea Gate), and in Nassau County, the Five Towns (which includes Village of Cedarhurst, Hewlett, Village of Lawrence, Woodmere, Village of Hewlett Neck, Village of Hewlett Harbor, Meadowmere and Inwood), and South Valley Stream.

The JBRWG supports the following USACE and NPS projects, which would further protect communities in and around Jamaica Bay from future storm hazards:

- ***Breezy Point/Roxbury Long-Term Comprehensive Edge Protection*** – This project envisions a system of dunes, berms, marsh restoration, raised roads, floodwalls and baywalls, partially on NPS land, for comprehensive protection of the Breezy Point and Roxbury communities. This would include work at the Cove, as well as the property lines along the cooperative, including Breezy Point Tip.
- ***Breezy Point Comprehensive Flood Protection System*** – This proposed dune system would provide sustainable, natural flood and erosion protection utilizing the area's existing natural features. The plan is comprised of an ocean side double dune system and complementary set of bayside flood and erosion protections that are designed to safeguard the community from future storm events. An application for this project was formally submitted by the State to FEMA on March 20, 2014.
- ***Broad Channel Shoreline Protection*** – A potential project from the Broad Channel NYRCR committee is a "Resiliency Campus," a rebuilding program to enhance the resiliency of several important community centers damaged during Sandy. The NPS property line hugs the campus site, the northwest quadrant of the neighborhood, and interventions here would further protect these community assets.
- ***Edge Protection for Upper Jamaica Bay*** – The JBRWG supports the inclusion of protective measures for communities located in upper Jamaica Bay, including Gerritsen Beach, Sheepshead Bay, and Manhattan Beach, in the USACE East Rockaway Inlet to Rockaway Inlet Reformulation Study. This would include protections for Plumb Beach and the water body of Sheepshead Bay, which were points of entry for storm surge during Superstorm Sandy.
- ***Howard Beach Shoreline Protection*** – The New York State Department of Environmental Conservation (NYS DEC) is currently working toward designing and implementing protective strategies on NPS property in lower Spring Creek. The Howard Beach NYRCR committee has also proposed work on NPS property at Upper Spring Creek, Charles Memorial Park, and Shellbank and Hawtree Basins.
- ***Rockaway East and West Bay and Coastal Protection*** – A system of bay walls, groins, and dunes are being implemented to protect Rockaway West. The JBRWG also supports additional bayside protections including bulkheads and natural solutions at vulnerable locations in Rockaway East, along the western, northern, and

eastern shoreline of Arverne, in Sommerville, and in Bayswater. Additionally, Jacob Riis Park, the westernmost boundary of the Rockaway West Planning Area geographic scope, remains NPS property. The JBRWG supports work at this location, through either dunes along the beachfront or berms within the property, and believes the project would ensure protection of the entire community.

- ***Surge Barrier at Rockaway Inlet*** – The JBRWG supports New York City Special Initiative for Rebuilding and Resiliency's (SIRR) call for the USACE to initiate an expedited study to examine the feasibility of developing a surge barrier and alternative measures at Rockaway Inlet as part of the previously mentioned Rockaway reformulation study.

Lastly, the JBRWG supports the Science and Resiliency Institute at Jamaica Bay, a partnership among academic institutions, government agencies, nongovernmental organizations and community groups dedicated to the promotion and understanding of resilience in Jamaica Bay and its surrounding communities. Institutions taking part include: Columbia University, Rutgers University, SUNY Stonybrook, Stevens Institute of Technology, Cornell University, CUNY, NASA Goddard Institute for Space Studies, the Wildlife Conservation Society, and New York Sea Grant. The Science and Resiliency Institute at Jamaica Bay was created in response to a RFEI (Request for Expression of Interest) put out by the NPS, City of New York, and Trust for Public Land, with grant funding from the Rockefeller Institute.

A Stronger, More Resilient New York (2013)

The City of New York issued this document on June 11, 2013. Then Mayor Michael Bloomberg created the Special Initiative for Rebuilding and Resiliency (SIRR) to identify means to create a more resilient City of New York in the wake of Superstorm Sandy, with a long-term focus on preparing for and protecting against the impacts of climate change. On June 11, 2013, the City released *A Stronger, More Resilient New York*[10] (SIRR Report), which provides the most detailed analysis of all the documents completed to date. It generally describes damage to the Brooklyn area, risks, initiatives, and priorities.

Priorities discussed in the SIRR Report that are relevant for the Gerritsen Beach and Sheepshead Bay Planning Area include:

- Addressing coastal vulnerabilities for residential, commercial, and public properties and civic facilities;
- Providing additional coastal/shoreline protection from wave action, beach erosion, and oceanfront vulnerabilities;
- Adding protection from inundation from backflow that can lead to flooding of inland areas;
- Focusing on infrastructure inadequacy, particularly stormwater drainage, power, and transportation;
- Improving communications during and following emergency situations; and
- Addressing the lagging recovery of housing, social services, and businesses along key commercial corridors.[11]

The plan includes citywide initiatives and discussions, including the following sections: Superstorm Sandy Impact, Climate Analysis, Citywide Infrastructure and the Built Environment including Coastal Protection and Buildings, Economic Recovery (Insurance, Utilities, Liquid Fuels, and Healthcare), Community Preparedness and Response (including Telecommunications, Transportation, and Parks), Environmental Protection and Remediation (including Water and Wastewater, other critical networks), Specific Rebuilding and Resiliency Plans (for Brooklyn and Queens waterfront, east and south shores of Staten Island, South Queens, Southern Brooklyn, and Southern Manhattan), Funding, and Implementation. These initiatives are reflected in the reconstruction strategies and projects for Gerritsen Beach and Sheepshead Bay.

Specific project recommendations within the NYRCR Community include a Neighborhood Retail Recovery Program on key commercial corridors such as Emmons Avenue, Nostrand Avenue, and Gerritsen Avenue; hardening or otherwise modifying shoreline parks to protect adjacent communities, and a recommendation to work with the U.S. Army Corps of Engineers (USACE) to study mitigating flood inundation risks through the Rockaway Inlet.

New York City Regional Economic Development Council 2011 and 2012 Plans and 2013 Project Report

The New York City Regional Economic Development Council (REDC) has a five-borough strategy that encourages partnerships between government, business, labor, academia, and civic organizations as well as inter-regional cooperation aimed at maximizing benefits of economic growth and job creation for the entire State. This report[12] acknowledges the serious blow dealt by Superstorm Sandy to the New York metropolitan area. The NYRCR effort follows a similar process as the REDC in terms of project identification and public engagement.

The REDC priorities for bolstering the local economy, which are germane to Gerritsen Beach and Sheepshead Bay, include:

- The revitalization of the Coney Island waterfront to include 5,000 new housing units, 25 acres of entertainment attractions, more than 25,000 construction jobs, and 6,000 permanent jobs;
- The opening of Steeplechase Plaza, a 2.2-acre public open space that is the western entryway to the revitalized amusement district;
- The new state-of-the-art 44,000-square-foot YMCA; and
- The City's HireNYC Program listed 500 open positions and filled 400 new hires for the summer of 2013 from the surrounding neighborhood.

Sustainable Communities: Climate Resilience Studies – Urban Waterfront Adaptive Strategies (2011)

The Urban Waterfront Adaptive Strategies[13] (UWAS) report, prepared by the New York City Department of City Planning, provides a systematic assessment of the coastal flood hazards from climate change and sea-level rise that face the City of New York. The UWAS lays out a risk-based, flexible process for identifying, evaluating and implementing potential coastal protection strategies. It recognizes that waterfronts vary, and may require a range of strategies at different scales. The report also identifies a range of potential adaptive strategies, and analyzes each for their ability to protect waterfront communities.

The report identifies a range of potential adaptive strategies that are applicable for the Gerritsen Beach and Sheepshead Bay Planning Area such as:

- Interventions inland, at the shoreline, and in the water. Each was analyzed for its ability to protect waterfront communities by reducing flooding from storm surge and high tides or absorbing destructive wave forces.

The Committee considered this information for the development of natural resource projects for flood reduction.

Sustainable Communities: Climate Resilience Studies – Designing for Flood Risk (2013)

Designing for Flood Risk[14] identifies key principles to guide the design of new buildings in flood zones so that construction will be more resilient to the effects of climate change and coastal flood events. Recognizing the distinct character and needs of higher-density urban environments, the report provides recommendations for how regulations and individual project design can incorporate these principles. The study informed the Department of City Planning's Flood Resilience Zoning text amendment adopted by City Council in 2013.

This report identifies key design principles to guide flood-resistant construction in urban areas, which are applicable to the Gerritsen Beach and Sheepshead Bay Planning Area, such as:

- An overview of NFIP regulatory requirements for construction in flood zones;
- The effects of flood-resistant construction standards;
- The creation of a vibrant streetscape and public realm; and
- Recommendations for how zoning can incorporate these principles to enable more versatile and desirable design solutions for flood-resistant construction.

The Committee considered this information for the development of housing and infrastructure projects.

New York City Natural Hazard Mitigation Plan (2009)

The Hazard Mitigation Plan[15] (HMP) provides hazard risk-reduction strategies and projects that are based on risk analyses, and developed through a community-wide planning process. The HMP includes the following elements that were considered during the development of the Gerritsen Beach and Sheepshead Bay NYRCR Plan:

- Natural hazards risk assessment;
- Mitigation strategy;
- Hazard mitigation projects; and
- Potential funding sources for projects.

The Committee reviewed the City Mitigation Plan, specifically the Section IV Mitigation Strategy that includes programs, plans, projects, and policies to decrease or eliminate potential losses from hazards identified in the Risk Assessment section. Overarching mitigation strategies pertain to the Planning Area, but no specific projects were listed for Gerritsen Beach or Sheepshead Bay.

The goals in the HMP coincide with the Community Vision developed for this NYRCR Plan and mention the economy, public safety, and property protection, as well as the need to be prepared and resilient. Many of the objectives in the HMP coincide with strategies and projects in this document.

PlaNYC 2030 (2007) and PlaNYC Full Report (2011)

PlanNYC[16] serves as the mandated blueprint for how future development will occur in the City. The 2007 local comprehensive plan includes initiatives that are relevant for Gerritsen Beach and Sheepshead Bay to support community resiliency through improvements to a range of community resources, including housing, parks and open space, climate change, green buildings, waterfront revitalization, and opportunities for economic development.

The updated 2011 plan includes initiatives and milestones for December 2013.

Vision 2020: New York Comprehensive Waterfront Plan (2011)

The Comprehensive Waterfront Plan[17] (CWP) is an analysis and overall vision for the City of New York's 520 miles of shoreline. It includes a strategic framework for the City's waterfront, short- and long-term strategies, and is used to guide land and water use decisions. Priorities in the plan focus on expanding public access, supporting the working waterfront, improving water quality, restoring the ecology of the waterfront, enhancing the Blue Network (the waterways between the five boroughs), and increasing the resiliency of the City in respect to climate change and sea-level rise.

Plan recommendations relevant to the NYRCR Community are in the sections describing Brooklyn Reach 15, 3.b for Calvert Vaux Park, and Reach 16 for Coney Island to Sheepshead Bay. Reaches refer to specific segments along the shoreline and are described on page 150.

Recommended actions for Gerritsen Beach and Sheepshead Bay include:

Sheepshead Bay:

- Evaluate for possible dredging in consultation with State and Federal partners; and
- Brigham Street Park: explore opportunities for enhanced public access by integrating into adjacent Plumb Beach.

Gerritsen Beach:

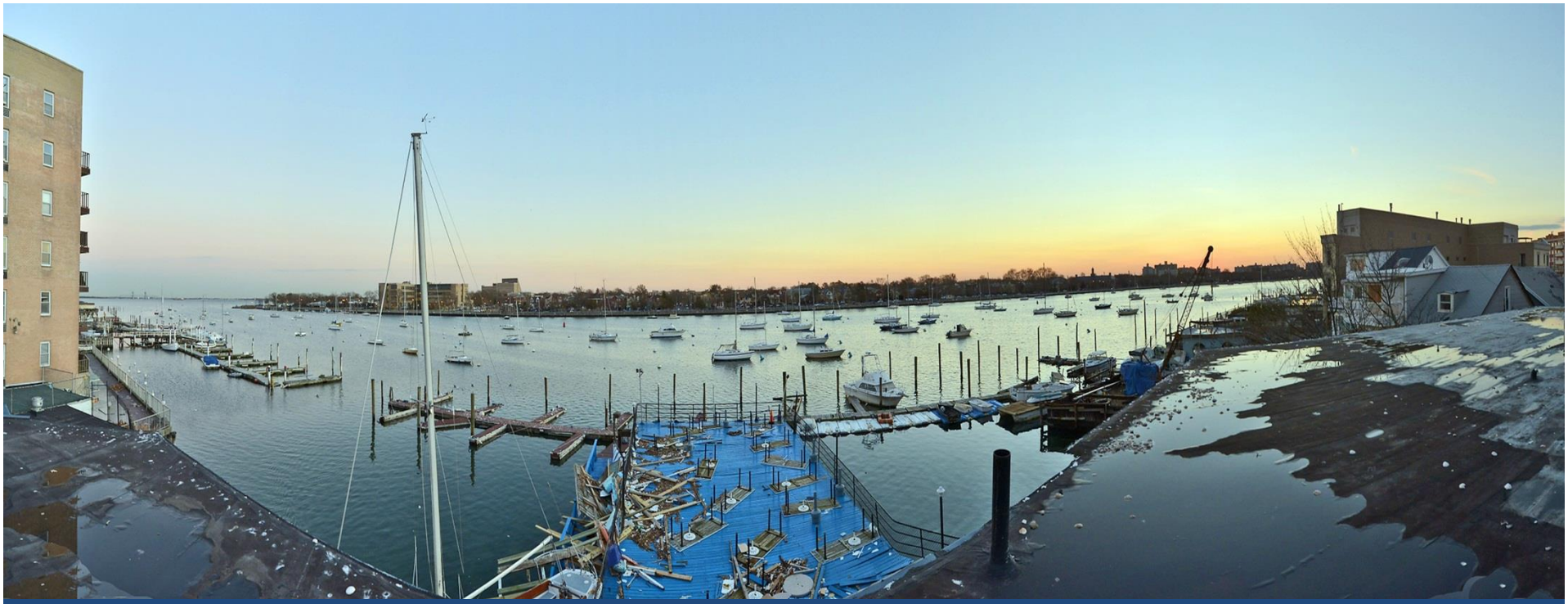
- Explore opportunities for enhancing visual access to waterfront at street ends with provision of public access where feasible.

Plumb Beach:

- Support the National Park Service General Management Plan process for Gateway National Recreation Area;
- In coordination with partners, explore options to mitigate against continuing erosion to promote recreational uses and enhance natural habitat; and
- Rebuild bike paths.

New York City Waterfront Revitalization Program (WRP)

The Waterfront Revitalization Program[18] is the City's principal coastal management tool, and implements the CWP. It establishes the City's policies for development and use of the waterfront, and provides the framework for evaluating the consistency of all discretionary actions in the coastal area. When a Proposed Project is located in the City's designated waterfront area, and it requires a local, state, or federal discretionary action, a determination of the project's consistency with the policies and intent of the WRP must be made before the project can move forward.



Section II: Assessment of Risk and Needs

Section II: Assessment of Risk and Needs

This section identifies community assets in Sheepshead Bay and Gerritsen Beach, and describes the risk assessment process for those assets. Conducting an assessment of risk and needs is an objective means to support decision-making for asset reconstruction and new construction that is more resilient to future storms.

The impact of hazards on assets was assessed by performing a risk analysis using current conditions and future goals and strategies. This process helped the Gerritsen Beach/Sheepshead Bay Planning Committee identify and evaluate methods to mitigate future risks.

A. Description of Community Assets

The Community Asset Inventory highlights the community assets (including critical facilities) that, if impaired as a result of hazard events, would compromise the essential social, economic, and/or environmental functions of the community. These impairments can adversely affect short- and long-term recovery efforts. This risk assessment depicts these two communities' assets, including those damaged by Superstorm Sandy, and their vulnerability to future flood and storm surge hazard events.

Critical facilities are defined as those that are crucial to the health and welfare of the entire population in the Planning Area, and to emergency response and recovery functions following hazard events. Critical facilities include health care facilities, police and fire stations, emergency operations centers, public works facilities, evacuation shelters, schools, daycare centers, and facilities that serve and house special needs populations.

The asset inventory also includes vital infrastructure systems, such as water, wastewater, stormwater systems, electrical systems, and transportation networks.

The NYRCR Planning Committee identified a list of community assets in five of the six Recovery Support Functions (Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources) and mapped their locations, utilizing input from the Committee. The remaining Recovery Support Function, Community Planning and Capacity Building, focuses on local institutional arrangements and community organizations, and thus does not address fixed assets. The Recovery Support Functions are defined below:

Community planning and capacity building: Relates to how the community will restore or enhance its ability to organize, plan, manage, and implement its recovery. This involves community engagement of a wide range of public, private, and non-governmental organization stakeholders.

Economic development: Addresses how the community will restore economic and business activities and develop new economic opportunities, provide goods and services, resume commerce and employment, and generate revenue.

Health and social services: Describes how the community will restore and improve essential health and social services, including those that serve vulnerable populations.

Housing: Relates to meeting the demand for affordable housing (and promotion of affordable housing), addressing post-disaster housing needs, and encouraging disaster-resistant housing for all income groups.

Infrastructure: Details how the community will restore, repair, and manage essential infrastructure services.

Natural and cultural resources: Relates to natural and cultural resource management from a risk reduction and economic development context.

The resulting asset inventory and associated maps were further modified based on public input captured at the first series of public engagement meetings, which were held on October 7 and October 8, 2013.

Asset Inventory Maps are shown for Gerritsen Beach (Figure II-1) and Sheepshead Bay (Figure II-2). These maps show a list of community assets and their corresponding locations.

Gerritsen Beach | Sheepshead Bay

Gerritsen Beach Asset Inventory

Source: NYC Department of City Planning, MapPLUTO

Figure II-1: Gerritsen Beach Asset Inventory

Gerritsen Beach | Sheepshead Bay

Sheepshead Bay Asset Inventory

Source: NYC Department of City Planning, MapPLUTO

Figure II-2: Sheepshead Bay Asset Inventory

The following discussion of community assets is organized by five of the six Recovery Support Functions. The associated asset descriptions include facts about the critical assets as a way to understand their significance in terms of emergency response and community sustainability. Many of the assets listed were either directly impacted by Superstorm Sandy or are susceptible to coastal hazards.

Economic Development

The NYRCR Community's principal commercial corridors include Kings Highway, Emmons Avenue, Nostrand Avenue, Avenue U, Ocean Avenue, and Sheepshead Bay Road in Sheepshead Bay, and Gerritsen Avenue in Gerritsen Beach. Emmons Avenue houses a variety of water-dependent and water-enhanced uses, including boat docking and storage, fishing charter businesses, restaurants, local and chain retail outlets, and three hotels. These uses are supported by the Emmons Avenue esplanade and Sheepshead Bay Footbridge, which attract high volumes of pedestrian activity in warm-weather months. Similar boating and marine uses are also found in Plumb Beach Channel in Gerritsen Beach.

Commercial uses on the other corridors in Sheepshead Bay, and on Gerritsen Avenue in Gerritsen Beach, are non-water dependent, and provide an array of neighborhood retail and service needs, such as groceries, doctor's offices, restaurants, and assorted shops.

While Sheepshead Bay attracts high numbers of visitors from Brooklyn and other parts of the City of New York during summer months, businesses in Gerritsen Beach cater almost exclusively to local residents. The Gerritsen Avenue corridor serves a vital function to neighborhood residents as the only local source of goods and services, including groceries, pharmaceuticals, and restaurants.

Health and Social Services

Within Sheepshead Bay are six senior centers, five residential health care facilities, five residential adult care facilities, and three community residences for people with developmental disabilities. There are no similar facilities within Gerritsen Beach.

The five public elementary schools in the Planning Area include one in Gerritsen Beach, which serves 459 pupils, and four in Sheepshead Bay, which serve a total of 2,676 students. One intermediate school in Sheepshead Bay has 1,365 students, and a junior high school in that community has 560 students. Sheepshead Bay High School (SBHS), the large public high school in the Planning Area, serves 1,168 students. Four other specialized high schools are co-located on the SBHS campus, including two charter schools, which serve much smaller populations.[19]

The Planning Area is also home to the 61st Police Precinct, headquartered in Sheepshead Bay, and five fire stations, including the Gerrittsen Beach Fire Department (spelled with two "t"s in reference to the neighborhood's historical spelling), the last remaining volunteer fire company in Brooklyn.

Housing

The occupied housing units in the Planning Area include a variety of building types, ranging from high-rise apartment towers to detached, one- to three-family structures. As described above, over 90% of the housing stock in the Community was built before 1960. The City of New York implemented a modern building code in 1968 and made additional enhancements to these regulations to improve flood resiliency in 1983. Therefore, most housing units in the Community predate modern building codes. In Gerritsen Beach, detached single-family structures on relatively small, narrow lots predominate. In 2012, there were a total of 54,009 housing units in the Community, with 92% occupied and 8% vacant.[20] This vacancy rate is comparable to the overall City of New York vacancy rate of 7.8%.[21] Of the total housing units, 46% were owner-occupied and 54% were rental units. Housing units were primarily in multiple dwellings with 20 or more units (42%), one-family attached or detached homes (26%) and two-family homes (20%). Sheepshead Bay's two public housing developments encompass 34 medium-rise buildings and 2,199 apartments.[22]

Infrastructure

The Gerritsen Beach and Sheepshead Bay Planning Area is served by numerous local bus lines, including two that access Manhattan directly via the Hugh L. Carey Tunnel (formally Brooklyn-Battery Tunnel). Two subway lines, including the B, which runs express to Manhattan during the week,

serve four elevated subway stations, all of which are located in Sheepshead Bay.[23] The busiest subway station in the Planning Area, Kings Highway, served nearly 5.5 million riders in 2012. The limited access highway at the northern end of the Planning Area, the Belt Parkway, carries approximately 140,000 private vehicles per day.[24]

Natural and Cultural Resources

The Planning Area was historically characterized by marshlands and wetlands. Intensive, urban-scale development has replaced or significantly degraded many of these assets. Natural and cultural features such as Plumb Beach, in Sheepshead Bay, which is part of the Jamaica Bay National Wildlife Refuge, and Marine Park adjacent to Gerritsen Beach, serve important mitigation and water attenuation functions. These features are supplemented by a variety of structural features within the Planning Area, including jetties, sea walls, and bulkheads. The quality and condition of these features is highly variable. The City is working to make improvements to the area's parklands and to increase access for public recreation. In addition, the City is working cooperatively with various federal entities to effect improvements to Jamaica Bay that would increase the area's resiliency to flooding, storm surge, and erosion.

The Planning Area has four branch libraries, with three located in Sheepshead Bay. The Gerritsen Beach Library was closed for several months due to damage caused by Superstorm Sandy, and has since been completely repaired.

B. Assessment of Risk to Assets

The New York State Department of State (NYS DOS) risk areas defined in Table II-1 were used to identify the location of community assets in flood and storm surge inundation areas. The Risk Assessment Map (Figure II-3) shows that most of Gerritsen Beach and the southern (coastal) part of Sheepshead Bay are located in a high-risk flooding area. Portions of the coastline of both neighborhoods are located in the extreme-risk flooding area. Most of the high and extreme risk areas are vulnerable to storm surge and backwater inundation.

A risk assessment was conducted to determine the potential impact of hazards on community assets. This assessment helped the community choose mitigation options to reduce future risk. The NYRCR Planning Committee selected proposed strategies, such as infrastructure improvements and changes in the building environment. Many of these general strategies were refined into project ideas, which were then subjected to a cost-benefit analysis.

Throughout the planning process, input from the NYRCR Planning Committee and the general public on areas with the highest risk of flooding was used to clarify and add information regarding at-risk areas along with the NYS DOS Risk Assessment Map.

Risk assessment methods

The Risk Assessment Tool developed by NYS DOS was used to quantify and evaluate risk to vulnerable assets within Gerritsen Beach and Sheepshead Bay. A detailed description of the methods used within the tool is provided in the NYS DOS report, *Guidance for Community Reconstruction Zone Plans*. The Risk Assessment Tool is available at:

http://nysandyhelp.ny.gov/community-reconstruction-zones.

The three factors used to assess risk were hazards, exposure, and vulnerability.

Hazards included flood and storm surge. Hazard scores were calculated by evaluating risk from a range of storm events, from frequent, low-intensity events to infrequent, high-intensity events. Assets located within an extreme-risk area experience hazards more frequently and with greater impact than those located in a high- or moderate-risk area.

Exposure refers to the location of the asset. Exposure scores were calculated as an expression of local topography (land elevation) and proximity to a flood source (near the shoreline or in a floodplain) that tend to increase or decrease the effect of coastal hazards on assets. Exposed assets at lower elevations suffer storm effects to a greater degree than less-exposed assets located at higher elevations.

Additionally, a series of landscape attributes was used to calculate a total landscape attribute score, which includes the following characteristics of the landscape for each asset:

- Erosion rate ≥1 foot per year or unknown;
- Waterline frequently at shore defense or upland vegetation;
- Shore defenses absent, not constructed to anticipated conditions, or deteriorating;
- Protective vegetation between asset and flood source absent;
- Dunes absent, below base flood elevation (BFE), eroding, little vegetation; bluff slope unstable, little vegetation; and
- Asset on coastal barrier island or filled wetland.

Vulnerability pertains to the capacity of an asset to be operational after a storm. Vulnerability scores are based on the durability of the structure as well as the ability to provide service (as a condition of having electric, water, and communications capabilities) from that structure. Assets that can quickly recover have a low vulnerability score.

The Risk Assessment Tool calculates a Risk Score using the formula:

Hazard x Exposure x Vulnerability = Risk

The tool generated a Risk Score that represents the relative risk of community assets to one another. The possible scores range from 1.5 (negligible) to 75 (severe).

The community contains a large number of assets, many of which share functional commonalities that put them into the same risk categories. Housing and systems assets such as stormwater and electrical were grouped together to simplify the assessment process. Risk scores for individual assets are presented in Section V.D.

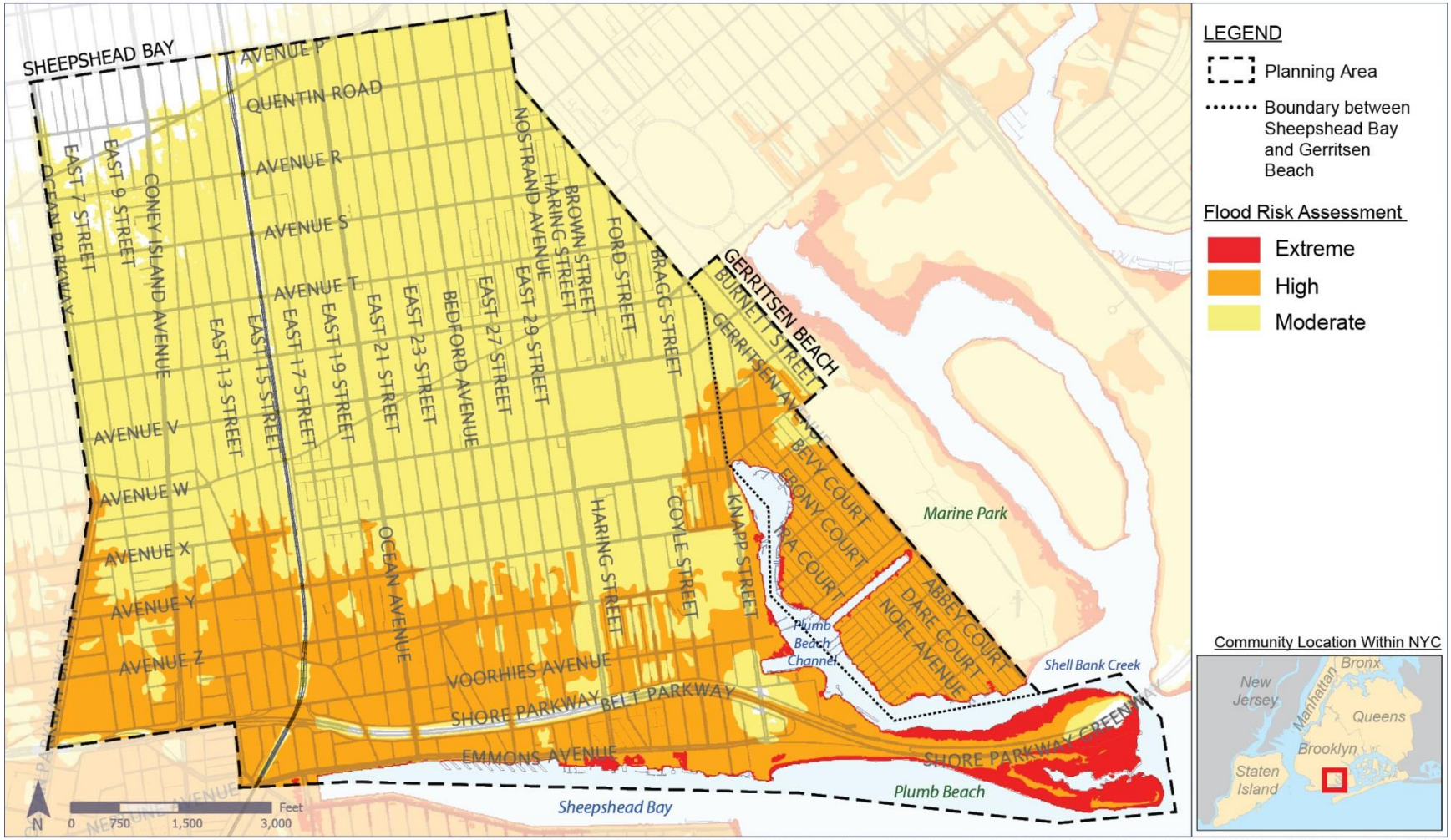
Table II-1: New York State Department of State Risk Areas

Extreme Risk Area	High Risk Area	Moderate Risk Area
Federal Emergency Management Agency (FEMA) Coastal V Zones	FEMA 1% (100-year) annual flood risk (FEMA Zone V and Zone A)	FEMA 0.2% (500-year) annual flood risk
National Weather Service (NWS) advisory thresholds for shallow coastal flooding	Areas within 3 feet of elevation of NWS advisory thresholds for shallow coastal flooding	Areas within 3 feet of elevation of FEMA 1% annual flood risk (base flood elevations)
Areas within 3 feet of elevation of mean higher high-water shoreline as defined by the National Oceanic and Atmospheric Administration (NOAA)		Area bounded by National Hurricane Center's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Category 3 hurricane storm surge inundation zone
Areas prone to erosion		

Source: New York State Department of State

Gerritsen Beach | Sheepshead Bay

Gerritsen Beach and Sheepshead Bay Flood Risk Assessment Areas



Source: Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Coastal Services Center (CSC)

Figure II-3: Gerritsen Beach and Sheepshead Bay Flood Risk Assessment Areas

Risk Assessment Results

An initial risk assessment was completed for the at-risk assets identified during the asset inventory (Figures II-1 and II-2) for Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources Assets. Using the Risk Assessment Tool, risk scores were calculated for each of the assets. The assessed risk for certain assets such as the Sheepshead Nursing and Rehabilitation Center, the 61st Police Precinct building, and Homecrest Library is moderate, while that of others such as the Brooklyn Yacht Club, the Tamaqua Bar and Marina, and the Fishing Charters is very high. The disparity between these levels of risk is largely the result of the facilities' different outage times and their physical locations. Assets with lower risk scores are located outside the Superstorm Sandy surge inundation areas. Assets with higher risk scores tend to be facilities located along the coastline, and water-dependent uses (such as the marinas) have some of the highest risk levels. The details of the risk assessments and resulting overall risk scores are presented in Section V.D.

Figure II-4 maps the locations of the Economic Development assets in both Gerritsen Beach and Sheepshead Bay, with the underlying mapping of the risk areas (moderate, high, and extreme). This figure shows the locations of the major commercial corridors in both communities. The numbers of the locations on the map correspond with the numbers in Section V.

Figure II-5 maps the locations of the Economic Development, Health and Social Services, Housing, and Natural and Cultural Resources Assets in Gerritsen Beach, with symbols to identify the assets with the highest risk scores.

Figure II-6 maps the locations of the Economic Development, Health and Social Services, Housing, Natural and Cultural Resources Assets in Sheepshead Bay, with symbols to identify the assets with the highest risk scores.

Building foundation undermined by flooding during Superstorm Sandy, Gerritsen Beach
Source: URS

Gerritsen Beach | Sheepshead Bay

Flood Risk Assessment Map of Economic Development Assets in Gerritsen Beach and Sheepshead Bay

Source: NYC Department of City Planning, MapPLUTO

Figure II-4: Risk Assessment Map of Economic Development Assets in Gerritsen Beach and Sheepshead Bay

Gerritsen Beach | Sheepshead Bay

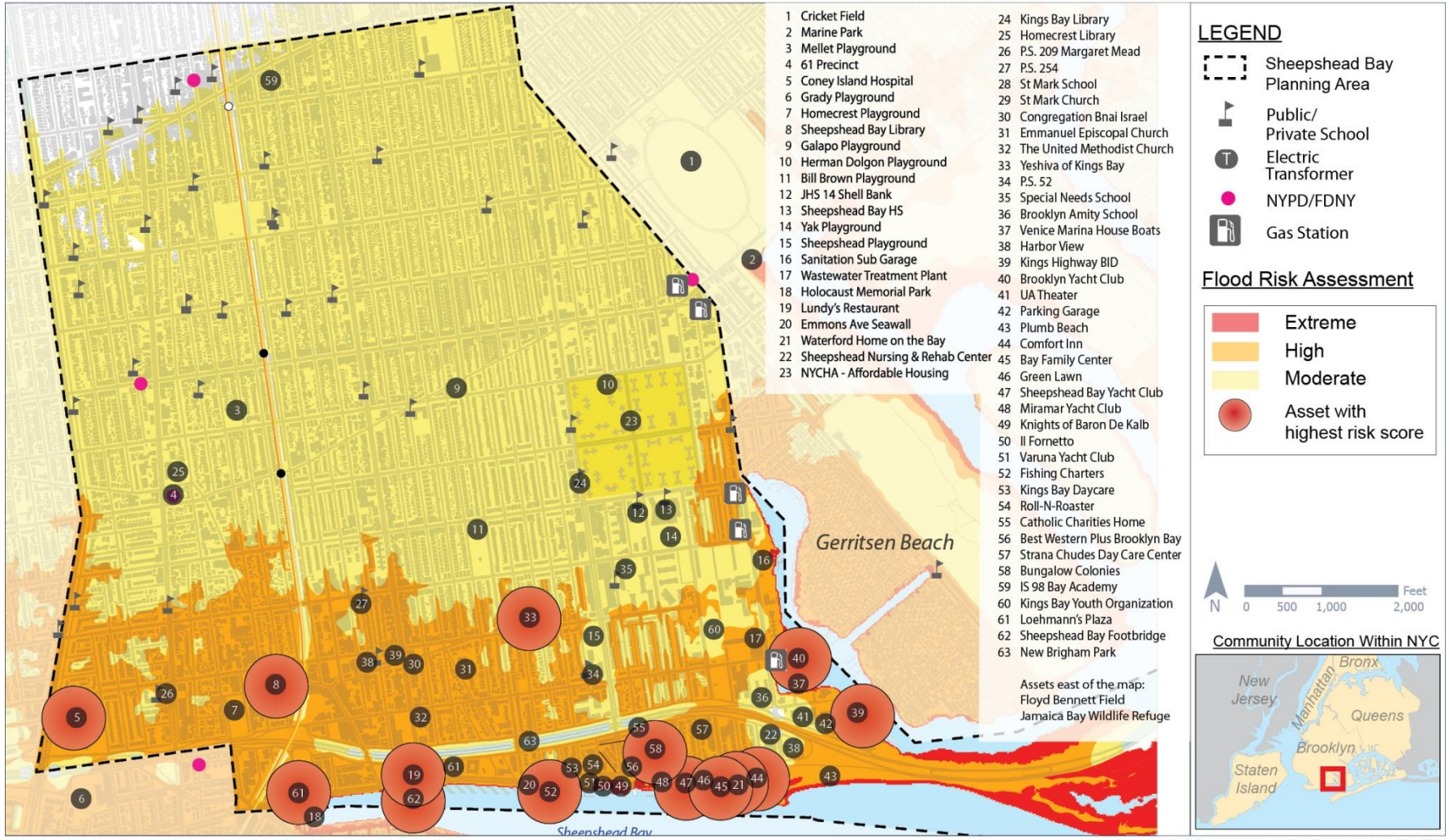
Flood Risk Assessment Map of Gerritsen Beach Assets

Source: NYC Department of City Planning, MapPLUTO

Figure II-5: Risk Assessment Map of Gerritsen Beach Assets

Gerritsen Beach | Sheepshead Bay

Flood Risk Assessment Map of Sheepshead Bay Assets



Source: NYC Department of City Planning, MapPLUTO

Figure II-6: Risk Assessment Map of Sheepshead Bay Assets

Assessment of Risk to Systems

This assessment of risk to systems highlights the initial risk assessment results for system asset groups (infrastructure, public services, etc.) that do not lend themselves to assessment as individual point assets. The risk assessment methods and risk assessment results described in the previous subsection were utilized to determine the risk score of systems. The systems analyzed included stormwater management, power, and communications. These fell into moderate-risk (stormwater management) and high-risk categories (power and communications).

The higher risk scores associated with power and communication systems assets are generally reflective of longer outage duration and greater service interruption for that system. Generally, though, because infrastructure systems are administered at a citywide or regional level, performance tends to be similar among adjacent neighborhoods. In general, the scores reflect that power, stormwater, and communications systems had considerable interruptions because of Superstorm Sandy.

C. Assessment of Needs and Opportunities

The Planning Committee and the public identified the reconstruction and capacity-building needs and opportunities to address resilience and mitigation issues through various Planning Committee Meetings and Public Engagement Events, using a consensus-driven approach.

The following needs and opportunities, organized by the six Recovery Support Functions, will be implemented using the strategies, projects, programs, and actions described in Section III.

Community Planning and Capacity Building

Needs

As noted previously, the NYRCR Gerritsen Beach/Sheepshead Bay Planning Area contains high concentrations of socially vulnerable populations who may not able to access and use traditional resources offered in emergency planning, response, and recovery. Special consideration is necessary to ensure needs of vulnearable populations are adequately met during and after emergencies.

In the case of individuals with limited English proficiency, many reported not receiving or understanding evacuation instructions, and thus interpreters may be needed. Similarly, the challenges faced in the evacuation of nursing, elder-care, and assisted-living facilities points to the need to ensure that evacuation protocols and methods are tailored to accommodate individuals with limited mobility, and for greater advanced planning at the neighborhood level.

A variety of civic groups and other non-governmental organizations provide vital services to many socially vulnerable individuals in the Community. These organizations include assisted-living facilities, nursing and elder-care facilities, religious institutions providing social services like hot meals, and local chapters of national and international fraternal and social organizations. Gerritsen Beach is also home to Brooklyn's only remaining volunteer fire department. The Gerrittsen Beach Fire Department's emergency response capabilities are a vital complement to the municipal emergency response infrastructure.

Even modest power and other utility outage times at these facilities compromised their ability to provide vital services and communicate important information to residents and constituents in the weeks after the storm. Moreover, many local service providers and non-profits are neighborhood-focused organizations that lacked significant resources or connections to a broader network of service providers. Although these providers are an essential component of the everyday social fabric, most local non-profits were stretched beyond capacity by the extraordinary events of Superstorm Sandy. Because these organizations traditionally focused on local constituencies, many had limited experience in collaborating across neighborhood lines and other boundaries.

The Brooklyn Community District 15 Community Emergency Response Team (CERT) is active, but its membership could be expanded. Under the guidance of the New York City Office of Emergency Management (NYC OEM), the District 15 team could undertake additional targeted outreach to grow the ranks of the team to ensure that it reflects the diversity and character of both communities. Committee members from both Sheepshead Bay and Gerritsen Beach have consistently expressed interest in developing neighborhood-level emergency response teams and capabilities to supplement CERT and City-wide emergency response plans. The Committee consistently identified storm surge and flooding mitigation as key priorities

and primary concerns. Although many potential solutions to these problems are infrastructural in nature, the Committee identified a need to increase general preparedness by developing community-based emergency response strategies.

NYC OEM has been conducting evacuation planning on a city-wide basis, incorporating lessons learned from Superstorm Sandy. Additional evacuation planning at a neighborhood level would augment these efforts, and is a useful method to evaluate specific evacuation needs and challenges within the NYRCR Community. Gerritsen Beach, which was not included in the City of New York's original evacuation order during Superstorm Sandy, is connected to the rest of Brooklyn by one main road; when the storm surge hit the neighborhood, residents were effectively trapped in place after Gerritsen Avenue was overtopped by floodwaters. Compounding the need for enhanced evacuation planning, many Community residents either do not have access to cars or rely on public transportation as their primary means of transportation.

Residents who sheltered in place or who returned to their home after the storm often encountered sustained cell phone or Internet outages. The lack of reliability of the local communications network was not only inconvenient, but potentially dangerous in the days immediately after Superstorm Sandy. As the City and other entities tried to communicate vital information to Community residents, many individuals were unable to access these communications. Because so many residents were unable to return to their homes immediately after the storm, and because so many residents reported difficulty accessing useful information about recovery activities for Superstorm Sandy, the Committee identified a need for community relief and gathering centers. The Committee identified this issue at its first meeting in September 2013 and continued to explore ways to develop and refine potential project ideas related to this need for the duration of the planning process.

Opportunities

The following opportunities were identified for community planning and capacity building:

- The Committee identified sites in the Community that could potentially serve as community relief and gathering centers. Many of these sites have the advantage of being located outside the floodplain or being affiliated with an existing community service provider.
- Many local community facilities and key assets appear to have the building space and other necessary resources to permit the installation of building-scale backup generators in case of sustained power outages.
- Sheepshead Bay has direct highway access, and both Gerritsen Beach and Sheepshead Bay have primary thoroughfares that are major borough surface roads. These factors should facilitate evacuation planning.
- Barring extraordinary unforeseen circumstances, both Vollies Memorial Hall and the Gerrittsen Beach Fire Department should be able to accommodate structural upgrades that would improve the resiliency of those buildings.
- Community interest in participating in localized emergency preparedness and response planning is high. Many Community members have specific local knowledge that could be incorporated into municipal and non-profit planning for the needs of socially vulnerable populations.

Economic Development

Needs

Community Risk Assessment Maps show that nearly all of Gerritsen Beach and approximately one-third of Sheepshead Bay are at extreme or high risk for flooding (see Figure II-4, Risk Assessment Map of Economic Development Assets in Gerritsen Beach and Sheepshead Bay).

Not surprisingly, local businesses suffered severe impacts in connection with Superstorm Sandy. Businesses that were not directly affected by the storm surge or backwater flooding still had to contend with power outages, intermittent heat and hot water service, and limited access to retail delivery. Six months after the storm, the *Brooklyn Eagle* reported that 85% of businesses on Emmons Avenue had sustained some level of damage and that at least 40% of the businesses in the broader neighborhood had yet to

reopen. Similar damages were observed along Gerritsen Avenue, Gerritsen Beach's commercial thoroughfare.

Analyses by the City, FEMA, and the Brooklyn Chamber of Commerce suggest that the goal of business resilience is undercut by a lack of coordination among area merchants on key commercial corridors. Prospects for merchant organization are complicated by the diverse language backgrounds and English-proficiency levels of many area property owners and merchants. In this context, it is understandable that many business owners reported relatively limited understanding of disaster-funding sources or business resiliency strategies, even several months after Superstorm Sandy.

However, even with improved business continuity planning, local enterprises will remain vulnerable to physical risk. With so much of the Community susceptible to storm surge, backwater inundation, or both, improved building practices and technologies are needed to limit the damages associated with flooding.

Retail activity often benefits from an attractive physical environment. Although recent years have seen increased municipal focus on street tree planting and streetscape design in Southern Brooklyn, Superstorm Sandy reversed some of this progress by killing or damaging trees and plantings on many streets, including along major commercial corridors.

Opportunities

The following opportunities were identified for economic development:

- Sheepshead Bay offers an attractive mix of commercial and recreational activities that are accessible to major public transportation lines and the local highway network.
- Both the Gerritsen Beach and Sheepshead Bay neighborhoods have extensive waterfront access that has allowed for the development of water-related uses, including recreational use and access opportunities.
- The City of New York, the Brooklyn Chamber of Commerce, and non-profit groups like Empower Sheepshead are already exploring means of promoting merchant organization and coordination on Emmons Avenue and Sheepshead Bay Road.
- Key businesses such as pharmacy service, retail food providers, and office uses on Gerritsen Avenue likely have the physical-plant capacity required to elevate mechanicals and implement floodproofing measures.

Housing

Needs

As noted previously, over 90% of the housing stock in the Community was built before 1960 and thus predates the City of New York's modern building code, implemented in 1968. Unsurprisingly, an analysis by the Furman Center found that housing damages from Superstorm Sandy were more severe for buildings constructed before the introduction of modern building codes. The SIRR Report indicated that although buildings constructed after 1961 constituted 28% of the building stock in the Superstorm Sandy inundation area, these newer buildings represented only 5% of the total number of buildings assigned red tags by the City.

In addition to building age, the housing stock in both neighborhoods in the Community faces considerable exposure to flood risk due to its proximity to the waterfront and low ground elevation. Large sections of Sheepshead Bay, and almost the entirety of Gerritsen Beach, are located within FEMA's A (1% annual chance flood flood zone) or VE-zone (1% annual chance flood zone, with potential for wave damage). Over 43% of Sheepshead Bay's housing units are in areas impacted by storm surge during Superstorm Sandy, and over 50% were impacted in Gerritsen Beach.

Housing affordability is another topic that was frequently mentioned during the planning process. This concern is particularly acute in the context of flood insurance rates. Despite the recently-enacted Homeowner Flood Insurance Affordability Act of 2014, which will provide relief to some ratepayers facing steep premium increases, there is signifigant uncertainty surrounding flood insurance rates, especially in the longer-term. Nearly 50% of homeowners in the Community have mortgage costs that exceed the accepted U.S. Department of Housing and Urban Development (HUD) definition of housing affordability. Owners who must dedicate large portions of their incomes to basic housing costs tend not to have funds available for repairs and upgrades that can improve the basic conditions and resiliency of their homes. Dozens of attendees at meetings expressed particular concern

that with flood insurance premiums set to rise in the future, the cost of basic repairs or floodproofing would force them from their homes.

The damages that Superstorm Sandy created continue to impact residents, homeowners, and renters, especially those in vulnerable populations, including low- and moderate-income families, seniors, and the disabled. Committee members and public meeting attendees stated that the slow pace of housing recovery underlined the need for greater homeowner education to increase resiliency after future storm events. Indeed, at the first and second Public Engagement Events, both held over a year after the storm, many attendees expressed a lack of awareness of funding and technical assistance programs relevant to their needs. The Committee has identified the need for a homeowner education campaign to better communicate necessary information on rebuilding programs and assistance, regulations, and methods. This campaign could complement existing efforts by the City of New York, such as Build it Back, and the Resilient Neighborhoods Program organized by the Department of City Planning.

Opportunities

The following opportunities were identified for housing:

- The Committee stated unequivocally that the majority of local residents intend to remain in the Community, particularly if they are able to access necessary funding and technical assistance.
- Homeowners appear to be receptive to building elevation or other floodproofing techniques if they have the financial means to implement them. Committee members reported that some residents of Gerritsen Beach and the Sheepshead Bay bungalow courts have already raised their homes above the base flood elevation.
- The City and the State have introduced a variety of housing assistance programs for which many Community residents are eligible.
- A large number of non-profit and social-service organizations have developed educational and assistance programs to meet the needs of homeowners, both locally, citywide, and regionally.

Health and Social Services

Needs

Many of the nursing homes, assisted-living facilities, and elder-care facilities in the Community still need to elevate their mechanical systems. The Committee reported that Waterford by the Bay, which has elevated its mechanicals, is a relative exception in this regard.

Opportunities

The following opportunities were identified for health and social services:

- As discussed in the "Community Planning and Capacity Building" section, the emergency response capacities of the Community's CERT could be expanded to assist in the evacuation of seniors and people with mobility impairments.
- The elevation of mechanicals at Waterford by the Bay provides a useful case study for operators and owners of other similar facilities in the Community.

Infrastructure

Needs

Superstorm Sandy caused significant damage to many of the Community's infrastructure assets and systems. Given the intensity of the storm surge associated with Superstorm Sandy, Committee members have consistently expressed strong interest in pursuing solutions that would mitigate future flood risk.

Moreover, the Community faces severe risk not just from direct storm surge but from backflow inundation. During Superstorm Sandy, floodwaters entered stormwater outfalls and flooded back through the stormwater system. This led to flooding of interior areas of the Community before the storm surge occurred. Where stormwater and sanitary sewer lines are combined (known as combined sewer overflows, or CSO), floodwaters caused sewage to back up into the system and overflow through connection valves into homes, businesses, and community facilities. This led to high levels of building damage and potential human exposure to toxic materials. Both Gerritsen Beach and Sheepshead Bay remain highly vulnerable to this

type of inundation in future storm events, including storms less severe than Superstorm Sandy. Throughout the planning process, the Committee and attendees at public meetings strongly expressed the need to upgrade stormwater and wastewater conveyance systems to handle current flow volumes.

Roadway improvements are needed in both Gerritsen Beach and Sheepshead Bay. The Belt Parkway, along the north shore of Jamaica Bay and east of Knapp Street, has been threatened by erosion for decades. During Superstorm Sandy, the storm surge flowed over Plumb Beach and increased flooding in Gerritsen Beach.

Opportunities

The following opportunities were identified for infrastructure:

- Relatively inexpensive, cost-effective methods of backflow prevention exist, and have been employed successfully in the City of New York.
- USACE has completed construction of a project to protect Plumb Beach along the Belt Parkway through the construction of stone groins and a breakwater, and sand placement. These measures may help mitigate flooding from storm surge and will reduce risk to the roadway and buried utilities.
- The NYC Department of City Planning has expressed interest in identifying planning solutions for the Sheepshead Bay courts. At the same time, the Pratt Center for Community Development is collaborating with a private architecture studio to develop conceptual plans to improve the resiliency of the courts.
- The Gerritsen Beach/Sheepshead Bay Planning Committee and the NYRCR Brighton Beach, Coney Island, Manhattan Beach, Sea Gate Planning Committee have identified storm surge reduction as a top priority. To ensure consistency of approach and to address the problem on a regional level, the two NYRCR Committees have included in their final list of Proposed Projects a reconnaissance study to evaluate methods for flood risk reduction in Manhattan Beach, Sheepshead Bay, and Gerritsen Beach. Both Committees would share the cost of the study.
- Although Sandy caused extensive damage to the local street network in Gerritsen Beach, there are cost-effective means available to repair the most affected street segments.

Natural and Cultural Resources

Needs

The Committee identified that Plumb Beach Park is an underutilized and under-maintained natural and recreational asset. The Committee feels that jurisdictional responsibilities related to Plumb Beach must be clarified, and that current confusion is leading to unsafe conditions that limit public use of the asset.

More generally, attendees at Public Engagement Events reported that some areas of the Community were relatively underserved by formal open space and parkland areas.

Opportunities

The following opportunities were identified for natural and cultural resources:

- The City of New York has committed to work with State and Federal partners to restore city beaches, including Plumb Beach. The SIRR Report specifically identifies Plumb Beach as a location where the city intends to improve and restore recreational infrastructure.
- The City of New York has approved plans to construct a park at the foot of Brigham Street in Sheepshead Bay, and funds have been allocated for construction. The park will include a direct connection to the greenway leading to Plumb Beach, and will encourage water-enhanced public recreational use and access opportunities.

Section III: Reconstruction and Resiliency Strategies

Section III: Reconstruction and Resiliency Strategies

The Committee developed reconstruction and resiliency strategies described in this section by reflecting on the impact of Superstorm Sandy, their direct experience as Community residents, insights gained through the visioning process, and the needs and opportunities and the risk assessment processes. These strategies were used as a framework for developing specific projects. The strategies represent the Committee's general recommendations for achieving rebuilding, resilience, and economic growth.

Taking existing local, State, and regional plans into consideration, the Committee discussed strategies in terms of the anticipated benefits to the community, as well as their potential to develop into projects that meet the critical community needs as a result of Superstorm Sandy. This section lists all reconstruction and resiliency strategies and, where applicable, introduces resulting Proposed and Featured Project concepts in general terms. The following is a brief summary of the needs that inspired these strategies.

Given the magnitude of the storm surge and flooding associated with Sandy, it was inevitable that coastal communities such as Gerritsen Beach and Sheepshead Bay would experience a significant level of damage. The Committee recognized that the failure or underperformance of key infrastructure systems exacerbated damage. The impacts of direct storm surge were made more severe, for instance, because water and wastewater systems backed up and overflowed. Similarly, the effects of prolonged, geographically extensive power outages were compounded by a lack of redundancy and power generation capacity at the local and building-specific levels. The Committee was particularly determined to generate strategies that specifically addressed the needs of socially vulnerable populations.

A great deal of the housing within the Planning Area suffered tremendous damage during Superstorm Sandy. A variety of residential building typologies are located in high- and extreme-risk areas of Gerritsen Beach and Sheepshead Bay, ranging from single-family homes to high-rise apartment co-ops, supportive housing and assisted living facilities on or near the waterfront. As the Committee devised strategies to mitigate housing damage by improving infrastructure systems, it also developed strategies to protect individual homes, homeowners and tenants.

The Committee also recognized that a disaster of Sandy's scale pointed to a need for improved community-based planning. While structural solutions are required to safeguard the Community's physical assets, community organization and capacity-building strategies are needed to utilize these assets and enable outside responders to provide assistance. While drawing on the challenges experienced during and after Sandy, the Committee worked collectively to generate a range of strategies to improve planning and build the capacity of local organizations, including community groups, nonprofits, and Community Emergency Response Teams (CERT). Many of these planning strategies were designed in response to urgent health and social service needs. For a variety of reasons, Gerritsen Beach and Sheepshead Bay have different levels of local emergency response capability. The Gerritsen Beach neighborhood is home to a well-trained and equipped local volunteer fire department, the only remaining volunteer fire department in Brooklyn, which was able to coordinate response activities after Superstorm Sandy. With this model in mind, the desire to enhance response capabilities in Sheepshead Bay was a constant theme throughout the planning process, serving as the basis for several strategies and associated projects.

The Committee also recognizes that the Community's long-term sustainability is predicated on economic well-being. Numerous Community residents rely directly on local businesses and commercial corridors for employment. Residents may rely on nearby businesses as a source of necessary household goods. With this in mind, the Committee developed strategies to protect and strengthen economic assets in Gerritsen Beach and Sheepshead Bay.

A. Reconstruction and Resiliency Strategies

Stemming from the aforementioned needs and opportunities, the following section lists and describes the specific strategies designed to enhance the Community's ability to organize, plan, manage, and implement recovery

measures. Highlighted below each strategy description are Proposed or Featured Projects created to address each strategy developed by the Committee.

The strategies provide a framework for the key Proposed Projects to be funded under the NYRCR Plan, as well as the Featured Projects and Additional Resiliency Recommendations for which the Plan advocates:

- Proposed Projects are proposed for funding through a community's allocation of Community Development Block Grant – Disaster Recovery (CDBG-DR) funding.
- Featured Projects are innovative projects for which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding, and regulatory reforms and other programs that do not involve capital expenditures.
- Additional Resiliency Recommendations are resiliency projects and actions the Planning Committee would like to highlight that are not categorized as Proposed or Featured Projects.

Metrics such as cost, time frame, and technical feasibility were considered during the development of projects. The estimated costs in the following tables are projections of projects' capital costs and industry-accepted unit costs using information currently available. Costs are likely to change during the implementation phase as projects are further developed and additional information gathered.

Strategy: Identify methods to reduce future flood risk and damage

The Committee agreed unanimously that identifying methods to reduce future flooding was a critical need, and worked to develop a strategy that would address the primary source of property damage to the community. The resulting strategy statement is sufficiently broad to encompass a variety of potential project types that could include building and refurbishing dunes, creating or enhancing wetlands, strengthening or constructing bulkheads, constructing flood walls and levees, installing breakwaters or jetties, or constructing flood gates. Prior to the first Committee meeting in September 2013, Committee members conducted a walking tour of both neighborhoods. The tour of Sheepshead Bay included stops at several of the bungalow courts located below street-grade on either side of Emmons Avenue. There are over 200 homes in the courts, and all suffered extensive damage due to flooding. South of the Belt Parkway, over 900 additional housing units in Sheepshead Bay sustained damage, recorded as far north as Avenue V in the neighborhood. The Committee then visited Gerritsen Beach and saw the widespread effects of flooding during Superstorm Sandy, with as many as 30% of homes still unrepaired and unoccupied almost a year after the storm. Floodwaters entered the neighborhoods through Gerritsen Inlet into Plumb Beach Channel and Shell Bank Creek, over low-lying sections of Plumb Beach and the Belt Parkway, and through backflow flooding of stormwater and sewer outfalls. South of Channel Avenue, over 86% of housing units recorded some level of damage.

USACE Plumb Beach Coastal Storm Risk Reduction Project *Source: https://www.flickr.com/photos/newyorkdistrict-usace/9719805236/*

Strategy: Identify methods to reduce future flood risk and damage				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Reconnaissance Study for Storm Surge Reduction and Flood Barrier Systems	This project would evaluate a range of options for reducing storm surge and flooding in Gerritsen Beach, Sheepshead Bay, and the adjoining neighborhood of Manhattan Beach.	$100,000	Proposed	Y

Strategy: Identify methods to mitigate chronic sewer-related damage

While the Community was being inundated with floodwaters, these waters were also entering the stormwater outfall and sanitary sewer systems. This volume of water entering these systems led to widespread backflow flooding, in which the floodwaters mixed with sewage rushed up through the tunnel system and into homes, businesses, and community facilities. This situation affected the majority of buildings in the flooded areas, and resulted in untreated sewage and floodwaters in the basements and first floor levels of many buildings. Committee members, and members of the public, identified the need to prevent such an occurrence during future flood events, understanding that regional-scale flood reduction measures such as tide gates and sea walls require years to plan and build, and do not eliminate the possibility of risk. The Committee thus developed a strategy and associated projects to address this critical need that would be achievable through small-scale retrofits of buildings, stormwater and sewer outfalls, and other drainage infrastructure such as catch basins.

Sewage backflow inside a Lake Avenue bungalow
Source: Melissa Haggerty

Strategy: Identify methods to mitigate chronic sewer-related damage				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Installation of Backflow Prevention Measures on City Infrastructure	This project would install valves or similar flap gates at appropriate stormwater outfall locations throughout Gerritsen Beach and Sheepshead Bay. The project would also modify catch basins to maximize capacity while preventing overflow.	$740,000	Proposed	N
Installation of Sewer Connection Cut-Off Valves	This project would provide direct financial assistance to home and business owners for the installation of sewer connection cut-off valves in homes, businesses, and community facilities in Gerritsen Beach and Sheepshead Bay.	$5.7 million	Proposed	N
Emmons Avenue: *Complete Streets*	This project would replace Sandy-destroyed street trees and plantings, and improve stormwater drainage infrastructure	$500,000	Proposed	N

Strategy: Repair and improve Community infrastructure

Superstorm Sandy caused damage to local streets and underlying infrastructure systems that raises transportation safety concerns and poses risk to property due to frequent ponding and flooding after rainstorms. Many streets in the neighborhood, particularly in the "old section," are constructed on a shallow foundation on top of sand. The roadways are prone to cracking, settling, and potholes; these conditions are a challenge to motorists and pedestrians alike, as many of the courts (side streets) do not have sidewalks. Catch basins and storm drains have to be reinstalled to remain at the proper level relative to the street. While the New York City Department of Transportation (NYC DOT), through the agency's 10-year capital fund, will reconstruct or repair approximately 6,300 linear feet along Bartlett Place, and in selected blocks between Seba Avenue and Cyrus Avenue, the remainder of streets in the neighborhood (approximately 13.5 linear miles) are not scheduled or budgeted for repair or reconstruction. Given the concern related to local street conditions, the Committee developed the following strategy statement, which responds to needs related to everyday access and evacuation planning.

In the case of Canton Court, which ends at Plumb Beach Creek, the bulkhead supporting the roadway was in poor condition pre-Superstorm Sandy and was severely damaged by the event. The bulkhead is failing, and the roadway surface is severely sloped towards the water. This presents a hazardous condition for the adjacent homes, drivers and pedestrians, and emergency services vehicles. If not repaired, the bulkhead and the end of the roadway will collapse into the water. In response, the Committee developed a project to reconstruct the failing bulkhead and the roadway.

Strategy: Repair and improve Community infrastructure				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Study of Street and Drainage Infrastructure Repair Needs, Gerritsen Beach	Identify needed repairs to streets and drainage infrastructure throughout Gerritsen Beach to address damage from Superstorm Sandy and long-term deficiencies in street construction and condition.	$200,000	Proposed	N
Repair and Reconstruction of Canton Court Bulkhead	This project would reconstruct the failing bulkhead at the end of Canton Court in Gerritsen Beach and return the roadway to a safe condition, and would help protect it from future wave impacts and flooding.	$500,000	Proposed	N

Strategy: Ensure adequate evacuation routes and advance planning

Evacuation plans are critical for both Gerritsen Beach and Sheepshead Bay; however, due to its composition, specific attention is needed for Gerritsen Beach. During Superstorm Sandy, very few residents evacuated from Gerritsen Beach. Many felt the storm would not result in overland flooding, recalling the relatively limited impact of Hurricane Irene the year previous. Additionally, the neighborhood was not designated as Zone A on the former New York City evacuation maps, the area for which Mayor Bloomberg issued a mandatory evacuation order. When floodwaters rapidly began rising and rushed down streets, residents found the water quickly became too deep for them to drive though, and thus were forced to evacuate on foot or remain in place. The neighborhood has now been remapped as Zone 1, out of the 6 newly designated evacuation zones and Committee members believe that widespread evacuation would likely occur in advance of the next significant storm.

However, there are geographic challenges to conducting an evacuation from Gerritsen Beach. Evacuation routes in the neighborhood are limited by the Gotham Avenue Inlet, which bisects the community, and the location of Marine Park to the east of Gerritsen Avenue. As seen in the figure to the right, all vehicles leaving the "old section" of the neighborhood south of Gotham Avenue Inlet must travel east to Gerritsen Avenue before heading north and out of the low-lying neighborhood. Gerritsen Avenue, like all streets in the neighborhood, is at risk of flooding during a nor'easter or hurricane, leaving some concern about whether an orderly and efficient evacuation can be conducted.

Gerritsen Avenue is the main evacuation route from the neighborhood, and the only route for residents in the "old section" (south of Gotham Avenue canal)

The Committee adopted a strategy to perform advance planning for evacuation, conduct an analysis of the street grid and its capacity, and identify any necessary operational or physical changes to the road network needed to achieve sufficient evacuation capacity.

Strategy: Ensure adequate evacuation routes and advance planning				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Evacuation Planning for Gerritsen Beach	Determine evacuation capacity of existing road network in Gerritsen Beach, and identify any operational or physical changes needed to conduct an orderly evacuation in advance of a hurricane or other hazard.	$50,000	Proposed	N

Strategy: Increase community preparedness and emergency response capabilities

The Committee provided a detailed description of the challenges faced throughout the Community during and after Superstorm Sandy. The storm itself was of far greater magnitude and impact than the municipal and local emergency management personnel were prepared to address. Extreme challenges were faced in the coordination of personnel, supplies, and equipment; downed trees throughout the area led to power failures and road blockages; the majority of residents had not evacuated in advance and many were forced to shelter in place without adequate food, water, medical supplies, or information. These difficulties were intensified in Sheepshead Bay due to the lack of a neighborhood-level emergency response team or a central facility for the coordination of recovery activities.

While Gerritsen Beach benefitted from the capabilities and resources of the volunteer Gerrittsen Beach Fire Department, no equivalent organization existed in Sheepshead Bay during Superstorm Sandy, nor does it today. The Committee identified a critical need to develop a robust emergency response program focused on the needs of Sheepshead Bay. Working in concert with New York City emergency planning efforts, this localized program would develop a block captain system, identify residents with mobility and medical care needs, and facilitate evacuation and other response measures. Building on this strategy, the Committee identified the need for a central location where Sheepshead Bay residents could obtain information and supplies and for local emergency management groups and volunteers to base their assistance programs. Committee members and residents reported having limited access to municipal services and storm-related information after Superstorm Sandy.

In Sheepshead Bay in particular, the disorienting days and weeks following Superstorm Sandy were worsened by a lack of organization in the community. Residents did not know where to go to obtain supplies and information and organizations did not know how to reach those in need. In response, the Committee developed a project to identify and retrofit a building for ongoing community use the potential for activation as a "one-stop-shop" recovery center in case of emergency. Establishing a headquarters would greatly enhance emergency planning in the neighborhood; as importantly, residents would be better able to identify a single location where they can obtain needed assistance during and after a disaster. The headquarters would also be a site for response training sessions and other civic events that would benefit the larger community.

In Gerritsen Beach, Committee members recognized the value of existing facilities, including the Vollies Memorial Hall and the Gerrittsen Beach Fire Department station, in preparing for and responding to emergencies. These facilities are used regularly for training of emergency management personnel, and for a variety of community meetings. For these two buildings, structural retrofits could be undertaken to provide better facilities for the volunteers who perform critical services in emergencies such as fire response, evacuation assistance, and first aid.

Strategy: Increase community preparedness and emergency response capabilities				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Identification and Retrofit of a Building for Use as an Emergency Response and Recovery Center in Sheepshead Bay	Identify a facility to serve as emergency operations headquarters (both pre- and post-disaster) and as a distribution point for supplies and information. Facility to be retrofitted as needed (such as floodproofing and installation of onsite power generation equipment).	$2.4 million	Proposed	N
Retrofitting of Vollies Hall and Gerrittsen Beach Fire Department Station	The Vollies Hall and Gerrittsen Beach Fire Station, both community-owned facilities, serve as an emergency response and training hub. This project would increase the resiliency and capacity of the buildings in preparation for future disaster events by adding second floors, applying wet floodproofing, and installing equipment for 24-hour emergency response, to both buildings.	$2.4 million	Proposed	N
Supplemental Community-Driven Emergency Response Programs	Augment local emergency response capabilities at a neighborhood level in Sheepshead Bay, including development of block captain system, advance preparation of response plans, and creation of a Sheepshead Bay Emergency Response Team.	$150,000	Featured	N

Strategy: Foster a thriving and resilient small business community

Local businesses provide many daily necessities to residents, such as food and medical supplies. When these key businesses are closed for any significant period, it creates a hardship for residents, such as the elderly, who may lack the means or ability to travel to other locations to obtain these supplies. This difficulty is compounded if businesses are closed over a wide area, as was the case after Superstorm Sandy. In addition, local businesses are a primary component of the local economy, providing employment to residents and tax revenues to the municipal budget. Thus, any extended closure of businesses has profound effects on the local community. Business owners experienced substantial damage to their properties and merchandise caused by direct flooding and power outages, leading to spoilage. Increasing the resilience of businesses to future damage, through floodproofing and elevation of mechanical equipment, would address many of these concerns and widely benefit the community. The Committee decided to address this need by means of a strategy designed to reduce the risk of future physical damages (and resulting closures) to businesses.

Superstorm Sandy caused moderate to severe damage to a number of institutions critical to the local economy. Although some key institutions with greater access to capital resources rebounded reasonably quickly after Superstorm Sandy, many local small businesses were slower to recover with some closing entirely. As noted previously, 74% of the businesses in the two ZIP codes that cover Sheepshead Bay and Gerritsen Beach have four or fewer employees. Several small businesses along Sheepshead Bay's business corridors are owned and managed by individuals with limited English proficiency who may lack experience interacting with City, State, or Federal agencies for assistance. Many of these businesses are also in high risk areas.

The ability of businesses to mitigate storm damage and reopen quickly is often linked to access to information about available loans/grants, insurance programs, or other resiliency measures such as floodproofing. Increased pre-storm planning and coordination is a strategy that would address this need. A business association could share best practices with its members, identify and implement actions aligning with shared goals, and provide information to its constituencies, all of which would support business growth and retention.

The Committee also identified a critical need to maintain adequate power supplies in key community facilities, such as assisted living facilities and shelters, and key businesses that provide daily necessities such as food and medicine, after a disaster. After Superstorm Sandy, many such facilities were either forced to operate at a very limited capacity by using small portable generators, or were forced to close entirely. Closure of the facilities caused a hardship to Community residents, and hampered efforts to clean, ventilate and repair the facilities. Thus, the Committee developed a strategy and associated project to provide reliable backup power for key assets. Increasing the ability of these facilities to remain operable during and after a disaster or emergency would be a widespread benefit to the Community.

Strategy: Foster a thriving and resilient small business community				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Establish Merchants Associations	Establish an association to help increase coordination among businesses by establishing associations, or other formal business organizations, on key commercial corridors to promote sharing of information on resiliency, disaster preparedness, and economic development. Key corridors would include Emmons Avenue, Sheepshead Bay Road, Avenue U, and Gerritsen Avenue.	$35,000	Featured	N
Retrofitting of Key Businesses and Community Services Assets	This project would fund the installation of small-scale flood barriers at the front and rear entrances to key businesses and community service centers. Sewer connection cut-off valves would be installed to prevent sewage backflow during floods. This proposal would also direct financial assistance to key businesses to elevate mechanical equipment, such as heaters, boilers, electrical panels, and HVAC systems.	$2.5 million	Proposed	N
Installation of Backup Generators at Key Community Facilities	Install onsite power generation and storage equipment at key community facilities such as assisted living facilities and emergency shelters to reduce downtime and increase their capacity to provide critical services during and after an emergency.	$2.5 million	Proposed	N

Strategy: Support a resilient housing stock

Throughout Gerritsen Beach and Sheepshead Bay there is still an urgent need for home repair assistance, with widespread unmet need for repair and retrofit of damaged homes. Residents and Committee members both identified significant difficulties in obtaining funds, whether through insurance, FEMA, or other public programs, to perform repair work. Understanding the new reality of living in a coastal community, many residents also want to elevate and/or retrofit their homes to reduce risk of future flood damage. Elevation above FEMA's Base Flood Elevation is widely considered the most effective method to mitigate flood risk and to alleviate the financial burden of increased flood insurance premiums. However, smaller-scale retrofit measures, such as installation of deployable flood barriers, elevation or encasement of mechanical systems, also offer significant risk reduction, and at lesser cost.

Raising and retrofitting the bungalow courts in Sheepshead Bay is more complex as they are not connected to municipal drainage systems, in addition to sitting, at some locations, 5 feet below the adjacent street grade. The small-scale drains and privately operated pump stations are often incapable of removing rainwater from a significant storm from the low-lying walkways and yards, resulting in frequent ponding and nuisance flooding. After Superstorm Sandy, a combination of sewage and floodwaters sat for several days until pumping equipment could be used to remove the water.

Residents and Committee members identified the need to identify long-term measures to improve the overall resiliency of the courts, with an emphasis on improving utility connections, drainage, and the reduction of flood risk to homes.

Strategy: Support a resilient housing stock				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Elevation and Retrofitting of Homes	Provide direct financial assistance to fund elevation and/or retrofitting of homes in high-risk areas to increase resiliency after future floods. Measures could include flood barriers and elevation of mechanical equipment.	$2.5 to $3.5 million	Proposed	N
Feasibility Study to Improve the Resiliency of the Courts in Sheepshead Bay	This study would address resiliency modifications to buildings, walkways, and shared services within the Courts; future infrastructure and maintenance arrangements and requirements; and the potential for connection to city utilities.	$150,000	Proposed	N
Homeowner Education Program	The project would provide a targeted and coordinated distribution of information already available from existing City, State, and Federal programs, and provide tailored information sessions to local residents, on the programs, policies, and building practices that increase resilience and protect community assets.	$30,000	Featured	N

Strategy: Restore and improve recreational opportunities

With a focus on everyday resources and community connectivity, the Committee also focused on existing and potential public gathering spaces whose creation or enhancement would catalyze local coordination and collaboration. The large open space parkland on Plumb Beach is under the jurisdiction of New York City Department of Parks and Recreation (NYC DPR) and the National Park Service (NPS). The U.S. Army Corps of Engineers (USACE) has finished construction of a beach stabilization and groin construction project to reduce the erosion rate on the beach and provide needed protection to the adjacent Belt Parkway. The park's facilities are somewhat underdeveloped and the only building on site, the Roundhouse, is closed due to deterioration. Identifying opportunities for coordinated maintenance and operation of Plumb Beach, and an evaluation of potential measures to reduce storm damage to the peninsula and adjacent areas, could increase the value to the Community.

Additionally, NYC DPR has completed planning and design, and allocated funding for, construction of a new park at Brigham Street. The park design incorporates lessons learned from Superstorm Sandy through the use of flood-resilient construction materials. However, this Phase 1 construction does not include installation of a comfort station. NYC DPR has prepared plans for construction of a resilient comfort station elevated above the FEMA Base Flood Elevation (BFE). This work (referred to as Phase II) has not been budgeted. Installation of a comfort station would greatly benefit park users, entice visitors from surrounding areas (such as the Emmons Avenue waterfront), and users of the adjacent bicycle path and Plumb Beach.

The Roundhouse at Plumb Beach
Source: https://www.flickr.com/photos/gerritsenbeach/

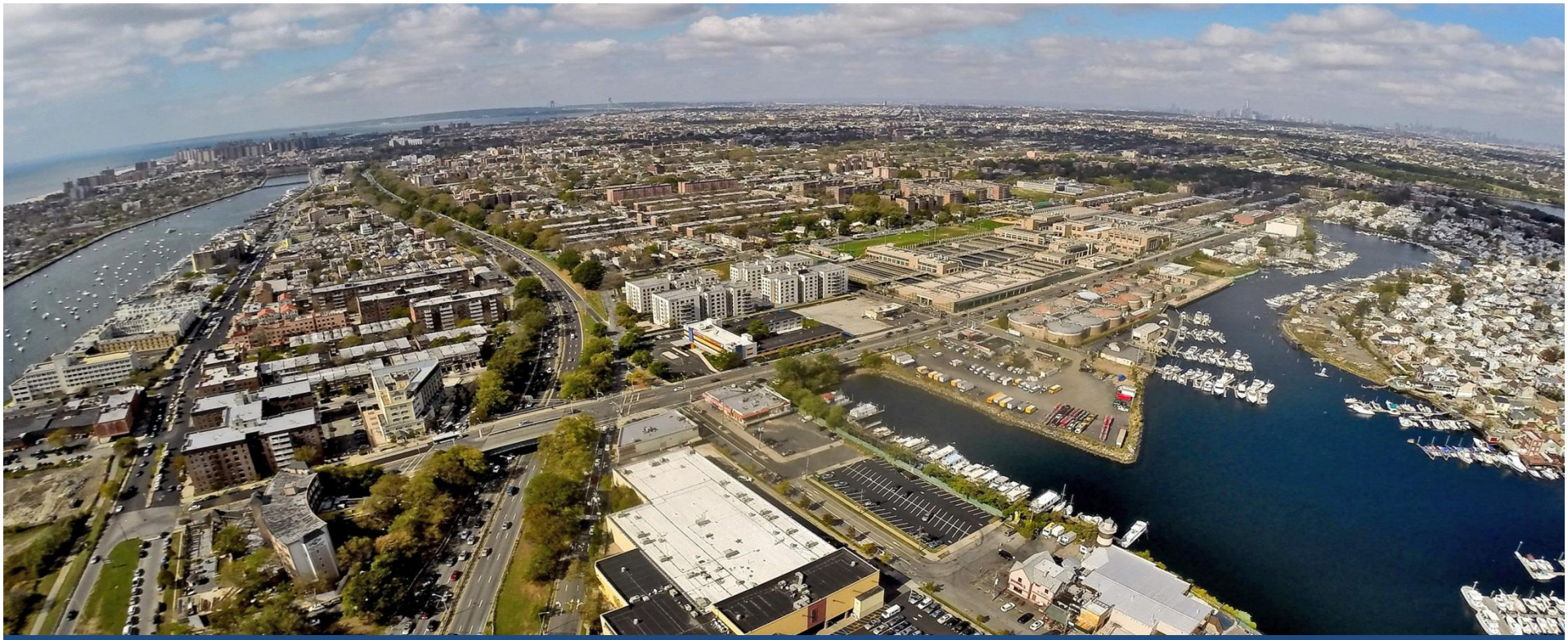
Strategy: Restore and improve recreational opportunities				
Project Name	**Short Project Description**	**Estimated Cost**	**Proposed or Featured Project**	**Regional Project (Y/N)**
Support the Resiliency and Maintenance of Plumb Beach	This project calls for an expansion of the U.S. Army Corps of Engineers study of Upper Jamaica Bay, as well as for the development of a Memorandum of Understanding (MOU) with all relevant parties at Plumb Beach.	$0	Featured	N
Construct a Resilient Comfort Station at Brigham Park	This project would expand on the current construction plans (Phase 1) at Brigham Park to include a flood-resilient comfort station. The year-round facility would be built and elevated above the FEMA Base Flood Elevation and would be maintained by the Department of Parks and Recreation. This would make the park more appealing, safer, and convenient for local and non-local visitors.	$2.7 million	Featured	N

Summary

The Committee identified a wide range of reconstruction and resiliency strategies to meet the identified needs in the Community. These strategies were informed by a review of planning documents and best practices from the City of New York and the region, the direct experiences of Committee members during and after Superstorm Sandy, and extensive public input. After establishing the reconstruction and resiliency strategies, the Committee focused on refining the list of projects to achieve the strategies.

As detailed in the following section, the Committee's overall project list includes:

- Infrastructure enhancements to reduce direct effects of flooding
- Reconnaissance studies for large-scale flood risk reduction measures
- Retrofit measures to individual buildings
- Plans to increase local emergency response capabilities



Section IV: Implementation – Project Profiles

Section IV: Implementation – Project Profiles

The NY Rising Community Reconstruction (NYRCR) Program has allocated to the Gerritsen Beach/Sheepshead Bay Community (Community) up to $13.3 million (Gerritsen Beach: $6.7 million; Sheepshead Bay: $6.6 million). The funding is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.

This section provides a complete project profile for each Proposed and Featured Project identified by the Planning Committee and the Community. The Proposed and Featured Projects were selected and developed as a response to risks, needs, and opportunities identified in Section II. The Proposed and Featured Projects are the implementation vehicles of the Reconstruction and Resiliency Strategies in Section III. These projects represent actions that can be implemented in the near future to build resiliency and fulfill other important community goals.

The Committee valued the input from the Public Engagement Events, including online surveys, to make decisions about which projects to select. Details of Gerritsen Beach and Sheepshead Bay's Public Engagement Events are documented in more detail in Section V, but the overall results confirmed the Committee's selection of projects.

In addition to providing a detailed description of each project, the profiles include information on two important elements used by the Committee to evaluate the value of each project—a cost-benefit analysis (CBA) and a risk-reduction analysis. Before proceeding to the projects themselves, it is important to understand these two analytical elements of the project profiles.

Project ideas that evolved from these Committee discussions are classified as Proposed Projects, Featured Projects, or Additional Resiliency Recommendations, and are defined as follows:

- Proposed Projects are proposed for funding through a community's allocation of CDBG-DR funding.
- Featured Projects are innovative projects for which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding, and regulatory reforms and other programs that do not involve capital expenditures.
- Additional Resiliency Recommendations are resiliency projects and actions the Planning Committee would like to highlight that are not categorized as Proposed or Featured Projects.

This section provides information on the Committee's approved Proposed and Featured Projects. The title block of each project profile identifies it as a Proposed or Featured Project, respectively.

Cost-benefit analysis

A CBA is a tool used to calculate and compare the benefits and costs associated with a project. The CBA provides decision-makers with a framework for comparing different projects (i.e.; anticipated cost of implementation against total expected benefits), and determining whether the benefits of a particular project outweigh the costs.

Because the NYRCR Program is a community-driven process, the CBA focuses on identifying project costs and benefits that easily relate to the communities that the Committees represent. Community and Committee input – informed by a true understanding of local conditions, needs, and community values – plays a crucial role in the selection of projects that are implemented. The risk-reduction benefits are described in terms of how much the Proposed or Featured Project would lower the vulnerability of a given asset. The additional benefits of the projects are provided in descriptive qualitative terms that explain how these projects bring additional value to the community.

The costs and benefits used to evaluate projects through the CBA are explained further below.

Project costs

Project profiles include a cost estimate for design and construction at a planning level, and have described factors contributing to operations and maintenance costs. However, the CBA cannot forecast costs or benefits with complete certainty; rather, it provides the community with a practical understanding of the potential estimated costs of project implementation and the potential benefits accrued to the community with the particular project in place.

The cost of implementation for a project is just one aspect of the justification for funding the Proposed Projects. Conversely, another important variable is the future costs of not implementing these Proposed Projects – which have the potential to negatively impact the long-term viability of the Community. Although these costs are more difficult to quantify, they are no less important to our analysis, and are, therefore, addressed qualitatively. These costs include:

- Extensive, repetitive damage to personal property (vehicles, residences) and public infrastructure resulting from frequent recurring flooding and future storm events;
- Economic loss to residents and to local and regional employers as a result of the inability to work; and
- Hindrance in the provision of life-safety and emergency services, resulting in repeated inability to access vast areas of the community.

Project benefits

The types of benefits considered in the CBA include:

- **Risk reduction:** The extent to which a project reduces the risk of damage to a community asset from a future storm event (discussed further below under "Risk-reduction analysis").[25]
- **Economic resiliency:** The project's potential to help minimize economic costs and reduce the time it takes for the local economy to rebound from a storm event. Economic data include, where applicable, an estimate of permanent jobs secured/added; relationship to, and/or furtherance of, Regional Economic Development Plan goals; potential for additional economic activity; and the net effect on local municipal expenditures.[26]
- **Health, social, and public safety services:** Qualitative information was provided on the overall population benefits of improved access to health and social service facilities and public safety services, type and size of socially vulnerable population secured,[27] and degree to which essential health and social service facilities are able to provide services to a community during a future storm or weather event as a result of the project.
- **Environmental protection:** Benefits include the protection of crucial environmental assets or high-priority habitat, threatened and endangered species, migration or habitat connectivity; any cleanup resulting from the action; and creation of open space or a new recreational asset.

Risk-reduction analysis

The risk-reduction analysis estimates the extent to which each Proposed and Featured Project will lower the flood risk to the Community's critical assets and population when the project is in place. The risk-reduction analysis uses information from the risk assessment in Section II to determine the risk of an asset before the project implementation. The analysis estimates how the risk will be lowered by showing how much the Proposed or Featured Project would lower the vulnerability score.

Installation of Backup Generators at Key Community Facilities (Proposed Project)

This project would provide onsite power generation and storage equipment to key facilities, including assisted living facilities and emergency shelters.

Description

Power outages during storms and other emergency events are a significant problem in Gerritsen Beach and Sheepshead Bay.

One full week after Superstorm Sandy, Con Edison reported that 2,326 of its customers in Gerritsen Beach, and 13,294 in Sheepshead Bay and Brighton Beach, were without power. Even a month after the storm, power had still not been restored to 223 residential customers in Gerritsen Beach.[28]

Power outages at key community facilities reduced those facilities' ability to provide sheltering and medical services, and to serve as distribution points for basic supplies to residents. The Committee recognized that minimizing or eliminating sustained power outages at individual facilities would confer broad benefits on the wider Community. For each key facility that remains operational in the immediate aftermath of a disaster, the overall need for costly or disruptive alternative power service arrangements is reduced. As Con Edison and other utility providers make long-term improvements to their systems, the Committee recognized this project as a relatively low-cost, scalable option to mitigate risk to key facilities in the interim. In many instances, community facilities escaped major flood damage but were still taken out of service due to power loss and associated disruptions to key building systems such as lighting; heating, ventilation, and air conditioning (HVAC); plumbing; and elevators. In cases like these, redundant onsite power generation capacity would be an effective means of increasing resiliency by reducing vulnerability to

High-capacity power generator installed on building rooftop, above flood elevation
Source: AWMA Industries

future power outages. This project would provide onsite power generation and storage equipment to key facilities, including assisted living facilities, medical care facilities, and designated community shelters. Identified locations would store/install equipment above the base flood elevation. Elevation of equipment or placement in floodproofed enclosures would be required wherever feasible. The project assumes the installation of 100-kW generators, which are of sufficient capacity to power a sizable building; however, additional analysis of specific power requirements would be needed to select the optimal equipment.

Potential criteria for selection of specific facilities, which will be further defined during the project implementation phase:

- Facility located in an extreme- or high-risk flood zone;
- Limited to public facilities or private buildings that provide health and medical services, food and medical supplies, and critical needs to the community.
- Facility must have elevated space available, or have space available for construction of an enclosed area for the installation of generators protected from flooding

For non-public buildings, the property must be owned outright by the business operator or have a minimum lease period of 10 years.

Cost estimate

The cost estimate for this project is $2,550,000. This cost is based on installation of 13 large-scale generator systems at key facilities, including the generator unit, fuel systems, and electrical components including switch gear for power transfer. The generators would be sited to limit (or if feasible, prevent) exposure to floodwaters.

Benefits

Health and social

The project is anticipated to provide specific benefits to Gerritsen Beach and Sheepshead Bay seniors and other socially vulnerable populations served by adult living facilities and nursing homes within the Community. The project would also benefit socially vulnerable populations who rely on community facilities for provision of basic services or supplies, either on a permanent basis or on a provisional basis in the immediate aftermath of an emergency event.

Economic

The project may indirectly benefit local economic activity by providing continuity of critical services within the Community. The availability of these services may allow more residents to return to their homes relatively quickly after an acute event.

Cost-benefit analysis

This project would provide a long-term benefit to the operators of key community facilities through installation of means to provide reliable onsite power. Facility operators would have reduced post-emergency costs and have a better ability to perform necessary clean-up and repairs, while being better able to provide critical services to Community residents. The benefits of the project would continue for the useful life of the generators (estimated at 35 years).

Risk reduction

This project would reduce the risk that key community facilities will experience service outages due to a lack of power. Therefore, the project reduces risk to the population by promoting the greater availability of critical community services during and after acute events. By maintaining an onsite power supply, facility operators would be better able to reduce additional damages such as mold infestation due to lack of ventilation.

The useful life of this project is limited to the useful life of generation equipment. With regular maintenance and limited usage, the units would be expected to have a useful life of 35 years. Both maintenance and operation of these generators entail costs above and beyond the implementation costs described above.

If this project is not implemented, community facilities in Sheepshead Bay and Gerritsen Beach will remain susceptible to the sustained power outages that affected both neighborhoods following Superstorm Sandy.

General time frame

This project could be completed within 12 to 16 months from inception, which would include time for site analyses and evaluation of power requirements, design, permit application, preparation of bid documents, and installation of generator equipment.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

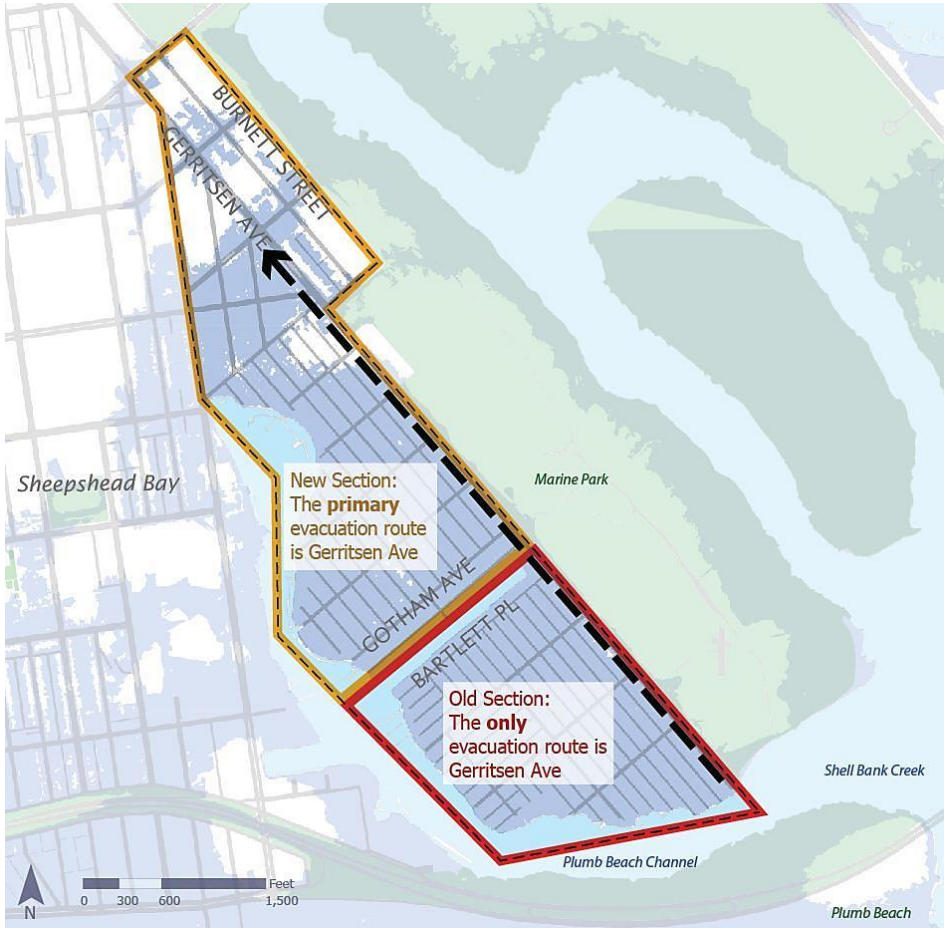
Evacuation Planning for Gerritsen Beach (Proposed Project)

This project would evaluate the existing roadway capacity of the neighborhood to determine whether it is sufficient to conduct an orderly evacuation under advance warning scenarios for a hurricane or nor'easter.

Description

During Superstorm Sandy, hundreds of Gerritsen Beach residents were prevented from evacuating because of the sudden incursion of floodwater. This hazardous situation was partly the result of limitations in the storm forecast and the neighborhood's not being included in Zone A, the zone for which the City of New York issued a mandatory evacuation order. Since Superstorm Sandy, the City released new hurricane contingency plans based on six evacuation zones that represent varying threats of coastal flooding resulting from storm surge. This change is positive, but large-scale neighborhood evacuation still poses significant challenges.

Despite recent evacuation policy changes and the City's remapping of evacuation zones (which now includes Gerritsen Beach in the new evacuation Zone 1), the Committee remains concerned about the neighborhood's overall capacity for quick and efficient evacuation. The concern related to both the street grid and to levels of advance planning. Evacuation routes from Gerritsen Beach are limited because of the Gotham Avenue Inlet, which bisects the community, and the location of Marine Park to the east of Gerritsen Avenue. All vehicles leaving the "old section" of the neighborhood must travel east to Gerritsen Avenue before heading north. Gerritsen Avenue, like the majority of the neighborhood streets, is at risk of flooding. The Committee determined that recent operational changes in City evacuation practices should be accompanied by a targeted study of Gerritsen Beach to determine whether an orderly evacuation can be conducted.



Gerritsen Avenue (indicated by the black arrow) is the primary evacuation route from the neighborhood, and the only route for residents in the "old section" south of the Gotham Avenue canal

This project would evaluate the existing roadway capacity of the neighborhood and determine whether capacity is sufficient (e.g., roadway) to conduct an orderly evacuation under the likely advance warning scenarios for a major hurricane or nor'easter. The analysis would begin with a review of available traffic information, including volumes from the New York Metropolitan Transportation Council's Best Practices Model. In coordination with the New York City Office of Emergency Management (NYC OEM), the citywide evacuation plan would be reviewed and evaluated as input to the neighborhood-level plan to be developed.

If more detailed traffic data are needed, an automatic traffic recorder or "road tube" would be placed across Gerritsen Avenue to record daily outbound and inbound traffic counts for a week. This information would be used to estimate the increased outbound traffic during an evacuation.

An analysis of the local street network in the neighborhood, and its connection to the larger City street grid, would be conducted to identify any necessary operational changes needed to increase evacuation capacity. For example, a parking ban on Gerritsen Avenue during an evacuation may be needed to increase traffic flow out of the neighborhood, while still allowing for easy access by emergency service vehicles.

Cost estimate

The cost estimate for this project is $50,000. This cost is based on a study consisting of the evaluation of current evacuation routes and procedures, coordination with New York City Department of Transportation (NYC DOT) and NYC OEM, traffic count data collection, development of recommendations for improved coordination, and identification of potential corridor (roadway) enhancements.

Risk reduction

The planning process would reduce risk to residents of Gerritsen Beach by facilitating more effective and efficient evacuation procedures in the event of an emergency or other acute situation.

Benefits

Health and social

The project would benefit socially vulnerable households in Gerritsen Beach, including those who may require additional time or assistance to evacuate their residences, such as people with access and functional needs and senior citizens. These categories include the 770 individuals aged 65 and older who live in Census Tract 628, which includes much of the neighborhood. By identifying not only potential changes to the roadway grid but also operating or institutional changes, the project would deliver benefits to vulnerable populations as well as the general population of the neighborhood.

A reduction in evacuation times, and clearly established and communicated protocols for evacuation, would provide a benefit to all residents during any emergency situation that may require large-scale evacuation. By increasing the percentage of residents who heed evacuation warnings, the potential for injury or loss of life is reduced.

Cost-benefit analysis

A well-developed evacuation plan resulting from the study would have an indefinite useful life. This neighborhood-level plan would be structured to complement the larger NYC OEM evacuation system.

The revision of the City of New York's hurricane evacuation maps to include Gerritsen Beach in the new Zone 1 reduces the probability that so many community residents will again be caught unaware during an acute flooding event. That said, the neighborhood continues to face real logistical and geographic challenges related to large-scale evacuation. This planning process would help address these challenges.

General time frame

This study could be completed within 3 to 4 months from inception, which includes coordination with City agencies, field data gathering, review of existing evacuation plans and procedures, and preparation of a findings report.

Local, State, and Federal Government regulatory requirements

Federal Emergency Management Agency (FEMA) guidelines on Evacuation Planning; NYC OEM evacuation planning and protocols; NYC DOT for any physical changes to streets

Jurisdiction

The project is located in the Gerritsen Beach neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

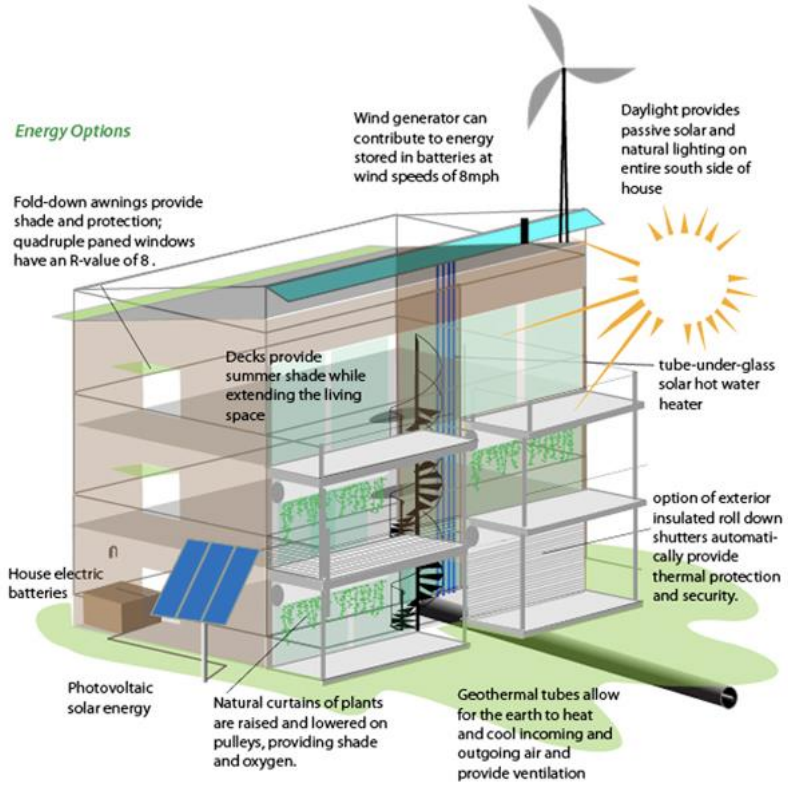
Identification and Retrofit of a Building for Use as an Emergency Response and Recovery Center in Sheepshead Bay (Proposed Project)

The hazard-resilient center would support training, preparedness, community outreach, and disaster response activities, and serve as a central point for information and supplies for residents in Sheepshead Bay.

Description

In the wake of Superstorm Sandy, Sheepshead Bay residents reported that they had only limited access to municipal services and information related to the storm. This feeling of being disconnected from services and information was a prominent and recurring theme at Committee meetings and Public Engagement Events, as attendees reported difficulty accessing municipal services in the storm's immediate aftermath. This lack of access was compounded by the temporary closure or inaccessibility of many of the social service organizations that would ordinarily fill these needs.

This project would identify suitable locations in existing buildings to use as a response and recovery center in Sheepshead Bay that would provide local residents and business owners with a primary meeting space to obtain information, seek support, and receive services after a disaster. An existing building would be retrofitted to create the response and recovery center, including the installation of green technologies for energy efficiency and power generation such as wind, solar, and if feasible, geothermal energy. In addition, the response and recovery center would include onsite power generation and storage, as well as sufficient space



Resilient building retrofit techniques and sustainable power generation equipment
Source: Green Building Council

for pre-disaster planning and post-disaster operations and storage of necessary supplies and equipment. Major project activities would include:

- Review existing lists of potential pre-identified potential locations;
- Conduct additional site suitability analyses to determine specific modifications needed and determine best methods of reducing hazard risks (such as flood barriers, hurricane-rated windows, upgraded roofs); and
- Prepare and issue a Request for Proposal (RFP) for building retrofit
- Develop lease, Memorandum of Understanding, or other arrangements for selected site to ensure longevity of use.

Cost estimate

The cost estimate for this project is $2.4 million dollars. This cost is based on the upgrade of building facilities, installation of resiliency measures such as generators and solar paneling, installation of flood protection measures, installation of hurricane-rated doors and windows, and installation of other equipment needed to support 24-hour emergency response operations. Engineering and design, and construction management costs are included.

Benefits

Economic

This project would result in more efficient delivery of services and access to information in a post-disaster setting. With more services and supplies available locally, the displacement of residents may be reduced. The project would therefore be useful in restoring and maintaining local business and resident confidence. Furthermore, the facility would serve as a central point for pre-disaster preparedness training and community outreach. This project would be a significant support to the Featured Project titled "Supplemental Community-Driven Emergency Response Programs."

Health and social

This project would benefit all residents of Sheepshead Bay, including socially vulnerable households which include, but are not limited to, individuals with limited English proficiency, households with children or elderly residents, and households of low or moderate income.

Risk reduction

This project would lead to a reduction of risk for the building selected as a response and recovery center. The project also would fill a communications gap expressed by Community residents, who expressed feeling disconnected from emergency response activities before, during and after the storm. An emergency response and recovery center would provide a location for information sharing amongst Community residents and City and emergency personnel.

Cost-benefit analysis

The useful life of the facility is limited to the useful life of the building. With regular maintenance, this period would be no less than 30 years. If the response and recovery center is sharing a facility with another entity, the operations and programming of the recovery center must not impinge on the regular function of the host space.

If the project is not implemented, Sheepshead Bay will remain vulnerable to the real and perceived challenges regarding the provision of social services and post-disaster communications. This facility would provide a valuable resource to help better address the specific preparedness and response needs of Sheepshead Bay.

General time frame

This project is estimated to take 12 to 16 months to complete, including site selection, analysis of building modification requirements, preparation of RFP, design and engineering, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in Brooklyn Community District 15, in Kings County, in the City of New York.

Retrofitting of Vollies Hall and Gerrittsen Beach Fire Department Station (Proposed Project)

This two-part project is intended to increase the resiliency and capacity of both Vollies Hall and the Gerrittsen Beach Fire Department Station in preparation for future disaster events.

Description

The Vollies Hall and Gerrittsen Beach Fire Department (GBFD) Station on Seba Avenue, both owned and operated by the GBFD, serve as an emergency response and training hub for Gerritsen Beach. The GBFD is Brooklyn's last remaining volunteer Fire Department. Due to the geography of the Gerritsen Beach peninsula, it can be difficult for fire crews from other parts of Brooklyn to quickly reach the neighborhood during a fire here. The GBFD provides a range of emergency services and provided critical assistance to residents during Superstorm Sandy and its aftermath. Befitting its status as a community gathering place, Vollies Hall hosted several Committee meetings in the first months of the NYRCR planning process. Both buildings escaped major damage during Superstorm Sandy, but only thanks to extraordinary interventions on the part of volunteer personnel before the storm.

The Committee identified the mitigation of risk to these facilities as a key objective from the very beginning of the planning process. Members of the Committee recognized that reliance on provisional measures during an emergency, such as sandbags, is not a sustainable means of safeguarding Vollies Hall or the GBFD station against future floods and hazards. This two-part project is intended to increase the resiliency and capacity of both buildings in preparation for future disaster events. The first part would enhance the capability of Vollies Hall to serve as a relief and recovery center by retrofitting the first floor through installation of flood barriers,

Vollies Memorial Training Hall and the Gerrittsen Beach Fire Department Station, Seba Avenue, Gerritsen Beach: Existing Conditions
Source: URS

hurricane-rated roll-up doors, and elevation or enclosure of mechanical systems; adding a second floor above the Base Flood Elevation (BFE) to increase space for response planning activities, training, and storage of supplies; elevating mechanical systems to the second floor; and adding green power generation equipment, such as solar panels. The new second floor would contain equipment needed for round-the-clock emergency response operations, including a full industrial kitchen, facilities for first responders such as cots, toilets and showers, and communications equipment.

The second project component would be to retrofit the GBFD station to increase its ability to operate as an emergency community assistance center during and after an emergency. Specifically, the project would add a second floor to provide operations space above the floodplain, relocate mechanical and communications equipment to second floor, install a generator, and incorporate green power devices for power generation and storage.

Cost estimate

The project cost is estimated as $2.4 million dollars. The cost includes the following work (or elements thereof) to both the Vollies Hall and GBFD station: extensive upgrades to the first floor, construction of a second floor, installation of resiliency equipment including flood barriers and generators, new building features to support 24-hour response operations such as an industrial kitchen and hygiene facilities. Costs for engineering and design, and construction management, are included in the estimate.

Benefits

Health and social

The project would benefit all Gerritsen Beach residents, including socially vulnerable populations such as, but not limited to, children, the elderly, and individuals with access and functional needs.

Economic

The project may reduce damage to the GBFD facilities and increase the organization's ability to respond to emergencies. Rapid fire response capabilities would reduce the prospect of widespread, multi-building fires that cause severe property damage, as occurred in several New York City neighborhoods during Superstorm Sandy.

Risk reduction

Vollies Hall and the fire station were both defined as community assets during the planning process. The Committee agreed that these critical facilities are of high community value in pre- and post-disaster scenarios. The project would considerably reduce risk to both assets, since both facilities would be less likely to have prolonged outages because of the addition of a redundant power supply, reduced or eliminated flood damage through use of floodproofing retrofit techniques, and relocation of key equipment to upper floors.

This project would reduce risk to residents of Gerritsen Beach by ensuring continuity of operations for the GBFD, which provides local emergency services. The physical isolation of Gerritsen Beach and the layout of the neighborhood both limit immediate access by the Fire Department of the City of New York and magnify the importance of the GBFD.

Cost-benefit analysis

Modifications to the two buildings are expected to remain effective for at least 30 years. The buildings themselves would remain in the floodplain, though the project would relocate critical equipment above the BFE. These facilities cannot be relocated horizontally out of the floodplain as they are local emergency service providers that must remain in Gerritsen Beach.

If this project is not implemented, the GBFD's emergency response capacity would be jeopardized during future flood events. Because of the neighborhood's geographic isolation from the rest of Brooklyn, and because of the unique nature of Gerritsen Beach's physical street layout, the GBFD's local experience and expertise are vital to the community's long-term safety.

General time frame

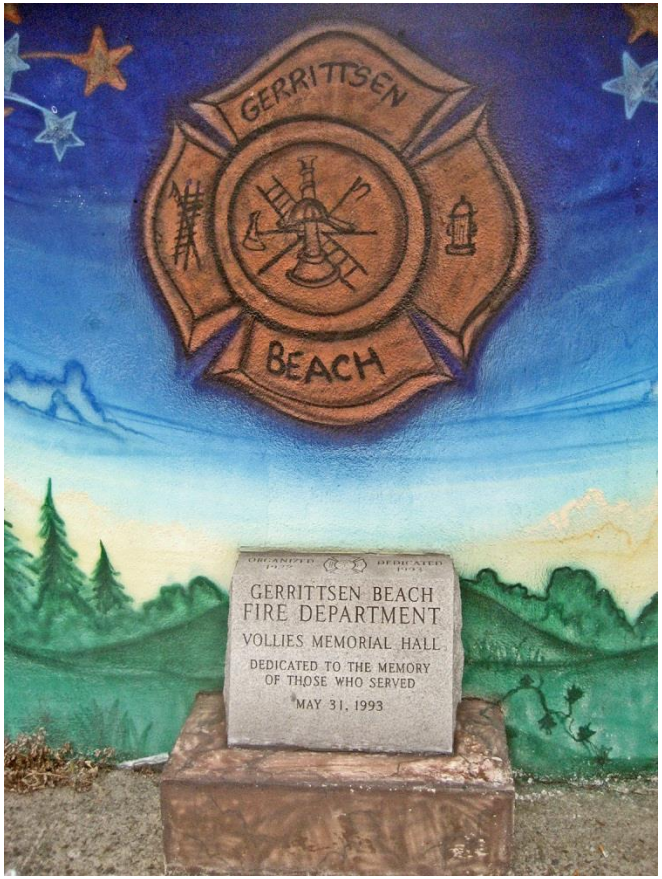
The project is expected to take 12 to 16 months to complete, including preparation of architect and engineering designs, preparation of building permit applications, preparation of bid documents, contractor selection, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in the Gerritsen Beach neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.



Memorial and mural on Vollies Memorial Training Hall, Seba Avenue, Gerritsen Beach
Source: URS Source: URS

Concept rendering of Gerrittsen Beach Fire Department Station after addition of a second floor, and resiliency measures including flood barriers, storm shutters, high-wind rated roof, and solar panels

Source: URS

Concept rendering of Vollies Memorial Training Hall after addition of a second floor, and resiliency measures including floodproof doors, storm shutters, high-wind rated roof, and solar panels

Source: URS

Retrofitting of Key Businesses and Community Services Assets (Proposed Project)

This project would fund the installation of small-scale flood barriers and the protection of mechanical systems, increasing the resilience of Community assets to future floods.

Description

Flooding caused by Superstorm Sandy resulted in severe damage to key businesses and community facilities in Gerritsen Beach and Sheepshead Bay. Many of these assets became inoperable for extended periods. In some cases, business closure posed significant hazards to residents. For example, pharmacies and grocery stores were without power, precluding residents from accessing basic necessities. For many residents with mobility challenges, the sudden inaccessibility of groceries, prescription drugs, and Community centers they rely on each day, caused major hardship. Beyond the inconvenience caused to residents, the damage sustained by local businesses disrupted local employment patterns and resulted in lost income to merchants.

The Committee was particularly keen to address these issues in Gerritsen Beach, which has only one commercial corridor. The Committee felt that the neighborhood had been relatively underserved by economic recovery resources in Sandy's aftermath. Members also felt that businesses that had survived Sandy would not necessarily have the financial means to withstand future disasters. Thus, the Committee developed its strategies related to business recovery and resiliency into a project concept that would provide targeted assistance to local businesses and community service providers in a cost-effective and efficient manner.

This project would fund the installation of comprehensive flood risk reduction measures, that could include: small-scale flood barriers at the front, rear and

Deployable flood barriers installed to protect a business
Source: Flood Panel LLC

side entrances, sewer connection cut-off valves to prevent sewage backflow during floods, upgrades to windows and roofs to reduce damage during high winds, and elevation or enclosure of mechanical equipment. The project would focus on businesses and community service centers, such as St. James Church in Gerritsen Beach, and schools and assisted living facilities throughout the Community. For facilities such as churches, the retrofitting would be focused on those portions of buildings used for community purposes such meeting spaces and sheltering residents during an emergency.

Cost estimate

The project is estimated to cost $2.5 million dollars, and would include retrofit of key businesses and community assets to select and install flood damage reduction measures. Project costs include site assessment and selection of needed retrofit, purchasing equipment (such as flood barriers) and installation and building retrofit.

Benefits

Health and social

The project would benefit socially vulnerable residents, including but not limited to, individuals with limited English proficiency, households with children or elderly residents, households of low or moderate income, and individuals with access and functional needs who may require ready access to food or pharmacy services. The project would enhance the capacity of essential health and social services to continue providing quality services to multiple constituencies. The project would also help ensure the continuous availability of vital commodities and resources after disasters, including food and medication.

Economic

This project would mitigate risk to local businesses that are currently susceptible to flooding and/or protracted power outages during and after emergencies. Local employment patterns may be positively affected by reduced business outage times in post-disaster scenarios. More generally, minimization of flood damage and power outages during and after emergency events would positively impact the local economy by minimizing short- and longer-term displacement of residents who constitute the customer base for local small businesses. The project is also likely to minimize government expenditures associated with storm recovery, as it diminishes the risk faced by businesses in the event of future disasters.

Risk reduction

This project would reduce the vulnerability of key community facilities and businesses. Risk scores would decline markedly at assets where improvements are made because the combination of floodproofing and elevation of key mechanical equipment would vastly reduce anticipated outage times.

This project protects socially vulnerable populations by promoting continuity of operations and service provision by key community facilities and businesses in high and extreme risk areas throughout Sheepshead Bay and Gerritsen Beach.

Cost-benefit analysis

Modifications to building foundations, mechanical systems, and installation of flood shields/barriers are expected to last an extended period, ranging from the useful life of a specific piece of equipment, to the useful life of the building itself in the case of structural retrofit. Once a given piece of equipment is no longer functional, it can be replaced in the now-elevated location above the floodplain. Benefits from the initial elevation or enclosure of the equipment would therefore continue to accrue.

If key businesses and community facilities are not retrofitted to mitigate flood risk, they will remain highly susceptible to the extreme damage patterns that accompanied Superstorm Sandy. Particularly in neighborhoods such as Gerritsen Beach and Sheepshead Bay, which have older, less mobile populations, the continuous and local availability of retail food and grocery services, pharmacy services, and other necessities is a basic public health requirement. Given these considerations, the investment of $2.5 million to increase the neighborhood's resiliency and ability to withstand future floods would result in a significant return on investment. The project is targeted, efficient, and relatively simple to implement. The project is also scalable, meaning that it can be expanded on a per-building basis at a relatively low unit cost.

General time frame

The project is expected to require 16-24 months, depending on the overall project scope and the number of facilities to be included. This period would include setting criteria, performing site assessments of candidate locations, selection of specific measures, permit applications, identification and selection of building contractors, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Emmons Avenue: *Complete Streets* Streetscape and Stormwater Drainage Improvements

(Proposed Project)

This project would address issues associated with stormwater drainage, while enhancing the streetscape and pedestrian experience.

Description

Emmons Avenue is a vital economic corridor in Sheepshead Bay, and Superstorm Sandy overwhelmed the carrying capacity of its stormwater and drainage systems. In addition, high winds and salt water from storm surge damaged hundreds of trees and plantings, many of which have not yet been replaced.

The Committee and the Community both expressed that street trees are important assets. Their damage or loss during Sandy has created an additional challenge for business owners who derive direct economic benefit from attractive streetscapes. Replacing these trees would also improve air quality, help control stormwater run-off and retention, provide shade, and contribute to the overall quality of life of residents. Tree replacement work would focus on selecting saltwater-resistant trees.

This project would also aim to address some of the issues associated with stormwater drainage, while enhancing the streetscape and pedestrian experience along this key economic anchor and public space. The project would construct streetscape and stormwater drainage improvements along Emmons Avenue in accordance with City of New York's *Complete Streets* criteria. Enhancements could include street furniture such as benches and lighting, connected tree beds and grass plantings, and the installation of green stormwater drainage and attenuation systems. Any improvements would adhere to the City's recommendations for salt- and flood-tolerant vegetation. The Veterans Memorial on Emmons Avenue would be

Street trees with improved planting boxes

Source: Wikimedia

evaluated for new, salt-resistant plantings and upgrades to onsite stormwater collection equipment.

Cost estimate

This project is estimated to cost $500,000, which includes street improvements such as tree plantings and planter boxes, recreation features such as benches, safety features including cross-walk lights, and drainage improvements such as pervious pavements and new drainage structures.

Benefits

Economic

This project would build on recent streetscape improvements along Emmons Avenue. In concert with parallel efforts to improve business organization on this key commercial corridor, these improvements make the physical environment of Emmons Avenue more attractive to residents, property owners, and visitors. The project would contribute to the vitality of the Emmons Avenue corridor, for which an improved retail atmosphere may lead to increased economic activity for the commercial corridor.

Recent research on urban forestry indicates that street trees confer significant economic benefit to communities. One analysis from Portland, OR finds that street trees located in front of buildings can increase those properties sale price by over $7,000. Another study conducted in Portland determined that walkability in "tree-lined" neighborhoods elevates home values six times more than walkability in treeless neighborhoods. Based on these analyses, this project should deliver substantial return on investment in the form of increased property values and economic activity.

Environmental

The project would provide significant environmental benefit to the Community. Trees improve air quality, help control storm water run-off, reduce the urban heat island effect, provide shade, and improve the overall quality of life of residents. The project would also retain stormwater that might run off into Sheepshead Bay and/or contribute to ponding conditions on Emmons Avenue. Reduction of untreated run-off into local waterways has a positive environmental effect. According to the City of New York's Special Initiative for Rebuilding and Resiliency (SIRR Report), similar techniques employed in the City's Greenstreets program were beneficial during Superstorm Sandy:

> "For example, the stormwater Greenstreet at Nashville Boulevard and Colfax Street in Queens absorbed water equivalent to 31 times its own area, including 1,300 gallons of rainwater falling directly on it and 39,000 gallons of runoff flowing in from surrounding streets – an amount estimated to represent 3,000 percent more water than a non-stormwater Greenstreet typically would hold."[29]

Measures to be used in this project are expected to have similar results, and would complement ongoing beautification measures already underway by the City. Ultimately, this project could serve as a catalyst for continued revitalization of the corridor under New York City Department of Transportation's (NYC DOT's) Sustainable Streets Program.

Risk reduction

This project may slightly mitigate risks to physical assets on Emmons Avenue by reducing the volume of stormwater runoff during storms. This reduction may also improve vehicular and pedestrian safety.

Cost-benefit analysis

The useful life of stormwater infrastructure improvements is expected to be at least 30 years. This useful life projection assumes regular cleaning and scheduled maintenance, both of which would impose operating costs on the project subrecipient. Trees and other plantings are typically long-lived and regenerating, if properly tended. A storm surge event would be expected to damage at least a portion of plantings. Plant species would be selected for salt tolerance to increase longevity.

If the project is not undertaken, street ponding and flooding will continue after heavy rainstorms, and environmental quality benefits will not be realized. The project cost of $500,000 to improve the aesthetic and environmental qualities of a primary commercial and tourist corridor in Sheepshead Bay represents a cost-effective means of delivering economic and environmental benefits to the Community.

General time frame

The project could be completed within 12 months, including site assessment, design, permit applications, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: 2012 NYC Department of Environmental Protection Standards for Green Infrastructure, NYC DOT Street Design Manual, and Administrative Code of the City of New York.

Jurisdiction

The project is located in the Sheepshead Bay neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

Elevating and Retrofitting of Homes (Proposed Project)

The project would provide direct financial assistance to fund elevation and/or retrofitting of homes in high-risk areas to increase resiliency against future floods.

Description

Storm surge and inundation damaged many homes in Gerritsen Beach and Sheepshead Bay. Elevation above the Federal Emergency Management Agency's (FEMA's) Base Flood Elevation (BFE) is required both to mitigate flood risk and to alleviate the financial burden of increased flood insurance premiums. The project would provide direct financial assistance through a community organization to fund elevation and/or retrofitting of homes in high-risk areas to increase resiliency against future floods. The project would include an outreach and public education component to inform homeowners about available assistance and new zoning regulations that permit building elevation within the floodplain. The project would complement existing City programs for home repair. Specific criteria to identify and evaluate candidate homes are to be developed.

Specific action items would include:

- Assess remaining need;
- Define target area and target clientele;
- Administer applications process; and
- Elevate homes and/or perform other floodproofing.

Cost estimate

This project is estimated to range in cost from $2.5 million to $3.5 million. This allocation would fund the retrofitting of homes through a variety of measures, including the installation of flood barriers, and elevation of the building to or above the Base Flood Elevation (BFE) on pilings, piers, or extended foundation walls. The number of buildings to be included in the project has not been established.

Single-family home elevated on pilings and reinforced concrete block after Superstorm Sandy, in Highlands, NJ

Source: URS

Benefits

Health and social

The project would benefit socially vulnerable households. These households may include, but are not limited to, individuals with limited English proficiency, households with children or elderly residents, households of low or moderate income, and individuals with access and functional needs. Additionally, given the costs of retrofitting and elevating homes, low and moderate-income households in particular would benefit from direct financial assistance through this project.

Economic

Elevation and/or retrofitting homes to mitigate flood damage would make more homes habitable in the aftermath of an emergency event. The expected reductions to short- and longer-term vacancy rates are likely to have a positive impact on local economic activity. Elevation serves a direct economic benefit to homeowners, and homes elevated above the BFE, in accordance with National Flood Insurance Program criteria, may be eligible for reduced flood insurance premiums.

Risk reduction

Proper elevation of homes raises living areas above the BFE, which would address all but the most severe floods. Therefore, any homes benefitting from the financial assistance proposed by this project would have significant reductions in risk and vulnerability scores. The Risk Assessment Tool shows changes in risk and vulnerability scores for the single-family home asset class in both neighborhoods.

Regardless of whether a home is elevated above the BFE, this project assumes that all residents will adhere to official evacuation orders. Although this project does not account for reduction of risk to the population during flood events, the project would reduce the incidence of building damage that causes hazardous situations for occupants, emergency response personnel, and others.

Cost-benefit analysis

Benefits associated with elevation of homes above the floodplain would be tied to the useful life of the structure. Potential impacts to neighborhood character and visual characteristics do arise with building elevation. These issues can be alleviated if entire blocks of homes are elevated. Building elevation would require the addition of access ramps/lifts to ensure easy access for the mobility-impaired and senior citizens.

Homes not elevated and/or retrofitted will remain as susceptible to damage as they were before Superstorm Sandy.

General time frame

Because this project requires further definition and scope, some of which is dependent on outcomes and lessons learned from existing City and State housing programs, this project is expected to take 24 months to complete. This time period would include activities such as screening and selection of buildings for retrofit, site assessment, design, permit applications, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Installation of Backflow Prevention Measures on City Infrastructure (Proposed Project)

This project would install valves or flap gates at stormwater outfall locations to prevent backflow flooding of interior areas.

Description

Backflow from sewer systems during Superstorm Sandy caused extensive damage, particularly in the inland sections of the neighborhood. Floodwater and storm surge pushed into the stormwater sewer system through outfall pipes, preventing water and wastewater from escaping and causing backup into houses, businesses, and streets. Backflow prevention technology works to keep backflow from inundating building interiors during periods of flooding, including extreme high tides, such as full-moon tides. This project would install valves or flap gates at appropriate stormwater outfall locations throughout Gerritsen Beach and Sheepshead Bay. The project would also modify catch basins to maximize capacity while preventing overflow. The primary phases of the project would be:

- Hydraulic analysis of existing stormwater infrastructure;
- Site survey to determine condition of pipes; and
- Identification of most suitable backflow prevention devices (gates, flap valves, etc.).

Using data from the New York City Department of Environmental Protection, 16 candidate locations have been identified that would experience reduced or eliminated backflow flooding during storm surge events.

Backflow prevention devices: Metal closure gates (above) and self-sealing rubber valve (below)
Source: AWMA Industries (top), Tideflex Technologies (bottom)

Cost estimate

The project is estimated to cost $740,000, which includes the site analysis and installation of backflow prevention devices such as rubber tide valves or flap gates on select City of New York stormwater outfalls and other drainage devices. The cost estimate is based on installation of components on five outfalls in Sheepshead Bay and 11 outfalls in Gerritsen Beach.

Benefits

Economic

This project would mitigate risk to local businesses that are currently susceptible to flooding from stormwater inundation. Local employment patterns may be positively affected by reduced business outage times in post-disaster scenarios. Minimizing floodwater/stormwater backflow during and after storm events would positively impact the local economy by minimizing business outage time and by reducing the number of residents forced from their homes for long periods of time.

Health and Social

Effective backflow prevention systems can reduce risks to public health posed by flooding of building interiors, including cross-contamination from comingled sewage or other pollutants. Socially vulnerable populations, including children, individuals with disabilities, senior citizens, and low- and moderate-income persons, would benefit from this project. Health and social service facilities would more easily be accessed during and after flooding events as a result of implementing backflow prevention technologies.

Environmental

This project would reduce the risk of contamination from stormwater, floodwater, and wastewater flowing into floodwaters or local water bodies, including Sheepshead Bay and Gerritsen Inlet.

Risk reduction

This project would reduce risk to physical assets by preventing floodwater and/or wastewater backup into homes, businesses, and streets. Further spatial analysis is required to determine the optimal locations for installation of measures such as rubber tide valves and flap gates. When this analysis is complete, quantifying the reduction of risk to assets will be possible.

Floodwater and stormwater backflow into buildings creates health hazards for building occupants. Residents would benefit from reduced exposure to these hazards and from reduced flooding risk associated with backflow.

Cost-benefit analysis

The project useful life is limited to the effective life of backflow prevention devices, which is assumed to be 30 years. Maintenance and replacement of individual components, as needed, would be required to keep backflow prevention systems operating. The useful life can be extended indefinitely through maintenance and ongoing replacement of individual valves/devices.

If this project is not implemented, the Community will remain vulnerable to backflow inundation during and after acute storm and flooding events.

General time frame

The project is estimated to require up to 12 months to complete, including site assessment, hydraulic modeling, selection of specific measures to be installed, and construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York State Department of Health Guidelines for Designing Backflow Prevention Assembly Installations and Cross-Connection Control Program.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Study of Street and Drainage Infrastructure Repair Needs in Gerritsen Beach (Proposed Project)

This project would identify and repair or reconstruct specific street segments in need of repair throughout Gerritsen Beach.

Description

Flooding from Sandy adversely affected road and utility conditions in Gerritsen Beach and increased the likelihood of extended power outages and impassibility of local roads. This project would identify the necessary repairs and modifications needed to be made to roadway surfaces, sidewalk, catch basins, and drainage infrastructure. Project cost assumes an evaluation of repairs needs throughout Gerritsen Beach.

The New York City Department of Transportation (NYC DOT) has budgeted in its 10-year capital plan for the repair or reconstruction of approximately 6,300 linear feet of streets in the "old section" south of the Gotham Avenue Inlet. These street segments are located along Bartlett Place, between Cyrus and Seba Avenues.

This project would identify the needs for repair or reconstruction of the approximately 13.5 miles of neighborhood streets not included in the NYC DOT capital plan. The major steps of the project would include:

- Review of existing street condition assessments;
- Performance of onsite surveys over the approximately 13.5 miles of roadway in the neighborhood not covered by the scheduled DOT plan;
- Selection of appropriate design standards to conform to site conditions and NYC DOT standards;
- Identification of repairs needed to specific catch basins or other drainage infrastructure.

Deteriorating side street in Gerritsen Beach
Source: URS

Cost estimate

The project is estimated to cost $200,000 to perform a detailed inspection and assessment of current roadway and stormwater drainage conditions for approximately 13.5 miles of roadway, and recommendations for type and scope of repairs and improvements.

Benefits

Economic

A properly operating roadway and associated drainage systems would help to prevent localized flooding of properties through reduction of excess stormwater runoff and ponding on neighborhood streets. Improvements to catch basins and stormwater outfalls would reduce backflow flooding of interior areas. Local property values may be adversely impacted by the current condition of the neighborhood's roads and stormwater drainage infrastructure. A project that returns these systems to good working order may increase local property values.

Health and Social Services

The identification of specific street segments in need of repair may lead to improvements that make it easier for emergency services (e.g. fire and ambulance) to respond to calls. Driving and walking conditions in the neighborhood are made worse by cracked and uneven pavement and frequent ponding and nuisance flooding.

Environmental

Improved roadway conditions, including drainage systems, would produce less stormwater runoff which would in turn have water quality benefits.

Risk reduction

Any physical repairs resulting from this project would reduce risk to physical assets through improvement of pavement and drainage infrastructure, which would reduce nuisance flooding during heavy rainfalls, and help roadways to better withstand future flood events by enhancing their foundations.

Cost-benefit analysis

Planning for this project would identify the best use of funds for street and drainage infrastructure repairs. Once constructed, the useful life of reconstructed roads is typically 5 years (industry standard) before maintenance activities, such as addition of asphalt or repaving, are required. Disruption of traffic patterns/parking would occur in the neighborhood while work is in progress. If this project and identified repairs are not undertaken, local roads will deteriorate further. The outage likelihood for asset systems will increase as road conditions decrease.

General time frame

The project is estimated to require 6-8 months, including detailed roadway condition surveys and identification of necessary repairs.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: NYC DOT Street and Roadway Construction regulations and NYC DOT Street Design Manual.

Jurisdiction

The project is located in the Gerritsen Beach neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

Installation of Sewer Connection Cut-Off Valves
(Proposed Project)

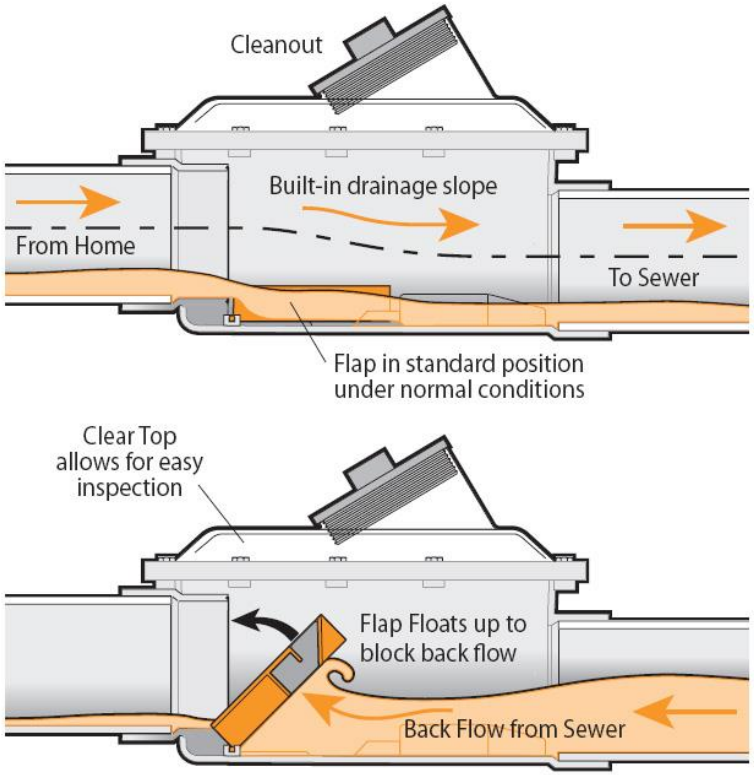
This project would provide direct financial assistance to home and business owners and community facilities for the installation of sewer connection cut-off valves to prevent sewage backflow during floods.

Description

Floodwater from coastal and surface flooding entered buildings through sewer lines during Superstorm Sandy, resulting in sewage backflow into buildings. This resulted in widespread and extensive building damage, high cleanup costs, and potential exposure to hazardous materials. This project would provide direct financial assistance for the installation of sewer connection cut-off valves in homes, businesses, and community facilities. In addition, this program would provide education and public outreach related to proper operation and maintenance of these devices.

Valves would be installed within structures and operated by the building owner, tenant, or operator. Installation requires cutting existing sewer pipe, installing the cut-off valve, resealing the pipe, and creating an access panel for valve operation. Limited excavation to access in-ground pipes is required; structures have either in-ground or aboveground sewer connections. As part of this project, both self-deploying and manually operated valves would be evaluated for consideration. The project cost estimates assumes that several thousand structures would be retrofit in the Community.

Performance of this work could be coordinated with existing programs administered by the City of New York and non-profit organizations active in the Community. Installers could be hired locally and trained. Use of local labor would directly address the workforce development needs



Self-deploying cut-off valve that prevents sewage backflow into buildings during floods
Source: AWMA Industries

identified by the Committee throughout the NYRCR planning process. For example, if workers were supervised by licensed master plumbers, their time spent working on the project would count towards the experience requirements for their own licensure.

This project was consistently rated as a top priority at both Public Engagement Events and Planning Committee Meetings. Planning Committee Members who emphasized the importance of infrastructure improvements were particularly supportive of this project because of its low unit cost and scalability. This project can be applied to the full range of building types in the Community, including businesses, single-family homes, multi-unit apartments, supportive housing, and assisted-living facilities.

Cost estimate

This project is estimated to cost $5.7 million, based on installation of sanitary sewer connection cut-off valves (also known as backflow prevention devices) to several thousand buildings. Project cost includes materials, installation, and coordination with building owners, occupants, and relevant City agencies.

Benefits

Economic

Minimizing sewage backflow during and after storm events would positively impact the local economy by reducing or eliminating direct damage to building interiors through sewage backflow. In addition, it would minimize business outage time and reduce the number of residents forced from their homes for long periods of time. Local employment patterns may also be positively affected by reduced business outage times in post-disaster scenarios and through the workforce development component of the project.

Health and social

Effective backflow prevention systems can reduce risks to public health posed by cross-contamination. This project would reduce flooding inundation caused by backflow. Socially vulnerable populations, including but not limited to children, individuals with disabilities, senior citizens, and low- and moderate-income persons, would benefit from this project. Health and social service facilities would remain open and functional as a result, and be better positioned to provide essential services to residents.

Environmental

The project would achieve environmental benefits by reducing the flow of untreated sewage into homes, businesses, and onto roadways. Contamination of floodwater through sewage overflow was a hazard faced by residents during Superstorm Sandy. In addition, reduction of backflow would reduce the flow of untreated waste into local water bodies, including Sheepshead Bay and Gerritsen Inlet.

Risk reduction

This project would reduce risk to physical assets by preventing water and/or wastewater backup into buildings. This project is currently scoped to provide risk mitigation benefits to up to 4,000 buildings within the Gerritsen Beach/Sheepshead Bay Community, depending on site conditions and specific cut-off valve units required. However, the project is scalable and can provide direct benefit to any number of buildings, given the appropriate funding. Backflow inundation during Superstorm Sandy resulted in potential exposure of Community residents to hazardous materials. This project would reduce similar risks to the population in future storm and flooding events.

Cost-benefit analysis

The project's useful life is limited to the effective life of backflow prevention devices. Maintenance and replacement of individual components, as needed, would be required to keep backflow prevention systems operating. Useful life is estimated to be 50 years, but can be extended further through maintenance and ongoing replacement of individual valves/devices. Proper usage of sewer connection cut-off valves requires homeowner education and understanding of the technology.

If the project is not implemented, homes and businesses within the Community will remain susceptible to backflow inundation and associated building damage and cross-contamination.

General time frame

The project is estimated to take 18 to 24 months to complete, depending on the number of buildings to be retrofit.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City Department of Environmental Protection (NYCDEP) water and sewer regulations; NYC building code requirements.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Repair and Reconstruction of Canton Court Bulkhead
(Proposed Project)

This project would reconstruct the failing bulkhead at the end of Canton Court in Gerritsen Beach and repair the adjacent roadway.

Description

The bulkhead at the southern end of Canton Court, which supports the roadway, was severely damaged during Superstorm Sandy. As a result, the street has begun collapsing, creating a potentially unsafe condition for residents, drivers, and pedestrians. This project would reconstruct the failing bulkhead at the end of Canton Court and repair the adjacent roadway. Both structures would be returned to full working order in compliance with New York City Department of Transportation (NYC DOT) standards. A new foundation for the bulkhead would be constructed, the existing bulkhead replaced, and the affected portion of the roadway excavated and replaced with standard materials for a residential street.

Cost estimate

This project is estimated to cost $490,000, including the removal of the existing, deteriorated bulkhead, installation of a new bulkhead, and repair of the roadway and drainage system. Engineering and design, and construction management costs are included.

Benefits

Economic

Property values on Canton Court may be adversely impacted by the deteriorating and unsafe condition of the roadway and bulkhead. A project that returns the road and bulkhead to good working order may increase property values for adjacent and nearby buildings, and would prevent further damage to the road and bulkhead during future storm events.

Failing bulkhead and roadway at Canton Court

Source: https://www.flickr.com/photos/gerritsenbeach/792646054/

Health and social

This project would benefit the residents of adjacent homes, other residents on Canton Court, and less directly, other residents of Gerritsen Beach. In its present condition, the roadway may be unsafe for emergency vehicles such as ambulances and fire trucks.

Risk reduction

This project would reduce risk to single-family homes located on Canton Court, to the bulkhead at the road end, and to the street itself. In addition, it would reduce risks to residents; at present, the roadway may not be capable of supporting emergency service vehicle traffic and is in danger of collapse.

Cost-benefit analysis

A reconstructed bulkhead is expected to last at least 30 years; the existing bulkheads are substantially older than that. Reconstructed road segments would need standard maintenance; limited repaving/repainting may be needed within 5 to 10 years.

If the project is not implemented, the bulkhead and roadway may fully collapse into Plumb Beach Channel. Serious damage to homes and local infrastructure systems would likely result from a total street collapse. The longer this project is deferred, the more likely it is that an increasingly costly intervention would eventually be required.

General time frame

The project is estimated to take 6 to 9 months to perform site inspection, design replacement measures, obtain permitting, and perform the construction.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: NYC DOT Street and Roadway Construction regulations and NYC DOT Street Design Manual. This may also involve the New York State Department of State, U.S. Army Corps of Engineers, and Coastal Zone Management consistency concurrence.

Jurisdiction

The project is located in the Gerritsen Beach neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

Feasibility Study to Improve the Resiliency of the Courts in Sheepshead Bay (Proposed Project)

The feasibility study would identify and evaluate the full range of options to reduce potential future damage to the Courts in Sheepshead Bay.

Description

The storm surge and flooding from Superstorm Sandy devastated the bungalow courts along Emmons Avenue in Sheepshead Bay. Between East 29th Street, Coyle Street, the Belt Parkway, and the waterfront, more than 200 homes are grouped in six courts. These courts are approximately 5 feet below the street level of Emmons Avenue and are not connected to City drainage infrastructure. Ponding and nuisance flooding are common during and after heavy rains. During Superstorm Sandy, floodwater from storm surge was trapped in the courts north of Emmons Avenue, causing significant damage to homes. Overall, the courts are at a higher risk of flooding than adjacent areas, particularly those on the waterfront south of Emmons Avenue. Additionally, increased flood insurance premiums would pose financial challenges to many residents and owners. The feasibility study would aim to address the following: resiliency modifications to buildings, walkways, and shared services within the courts; the potential benefits of officially mapping the courts as City streets or pathways; and operations and maintenance responsibilities of homeowners and the City in regard to connecting to the City's utilities infrastructure. The Committee identified the need to address this problem at its initial meeting and have received strong public support for the project.

Stanton Court, Sheepshead Bay
Source: URS

Cost estimate

This project is estimated to cost $150,000. The cost is based on performing a risk assessment of the buildings in the courts, and performing an evaluation of potential measures to reduce risk. The feasibility study would also identify methods for improving drainage and other utility services, and identify and evaluate potential large-scale modifications, such as elevation of the homes and walkways. This project could be completed within 12 months, and the cost estimate assumes extensive coordination with residents and relevant City of New York agencies.

Benefits

Economic

This project would identify methods to reduce risk (primarily flooding) and improve drainage and other infrastructure services. Such methods would reduce direct damages to buildings and contents, and improve the overall resiliency of the courts. These changes would reduce future repair costs for residents, and would likely increase the value of the building stock.

Health and social

The proposed study may identify a range of structural solutions that would reduce risks to socially vulnerable resident populations of the Sheepshead Bay courts. These vulnerable populations include, but are not limited to, children and the elderly, low- and moderate-income households, and individuals with access and functional needs. More generally, the project may eventually benefit all residents of the Sheepshead Bay courts by facilitating access to health and social services facilities.

By evaluating and identifying a range of measures to address the flood risk, drainage problems, and remaining physical damage to homes, the project would significantly advance overall risk reduction for both the residences and their occupants. Any resulting physical modifications, such as connections to City utilities or elevation of homes and walkways, which result from the plan, would be of direct benefit to residents.

Risk reduction

The study component of this project would identify measures to reduce risks to physical assets, namely the single-family homes in the courts. In addition, it would identify measures to improve stormwater drainage and help alleviate the persistent nuisance flooding that occurs during rainfall.

The risk-reduction measures identified by the plan would also reduce risks to the occupants of the courts, which is a greater concern than reduction in structural damage.

Cost-benefit analysis

No negative externalities have been identified. Opportunity costs may arise if a given alternative is not explored in sufficient depth to determine whether it would be an effective measure to increase resiliency of the courts. The study may determine the advisability of implementing structural solutions for which funding is not currently available or identified.

Planning solutions are badly needed to protect the safety and economic well-being of the courts' residents and property owners. Any solution or range of solutions identified through this planning process would require cooperation or participation by a broad range of governmental and private entities.

General time frame

The project could be completed within 12 months.

Local, State, and Federal Government regulatory requirements

Applicable City of New York land uses laws and procedures, such as Uniform Land Use Review Procedure, local zoning, City building codes, and Federal Emergency Management Agency floodplain mapping and insurance requirements.

Jurisdiction

The project is located in the Sheepshead Bay neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

Reconnaissance Study for Storm Surge Reduction and Flood Barrier Systems (Proposed Project)

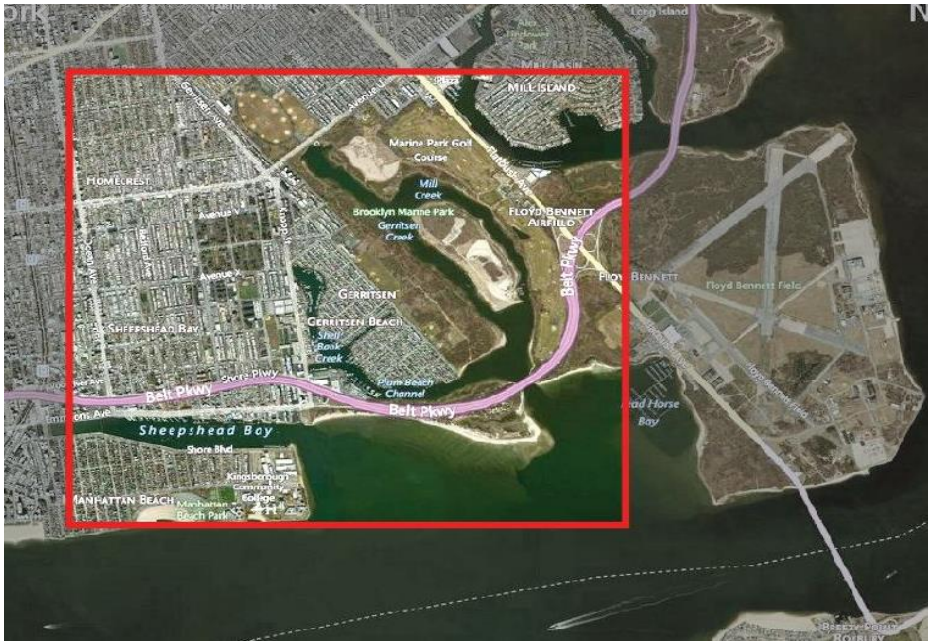
This project would evaluate a range of options for reducing storm surge and flooding.

Description

During Superstorm Sandy, storm surge and floodwaters inundated most of Gerritsen Beach and the southern sections of Sheepshead Bay through Gerritsen Inlet, Sheepshead Bay, and low-lying portions of Plumb Beach. This project would evaluate a range of options for reducing storm surge and flooding in these neighborhoods, including the neighboring community of Manhattan Beach, just across Sheepshead Bay.

Specifically, both green and grey infrastructure options would be examined, including flood barriers and gates, dune enhancements and wetlands, and sea walls and road improvements. The study would also determine the potential effectiveness of deployable flood walls and passive flood barrier systems to mitigate flood damage along the Emmons Avenue corridor and neighboring Manhattan Beach.

If the reconnaissance study identifies viable options, it may warrant Federal participation in a more detailed engineering phase, and a construction phase could follow. This project would complement the larger, ongoing U.S. Army Corps of Engineers (USACE) study of flood reduction measures for the Rockaway Peninsula and Jamaica Bay. In addition, the NY Rising Community Reconstruction (NYRCR) Brighton Beach, Coney Island, Manhattan Beach, Sea Gate Planning Committee has agreed to partner and cost-share this project.



Study area for reconnaissance study of storm surge reduction measures
Source: URS

Cost estimate

This project is estimated to cost $100,000, which is the limit for reconnaissance studies under USACE guidelines.

Benefits

Health and social

The study may lead to identification and construction of structural measures that would protect socially vulnerable populations, including but not limited to children and the elderly, individuals with access and functional needs, and low- and moderate-income households. As listed in the asset inventory, and described via the Risk Assessment Tool, a considerable number of essential health and social services are located in areas currently defined as high- or extreme-risk by New York State. A theoretical structural intervention to mitigate local flood risk might benefit multiple socially vulnerable populations by reducing risk to these assets during and after acute events.

Economic

Economic benefits would not directly be realized through this reconnaissance study. However, infrastructure constructed based on the study could realize several economic advantages, including: mitigation of costs associated with flooding repairs to home and business owners; reduction of flood insurance premiums; increase to property values; and the increase of economic activity through the mitigation of business outages and displacement of the local population due to flooding.

Risk reduction

The study seeks to identify structural interventions that would reduce risk to the residents of Gerritsen Beach and Sheepshead Bay. In addition, it would seek measures that would reduce risk to a wide range of physical assets, including homes, businesses, community facilities such as schools, and infrastructure.

This study offers the opportunity to identify long-term approaches to reduce the potential for future flood damage. Environmental impact analysis would be required at a later stage to evaluate any effects of floodgate, seawall, levee, or related measures. Additionally, the City of New York has indicated that it may prefer to explore alternate means of mitigating flood hazards to a broader geographic area.

If the project is not undertaken, there would be no basis for conducting a more in-depth feasibility study.

Cost-benefit analysis

This study offers the opportunity to identify long-term approaches to reduce the potential for future flood damage. Environmental impact analysis would be required at a later stage to evaluate any effects of floodgate, seawall, levee, or related measures. Additionally, the City of New York has indicated that it may prefer to explore alternate means of mitigating flood hazards to a broader geographic area.

If the project is not undertaken, there will be no basis for conducting a more in-depth feasibility study.

General time frame

A reconnaissance study may require up to 12 months for completion.

Local, State, and Federal Government regulatory requirements

The study would conform to the all relevant methodological and process requirements as defined by USACE. It will also involve New York State Department of Environmental Conservation and New York State Department of State.

Jurisdiction

The project is located in the Gerritsen Beach, Sheepshead Bay, and Manhattan Beach neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Supplemental Community-Driven Emergency Response Programs (Featured Project)

This project focuses on assisting local organizations to prepare neighborhood-level response plans and expand their response capacity. In Sheepshead Bay, it involves the creation of a neighborhood-level emergency response organization.

Description

The City of New York has an existing city-wide emergency response protocol. The neighborhoods of Gerritsen Beach and Sheepshead Bay believe a localized response mechanism should be developed to work in concert with the New York City Office of Emergency Management (NYC OEM) protocol to provide a more nimble solution in the immediate aftermath of disaster. This project would include capacity building for designated community groups. Specifically, the project would develop or enhance neighborhood-level plans for emergency response; identify means to acquire needed training for responders; and focus on meeting the needs of vulnerable populations. While Gerritsen Beach has an existing local response group in the Gerrittsen Beach Fire Department (GBFD) (also known as the Vollies), Sheepshead Bay lacks its own neighborhood-level response organization. Key project components would include the establishment of a neighborhood-level emergency response team for Sheepshead Bay, which would include a block captain system. Specific measures to be implemented include:

- Development of a community alert mechanism;
- Translator identification and recruitment;
- Identification of medical care/supply needs of residents; and
- Advance planning and training for evacuating and assisting vulnerable populations.

Training session for volunteer first responders

Volunteers assisting disaster victims at a local shelter
Source: Creative Commons (top and bottom)

Cost estimate

The project is estimated to cost $150,000, which would fund the creation of a Sheepshead Bay Emergency Response Team, training, and the various other tasks described above.

Benefits

Health and social

The project provides emergency planning, community organization, and emergency response services that are specifically customizable to the needs of socially vulnerable populations. These benefits would accrue to Sheepshead Bay residents through preparation of localized response plans and creation of a neighborhood-level response organization. Given the large physical area and population density of Sheepshead Bay, these benefits would improve the resiliency of a substantial population.

Risk reduction

This project would directly benefit residents of Sheepshead Bay, many of whom would derive direct benefit from one or more of the project subcomponents. This project would specifically reduce risk to residents by creating a neighborhood-level team to provide efficient delivery of emergency response and through the preparation of local response plans.

Cost-benefit analysis

Once achieved, the benefits of the expansion of local emergency management capacities would continue to accrue indefinitely. Maintenance of the expanded capacity may require training, equipment upgrades, and continued planning efforts. The benefit of this expansion would be particularly welcome in Sheepshead Bay, which does not have a neighborhood-level emergency response organization.

If this project is not implemented, the ability of neighborhood to provide critical emergency services would be expected to remain at current levels. However, opportunities to enhance these capacities would be missed.

General time frame

The project could begin within 1 month, with expected completion within 12 months.

Local, State, and Federal Government regulatory requirements

Neighborhood-level emergency management planning would be done with technical assistance from NYC OEM and other relevant entities.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Support the Resiliency and Maintenance of Plumb Beach
(Featured Project)

This two-part project calls for an expansion of the U.S. Army Corps of Engineers study of Upper Jamaica Bay, as well as for the development of a Memorandum of Understanding (MOU) with all relevant parties at Plumb Beach. Together, these efforts will ensure the long-term sustainability of Plum Beach and beyond.

Description

Plumb Beach is a centrally-located open space asset in Sheepshead Bay that provides opportunities for recreational use, economic benefits, and natural protection from floodwaters and waves. During Superstorm Sandy, Plumb Beach and the Belt Parkway were subject to overtopping, leading to flooding of adjacent neighborhoods and roads.

This project urges the U.S. Army Corps of Engineers (USACE) to include Gerritsen Beach, Sheepshead Bay, and Manhattan Beach, in the USACE East Rockaway Inlet to Rockaway Inlet Reformulation Study. This would include Plumb Beach and the water body of Sheepshead Bay, which were points of entry for storm surge during Superstorm Sandy. The expanded study would evaluate potential flood risk-reduction measures in these areas. This request is also supported by Jamaican Bay Working Group recommendations outlined in Section I.

Maintenance and upkeep of the beachfront is limited, and the sole building (the Roundhouse) was closed as a result of structural deterioration. City of New York agencies and the National Park Service (NPS) lack clarity on the ownership, jurisdiction, and maintenance of this area. Thus, this project

Aerial view of Plumb Beach, looking west, with Gerritsen Inlet bridge in foreground

calls for the development of an MOU with relevant agencies, including the New York City Department of Parks and Recreation and NPS.

An effective maintenance and operations plan at Plumb Beach could increase public safety through the increased presence of Parks personnel, more frequent removal of trash from the beachfront, and establishment of enhanced visitor facilities. The plan would identify which parties are responsible for implementation of potential future storm damage reduction measures, such as dune enhancements.

The development of an MOU would provide a mutually agreeable, legally binding framework for the future use and maintenance of Plumb Beach. This project would require the involvement of staff and legal counsel from the relevant agencies to research the existing jurisdictional arrangements and identify revisions for future arrangements. This MOU will help to obtain a clear understanding of jurisdiction and maintenance responsibilities at Plumb Beach to ensure the long-term sustainability of this asset, and identify ways to further increase its value to the community.

Cost estimate

This project is estimated to be a zero cost item, as it requires only coordination between various agencies, and includes no construction costs.

Benefits

Environmental

Inclusion of Plumb Beach in the USACE Jamaica Bay Reformulation Report would entail analysis of the environmental conditions on site, and identification of any potential negative effects from project measures on environmental resources. The MOU may identify potential opportunities to enhance the natural habitat values of Plumb Beach.. According to the New York City Audubon Society, Plumb Beach provides "nesting, foraging or stopover habitat for common and least terns, black skimmers, red knot, piping plover, northern harrier, and Nelson's and saltmarsh sparrows all of which are state- or federally-listed as threatened, endangered or species of concern." The beach also provides key habitat for the largest concentration of horseshoe crabs in New York State. The MOU may contain provisions for more frequent trash cleanup at Plumb Beach and better maintenance of building facilities.

Risk reduction

Discussion and analysis under this project may identify methods to reduce future flood risk to Plumb Beach itself, and may identify measures by which Plumb Beach can help to further reduce direct wave impacts or inundation to adjacent developed areas. Increased maintenance and a clearer operations plan for Plumb Beach may increase the safety of site users, both through increased site supervision and removal of hazardous materials and debris on the beachfront.

Cost-benefit analysis

Environmental

A legally binding framework for jurisdiction, maintenance, and operation of Plumb Beach would have long-term benefits that would theoretically continue in perpetuity.

If the project does not proceed, the responsible parties for operational and maintenance tasks related to Plumb Beach would remain unknown. Committee members and Public Engagement Event attendees report that Plumb Beach is poorly kept and that conditions dissuade visitors from using the open space and water resources at Plumb Beach. Without an MOU, any entity undertaking broader habitat restoration or protection measures at this location is unlikely.

General time frame

Given the need to coordinate among multiple parties, the drafting and adoption of an MOU is anticipated to require 3 to 6 months for completion. The expansion of the USACE study to include Plumb Beach and adjacent areas may require 6 to 12 months.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York State Coastal Policies and relevant provisions of the NYC Waterfront Revitalization Program.

Jurisdiction

The project is located in Brooklyn Community District 15, in the Sheepshead Bay neighborhood of Kings County (Brooklyn), in the City of New York.

Homeowner Education Program (Featured Project)

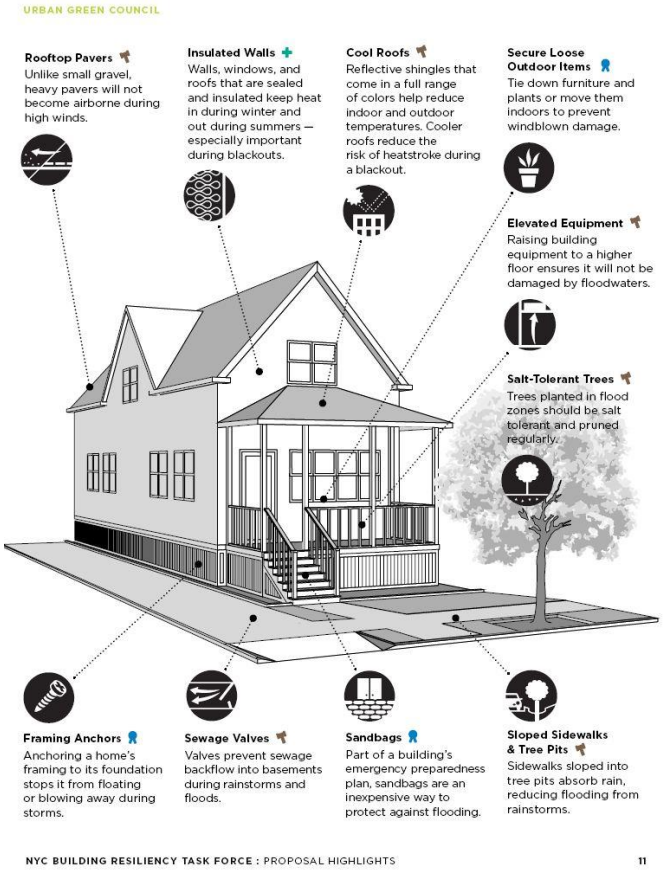
This project would inform the Community of existing resiliency programs, policies, and practices that would protect homes.

Description

This project would provide a targeted and coordinated distribution of information already available to homeowners through existing City, State, and Federal programs. This project would also provide tailored information sessions to local residents on the programs, policies, and building practices that increase resilience and protect community assets**.** The project would coordinate with existing programs administered by the City of New York and non-profit organizations. The project could be managed by existing entities such as local civic associations, volunteer groups, and the Community Board to supplement the ongoing outreach programs operated by City, State, and federal agencies.

By collecting and streamlining the wide array of available information, this project would help local residents to better understand the requirements for retrofit and rebuilding, and the various forms of assistance available. Topics would include available insurance programs and relevant regulations, developing familiarity with resilient building techniques, and evolving zoning regulations related to flood risk reduction. Outreach strategies would be developed to ensure equitable access to information for the Community members of both Gerritsen Beach and Sheepshead Bay.

Early action items could include a survey of local homeowners, an evaluation of structural repair and rebuilding needs in the community, and a review of available information on resilient building techniques. Additional first-phase activities could include a targeted outreach to inform homeowners of changes to the National Flood Insurance Program and local floodplain mapping.



Resilient Building Techniques for Homes in the Floodplain
Source: NYC Building Resiliency Task Force

Cost estimate

This project is estimated to cost $30,000, based on anticipated costs for printing and distribution of educational materials, limited labor costs for distribution, renting facilities to hold community information sessions, and related costs.

Benefits

Health and social

The project would benefit socially vulnerable households that may include individuals with limited English proficiency, households with children or elderly residents, low- or moderate-income households, and individuals with access and functional needs. In particular, low- and moderate-income households would benefit from information on insurance programs, relevant regulations, and building techniques.

Economic

If implemented, information and programs pertaining to resilient building techniques and the elevation or retrofitting of homes to mitigate flood damage would make more homes habitable in the aftermath of an emergency event. Reduced flood insurance premiums and greater familiarity and comfort with insurance policies and zoning regulations would help to encourage stabilization, growth, and investment in the NY Rising Community Reconstruction Community.

Risk reduction

The project streamlines communication about programs, policies, and building practices addressing resiliency. Therefore, any residences benefitting from the assistance proposed by this project would have reductions in risk and vulnerability scores.

Regardless of whether programs are adopted, this project assumes that all residents would adhere to official evacuation orders in the future. Although this project does not account for reduction of risk to the population during flood events, the project could reduce the incidence of structural damage that causes hazardous situations for occupants and emergency response personnel.

Cost-benefit analysis

Homeowner benefits associated with retrofits, resiliency measures, and flood protection efforts would be tied to the useful life of the structure.

Homes that are not elevated, retrofitted, or made subject to flood resiliency measures would remain as susceptible to damage as they were before Superstorm Sandy.

General time frame

This project could continue as needed, up to 2 years.

Local, State, and Federal Government regulatory requirements

The program would distribute literature and information that discussed applicable City zoning and building codes, and federal flood insurance requirements. No construction would occur under this project.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Construct a Resilient Comfort Station at Brigham Park in Sheepshead Bay (Featured Project)

This project would expand on the current plans (Phase 1) at Brigham Park to include a comfort station.

Description

The Brigham Street Park, now a vacant tract of land, is undergoing a transformation to a vibrant green, local park with a playground, walking path, and picnic tables. This new park would serve as the gateway to Plumb Beach. The New York City Department of Parks and Recreation's plans are an important investment in the economic, natural, and cultural wealth of Sheepshead Bay. This project would expand on the current plans (Phase 1) at Brigham Park to include a flood-resilient comfort station (bathrooms). The year-round facility would be built and elevated above the Federal Emergency Management Agency Base Flood Elevation (BFE) and would be maintained by the New York City Department of Parks and Recreation. This would make the park more appealing for local and non-local visitors. During times of flooding in the area, the comfort station would be a useful resource for residents of flooded buildings.

Cost estimate

The cost of the Phase II resilient comfort station is estimated by the New York City Department of Parks and Recreation to be $2.7 million dollars. This cost includes all site preparation, utility connections, and construction of the comfort station building.

Rendering of Brigham Park after Phase I construction; future site of a comfort station is indicated by a red circle
Source: NYC Department of Parks

Benefits

Health and social

The project makes park use safer and more convenient for local and non-local visitors.

Economic

The project would benefit local economic activity by enhancing recreational opportunities and increasing visitation and tourism to the area. The Brigham Park site is immediately adjacent to a City-owned bike path, Plumb Beach, and the Gateway National Recreation Area; thus, users of these facilities would also benefit from the comfort station.

Environmental

The project enhances recreation value of adjacent areas, including the Emmons Avenue waterfront and New York City Parks Department Bike Path.

Risk reduction

This project would construct a useful public amenity (comfort station) elevated above the BFE and constructed with resilient and flood-resistant materials. The facility would be expected to sustain minimal damage during future floods.

Cost-benefit analysis

The useful life of the comfort station is limited to the useful life of the hosting building, which can be estimated to be 50 years or more. The plumbing, toilets, sinks, and other fixtures would require maintenance and replacement as needed during this period.

General time frame

Construction would be expected to be complete within 6 to 9 months.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: New York City (NYC) Zoning Resolution, including the 2013 Flood Resiliency Zoning Text Amendment; NYC Mechanical Code; 2008 NYC Construction Code, and all subsequent amendments; 1968 NYC Building Code, and all subsequent amendments; NYC Fire Code; and the International Building Code, if applicable.

Jurisdiction

The project is located in the Sheepshead Bay neighborhood of Brooklyn Community District 15, in Kings County, in the City of New York.

Establish Merchants Associations (Featured Project)

This project would help to increase cooperation among merchants and commercial stakeholders by establishing associations, or other formal business organizations, on key commercial corridors.

Description

Superstorm Sandy damaged or destroyed a significant number of small businesses in Gerritsen Beach and Sheepshead Bay. Key commercial corridors had prolonged business closures that were partially attributable to a lack of preexisting business organization and coordination. The ability of businesses to mitigate storm damage and reopen quickly is often linked to access to information about available loans/grants, insurance programs, and or other resiliency measures. This project would increase cooperation among merchants and commercial stakeholders by establishing associations, or other formal business organizations, on key commercial corridors. These corridors could include Emmons Avenue, Coney Island Avenue, Sheepshead Bay Road, Kings Highway, Avenue U, and Gerritsen Avenue. These organizations could disseminate best practices to their members, identify and implement actions aligning with shared goals, and provide information to their constituencies. Early steps in the project could include a survey of local businesses, residents, and visitors and conducting an assessment of business owners' needs for information and remaining challenges faced from damage due to Superstorm Sandy.

Cost estimate

The project is estimated to cost $35,000, based on anticipated activities such as surveys of business owners, public meeting, information distribution, and preparation of association charters or similar documents.

Along the Sheepshead Bay Road business corridor
Source: URS

Benefits

Economic

Business Improvement Districts (BIDs) and other, less formal, merchants associations have been correlated with increased economic and job activity. Establishment of merchants associations would promote a more vibrant retail and commercial climate. The evolution of new merchants associations into full-fledged BIDs may result directly in the addition of new permanent jobs. Indirectly, the economic development effects of merchant organization may lead to the creation of new jobs.

Risk reduction

This project would enhance coordination among businesses to promote sharing of information on resiliency and disaster preparedness, reducing threats to physical assets. In addition, the project would improve coordination among businesses to promote sharing of information on resiliency and disaster preparedness in the face of future disaster threats to the Community.

Cost-benefit analysis

The benefits of local merchants associations, once established, would continue indefinitely. The merchants associations can adapt to face new challenges as needed.

If this project is not implemented, businesses and commercial areas would lack the framework and organization for proper information sharing and coordination for disaster preparedness and resiliency. This may reduce the potential for future investment and business growth.

General time frame

It is estimated that completion of formal arrangements of Merchants Associations would occur within 12 months.

Local, State, and Federal Government regulatory requirements

The following is a partial list of applicable requirements: regulations pertaining to formulation of BIDs and the Administrative Code of the City of New York.

Jurisdiction

The project is located in the Gerritsen Beach and Sheepshead Bay neighborhoods of Brooklyn Community District 15, in Kings County, in the City of New York.

Along the Gerritsen Avenue commercial corridor, Gerritsen Beach
Source: URS

Section V:
Additional Materials

Section V: Additional Materials

A. Additional Resiliency Recommendations

Table V-1: Additional Resiliency Recommendations for Gerritsen Beach and Sheepshead Bay

Strategy	Project Name	Short Project Description	Regional Project (Y/N)	Estimated Cost
New investments in infrastructure that most effectively improve services to the community, resilience, and economic growth	**Feasibility Study on Suitability of Microgrid Power Generation in Hospitals and Senior Citizen Housing**	Educational outreach to local non-governmental organizations, community groups, and building operators on the benefits and drawbacks of microgrid power generation systems for key facilities and multi-unit buildings; use Brightwaters Towers (Coney Island) micro-grid project as a local area case study	N	$150,000
Assist residents returning to storm-damaged housing and identify available funding sources for residents to address post-disaster housing needs, such as repair and retrofit	**Financial Assistance for Supportive Housing Facility Owners**	Develop grant and/or loan program(s) to help residents and facility owners of housing for socially vulnerable populations to elevate or floodproof mechanical systems, including boiler; heating, ventilation, and air conditioning systems; and electrical panels	N	$100,000
	Organize Community Volunteer Teams to Assist with Repair of Damaged Homes	Organize community volunteer teams to perform necessary repairs of damaged properties in post-disaster settings	N	$100,000
Preserve and promote affordable homeownership within the existing neighborhood fabric and character	**Incentives to Promote Development of Affordable Housing and/or Community Facilities**	Investigate potential effectiveness of financial or other incentives to encourage owners of never-occupied residential units in Sheepshead Bay to allow redevelopment as affordable housing and/or community facilities	N	$150,000
Protect and make resilient seniors and other potentially vulnerable populations (e.g., disabled) through increased access to basic health care, emergency needs, and basic daily necessities (e.g., food and shelter) both on a long-term basis and after disasters	**Obtain Mobile Pharmacies and Medical Treatment Vans**	Organize agreements to deploy mobile pharmacies and medical treatment vans to provide necessary services in post-disaster setting	N	$100,000
	Establish Emergency Transportation Services	Establish emergency transportation services to take residents to shelters, medical facilities, and supply distribution locations	N	$500,000

B. Master Table of Projects

Table V-2: Master Projects for Gerritsen Beach and Sheepshead Bay

Strategy	Project Name	Short Project Description	Project Category	Estimated Cost	Regional Project (Y/N)
Foster a thriving and resilient small business community	**Installation of Backup Generators at Key Community Facilities**	Install generators at schools, shelters, assisted living facilities, etc. to reduce downtime and provide services post-emergency	Proposed	$2,550,000	N
	Retrofitting of Key Businesses and Community Services Assets	Provide funds to elevate mechanical equipment and prevent interior flooding of key locations (criteria to be developed)	Proposed	$2,500,000	N
	Establish Merchants Associations	Increase coordination among businesses to promote sharing of information on resiliency, disaster preparedness, and economic development	Featured	$35,000	N
Increase community preparedness and emergency response capabilities	**Identification and Retrofit of a Building for Use as an Emergency Response and Recovery Center in Sheepshead Bay**	Identify a facility to serve as emergency response and recovery center and distribution point for supplies and information	Proposed	$2,400,000	N
	Retrofitting of Vollies Hall and Gerrittsen Beach Fire Department Station	Add second floors, wet floodproofing, and install equipment for sheltering and 24-hour emergency response to both buildings	Proposed	$2,400,000	N
	Supplemental Community-Driven Emergency Response Programs	Augment emergency response capabilities at a neighborhood level in Sheepshead Bay, including development of block captain system, advance preparation of response plans, and creation of a Sheepshead Bay Emergency Response Team. Collaborate with New York City Office of Emergency Management to prepare a local level response plan.	Featured	$150,000	N

Table V-2 (Continued)

Strategy	Project Name	Short Project Description	Project Category	Estimated Cost	Regional Project (Y/N)
Identify methods to mitigate chronic sewer-related damage	**Emmons Avenue: *Complete Streets* Streetscape and Stormwater Drainage Improvements**	Replace Sandy-destroyed street trees and planting, improve stormwater infrastructure	Proposed	$500,000	N
	Installation of Backflow Prevention Measures on City Infrastructure	Install rubber tide valves, flap gates, and similar devices to prevent stormwater backflow through drainage system and, thus, reduce flooding of interior areas	Proposed	$740,000	N
	Installation of Sewer Connection Cut-Off Valves	Install sewer connection cut-off valves to prevent sewage backflow into buildings during extreme high tides and storm surges	Proposed	$5,700,000	N
Support a resilient housing stock	**Elevating and Retrofitting of Homes**	Provide funds to elevate homes above base flood elevation or retrofit to reduce flooding, using criteria to be developed	Proposed	$2.5 to $3.5 million	N
	Homeowner Education Program	Provide a targeted and coordinated distribution of the information already available from existing City, State, and Federal programs, and provide tailored information sessions to local residents, on the programs, policies, and building practices that increase resilience and protect community assets.	Featured	$30,000	N
Support a resilient housing stock **Identify methods to mitigate chronic sewer-related damage**	**Feasibility Study to Improve the Resiliency of the Courts inSheepshead Bay**	Identify and evaluate full range of options to reduce potential future damage to courts and improve utility and drainage services.	Proposed	$150,000	N

Table V-2 (Continued)

Strategy	Project Name	Short Project Description	Project Category	Estimated Cost	Regional Project (Y/N)
Identify methods to reduce future flood risk and damage	**Reconnaissance Study for Storm Surge Reduction and Flood Barrier Systems**	Identify and evaluate full range of options to reduce storm surge in Gerritsen Beach, Sheepshead Bay, and Manhattan Beach	Proposed	$100,000	Y
Repair and improve community infrastructure	**Study of Street and Drainage Infrastructure Repair Needs in Gerritsen Beach**	Study to identify specific street segments in need of repair or reconstruction in Gerritsen Beach, due to damage by Superstorm Sandy or otherwise not in acceptable condition; includes identification of repairs and modifications to catch basins and other drainage infrastructure	Proposed	$200,000	N
	Repair and Reconstruction of Canton Court Bulkhead	Reconstruct failing bulkhead and roadway to prevent major damages to homes on Canton Court in Gerritsen Beach	Proposed	$490,000	N
Ensure adequate evacuation routes and advance planning	**Evacuation Planning for Gerritsen Beach**	Determine evacuation capacity of existing road network and any operational changes needed to conduct an orderly evacuation	Proposed	$50,000	N
Restore and improve recreational opportunities	**Support the Resiliency and Maintenance of Plumb Beach**	This project calls for an expansion of the U.S. Army Corps of Engineers study of Upper Jamaica Bay, as well as for the development of a Memorandum of Understanding (MOU) with all relevant parties at Plumb Beach	Featured	$0	N
	Construct a Resilient Comfort Station at Brigham Park in Sheepshead Bay	Fund the construction of a flood-resilient comfort station at Brigham Park	Featured	$2,700,000	N

Table V-2 (Continued)

Strategy	Project Name	Short Project Description	Project Category	Estimated Cost	Regional Project (Y/N)
Assist residents returning to storm-damaged housing and identify available funding sources for residents to address post-disaster housing needs, such as repair and retrofit	**Financial Assistance for Supportive Housing Facility Owners**	Develop grant and/or loan program(s) to help residents and facility owners of housing for socially vulnerable populations to elevate or floodproof mechanical systems, including boiler, heating, ventilation, and air conditioning systems; and electrical panels	Additional Resiliency Recommendation	$100,000	N
	Organize Community Volunteer Teams to Assist with Repair of Damaged Homes	Organize community volunteer teams to perform necessary repairs of damaged properties in post-disaster settings	Additional Resiliency Recommendation	$100,000	N
Preserve and promote affordable homeownership within the existing neighborhood fabric and character	**Incentives to Promote Development of Affordable Housing and/or Community Facilities in Sheepshead Bay**	Investigate potential effectiveness of financial or other incentives to encourage owners of never-occupied residential units in Sheepshead Bay to allow redevelopment as affordable housing and/or community facilities	Additional Resiliency Recommendation	$150,000	N
Protect and make resilient seniors and other potentially vulnerable populations (e.g., disabled) through increased access to basic health care, emergency needs, and basic daily necessities (e.g., food and shelter) both on a long-term basis and after disasters	**Obtain Mobile Pharmacies and Medical Treatment Vans**	Organize agreements to deploy mobile pharmacies and medical treatment vans to provide necessary services in post-disaster setting	Additional Resiliency Recommendation	$100,000	N
	Establish Emergency Transportation Services	Establish emergency transportation services to take residents to shelters, medical facilities, and supply distribution locations	Additional Resiliency Recommendation	$500,000	N

C. Public Engagement Process

To ensure the success of the NY Rising Community Reconstruction (NYRCR) Plan for Gerritsen Beach and Sheepshead Bay, a broad-reaching Public Engagement Strategy was established and implemented. The Gerritsen Beach and Sheepshead Bay communities were provided extensive opportunities for collaboration during three Public Engagement Events between September 2013 and February 2014.

The Public Engagement Events were designed to solicit feedback from the Gerritsen Beach/Sheepshead Bay Community on the NYRCR planning process and deliverables and on conducting outreach through a variety of mediums and methods.

Meeting notices for Public Engagement Events were posted as follows:

- Website: http://stormrecovery.ny.gov/nyrcr/community/gerritsen-beach-and-sheepshead-bay
- Press Release: Local news outlets and newsletters
- Twitter: @NYStormRecovery
- Facebook: NYStormRecovery

Flyers and posters were translated into four languages (English, Russian, Chinese, and Spanish) and distributed both manually and electronically to NYRCR Planning Committee Members, who subsequently distributed flyers within their neighborhoods. In addition, they distributed flyers and electronic notices to local community groups, health and social service agencies, community centers, libraries, civic organizations, schools, and previous meeting attendees.

The Committee held 12 Planning Committee Meetings between September 18, 2013, and March 7, 2014. The Committee provided input on local issues, opportunities, and communication strategies, and offered the public opportunities to provide comments at the conclusion of each Planning Committee Meeting. Information developed at the Planning Committee meetings was then in turn shared with the public at the three public engagement events, which are described below.

First Public Engagement Events

Public Engagement Events were held on October 7 and October 8, 2013, and attended by more than 150 residents of the two communities. The October 7 event was held in Sheepshead Bay, and the October 8 event was held in Gerritsen Beach. Both events opened with an introduction of the Committee Members. An overview of the NYRCR planning process was provided, followed by a report on the Committee's progress to date.

Most of the meeting time was devoted to facilitated breakout sessions at multiple tables, during which participants were asked for feedback on the Vision Statement, needs and opportunities, key strategies, community assets, and ideas for potential projects. The feedback helped guide the Committee and was incorporated into the NYRCR Gerritsen Beach/Sheepshead Bay Conceptual Plan, particularly with respect to needs and opportunities, key strategies, and project ideas. The local blog *Brooklyn Daily* published an article on the October 7 Public Engagement Event titled "Civic storm plans: Locals help state prepare for next Sandy."[30]

Public Engagement Event on October 7, 2013
Source: Elizabeth Graham

Second Public Engagement Event

The second Public Engagement Event was held on November 20, 2013, at the Brooklyn Amity School in Sheepshead Bay and had approximately 100 public attendees. The purpose of this event was to share key elements of the NYRCR Conceptual Plan, with a focus on resiliency strategies and potential projects. The meeting format included a short presentation; small, structured working groups; and a short open house session.

Following the short presentation, participants were encouraged to explore three different recovery functions in three short, 20-minute, small group rotations. Each rotation included a facilitated discussion followed by personalized project and strategy ranking and feedback. Emphasis for the activity was on review and refinement of strategies and identifying gaps. The last portion of the event was an open house session in which participants explored other recovery functions, asked questions, and provided input.

Third Public Engagement Event

The third Public Engagement Event was held on February 27, 2014, at the Brooklyn Amity School in Sheepshead Bay and had approximately 55 attendees. The open house format included the following:

- A Welcome Station with program history and work-to-date;
- A Project Evaluation Station with overview of the criteria, ranking, inventory process, and any other factors that went into the ranking process;
- Nineteen Project Stations, including Proposed Projects and Featured Project Boards; and
- An Exit Station at which participants could map their address and submit feedback forms.

Fifty-five project feedback forms were collected at the end of the night and the information was tallied for presentation to the Committee prior to the next Planning Committee Meeting on March 7, 2014.

The public was invited to visit each project board station and use the Project Evaluation Guide to provide public comments and rank projects. This feedback was captured and is summarized in the tables on the following pages. The Committee also continued to capture project feedback after the meeting. They circulated paper versions of the brochures and feedback forms in the community. Additionally, an electronic version of the survey has been posted through the internet and other social media outlets. Over 50 additional feedback forms were completed online and through additional outreach, and this information was compiled and shared with the Committee. Overall, post-meeting feedback was aligned with that received during the meeting.

Attendees discuss a Proposed Project for a study of flood risk-reduction measures at 3rd Public Engagement Meeting, February 22, 2013
Source: URS

D. Community Asset Inventory

Asset Information						Landscape Attributes							Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate ≥1 foot per year or unknown**	**Waterline frequently at shore defense or upland vegetation**	**Shore defenses absent, not constructed to anticipated conditions, or deteriorating**	**Protective vegetation between asset and flood source absent**	**Dunes absent, below BFE, eroding, little vegetation; bluff slope unstable, little vegetation**	**Asset on coastal barrier island or filled wetland**	**Landscape Attribute Score ("Yes" = +0.5)**	**Hazard Score**	**Exposure Score**	**Vulnerability Score**	**Risk Score**
Brooklyn Yacht Club	Extreme	Economic	No	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**68**
Tamaqua Bar and Marina	Extreme	Economic	No	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**68**
Fishing Charters	Extreme	Economic	No	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**68**
Sheepshead Bay Yacht Club	Extreme	Economic	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54**
Comfort Inn	High	Economic	No	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
Lundy's Restaurant	High	Economic	No	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
Loehmann's Plaza	High	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
United Artists Theater	Moderate	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Nostrand Avenue Commercial Corridor	High	Economic	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Avenue U Commercial Corridor	Moderate	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**1**	**8**
Marine Pharmacy	High	Economic	No	No, locally significant	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
New Dutch Farms	High	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Brenman's Prime Meat Market	High	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Derek's Deli	High	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Doreen Greenwood Realty Office	High	Economic	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Brooklyn Amity School	Moderate	Health and Social Services	Yes	Yes, FEMA	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
IS 98 Bay Academy	High	Health and Social Services	Yes	Yes, FEMA	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
St. Mark School	High	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**2**	**15**
PS 52 Sheepshead Bay	Moderate	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
PS 254 Dag Hammarskjold School	Moderate	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Brooklyn Blue Feather Elem. School	Moderate	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
PS 277 Gerritsen Beach	Moderate	Health and Social Services	Yes	Yes, FEMA	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Sheepshead Bay HS	Moderate	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
PS 209 Margaret Mead	Moderate	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Yeshiva of Kings Bay	High	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
Coney Island Hospital	High	Health and Social Services	Yes	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**5**	**45**
Sheepshead Nursing & Rehab Center	Moderate	Health and Social Services	Yes	Yes, FEMA	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**1**	**8**
Kings Bay Daycare	Moderate	Health and Social Services	Yes	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Day Care	High	Health and Social Services	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Strana Chudes Day Care Center	High	Health and Social Services	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Engine 246, Ladder 169	High	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**

D. Community Asset Inventory (continued)

Asset Information						Landscape Attributes							Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate ≥1 foot per year or unknown**	**Waterline frequently at shore defense or upland vegetation**	**Shore defenses absent, not constructed to anticipated conditions, or deteriorating**	**Protective vegetation between asset and flood source absent**	**Dunes absent, below BFE, eroding, little vegetation; bluff slope unstable, little vegetation**	**Asset on coastal barrier island or filled wetland**	**Landscape Attribute Score ("Yes" = +0.5)**	**Hazard Score**	**Exposure Score**	**Vulnerability Score**	**Risk Score**
Engine 254, Ladder 153	Moderate	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Engine 321	Moderate	Health and Social Services	No	Yes, FEMA	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
61 Precinct	Moderate	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**1**	**8**
Gerritsen Beach FD	High	Health and Social Services	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
Sheepshead Bay Footbridge	Extreme	Infrastructure Systems	No	No, locally significant	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54**
B44 Bus	High	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**1**	**9**
B31 Bus	High	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**1**	**9**
B4 Bus	High	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**1**	**9**
Sanitation Sub Garage	High	Infrastructure Systems	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Coney Island Wastewater Treatment Plant	High	Infrastructure Systems	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Gas Stations on Knapp Street	High	Infrastructure Systems	No	No, locally significant	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
Fuel - Tamaqua Marina	Extreme	Infrastructure Systems	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**3**	**36**
Sheepshead Bay Stormwater Facilities	High	Infrastructure Systems	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Gerritsen Beach Stormwater Facilities	High	Infrastructure Systems	No	Yes, FEMA	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**2**	**21**
Sheepshead Bay Power Facilities	High	Infrastructure Systems	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
Gerritsen Beach Power Facilities	High	Infrastructure Systems	No	Yes, FEMA	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
Communications Facilities - Community Wide	High	Infrastructure Systems	No	Yes, FEMA	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
Co-ops	Moderate	Housing	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Venice Marina House Boats	Extreme	Housing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54**
Harbor View Home for Adults	Moderate	Housing	Yes	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Bungalow Colonies	High	Housing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**5**	**53**
Single-Family Residences - Sheepshead Bay	High	Housing	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
Single-Family Residences - Gerritsen Beach	High	Housing	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**4**	**42**
The Waterford Home on the Bay	High	Housing	Yes	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
NYCHA Sheepshead Bay	Moderate	Housing	Yes	No, locally significant	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
NYCHA-Nostrand	Moderate	Housing	Yes	No, locally significant	High	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Bay Family Center	High	Housing	Yes	No	Low	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**32**
Kings Bay 1 (Mitchel-Lama Subsidy Housing)	Moderate	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Kings Bay 2 (Mitchel-Lama Subsidy Housing)	Moderate	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Bel-Air (Lefrak Housing)	High	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
The Annapolis Housing Complex (Lefrak Housing)	High	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**

D. Community Asset Inventory (continued)

Asset Information						Landscape Attributes							Risk Assessment			
Asset	**Risk Area**	**Asset Class**	**Socially Vulnerable Populations**	**Critical Facility**	**Community Value**	**Erosion Rate ≥1 foot per year or unknown**	**Waterline frequently at shore defense or upland vegetation**	**Shore defenses absent, not constructed to anticipated conditions, or deteriorating**	**Protective vegetation between asset and flood source absent**	**Dunes absent, below BFE, eroding, little vegetation; bluff slope unstable, little vegetation**	**Asset on coastal barrier island or filled wetland**	**Landscape Attribute Score ("Yes" = +0.5)**	**Hazard Score**	**Exposure Score**	**Vulnerability Score**	**Risk Score**
The Dover Housing Complex (Lefrak Housing)	Moderate	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Ahi Ezer Apartments	Moderate	Housing	Yes	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**3**	**18**
Catholic Charities Home	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Congregation Bnai Israel	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**2**	**15**
Emmanuel Episcopal Church	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**2**	**15**
The United Methodist Church	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
St. Marks Church	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.50**	**2**	**15**
Resurrection Church	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
St. James Evangelical Lutheran	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Kings Bay Library	Moderate	Natural and Cultural Resources	Yes	No, locally significant	Medium	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**1**	**6**
Homecrest Library	Moderate	Natural and Cultural Resources	Yes	No, locally significant	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**1**	**8**
Sheepshead Bay Library	High	Natural and Cultural Resources	Yes	No, locally significant	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Gerritsen Beach Library	High	Natural and Cultural Resources	Yes	No, locally significant	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Bill Brown Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Galapo Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Grady Playground	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Herman Dolgon Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	No	1.5	**3**	**2.00**	**2**	**12**
Yak Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Homecrest Playground	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Marine Park	High	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Mellett Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Amity Little League Stadium	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**3**	**23**
Sheepshead Playground	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Larry Veling Memorial Field	High	Natural and Cultural Resources	No	No	Medium	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Seba Avenue Skate Park	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Kiddie Beach	Extreme	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**4**	**48**
VFW Post 107 and Ladies Auxiliary	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27**
AOH, Ancient Order of Hibernians	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Cort Club, Inc	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36**
Vollies Memorial Hall	High	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**2**	**18**
Floyd Bennett Field	Moderate	Natural and Cultural Resources	No	No	Low	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**2**	**15**
Jamaica Bay Wildlife Refuge	High	Natural and Cultural Resources	No	No	Medium	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**2**	**21**

E. Endnotes

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[26] These costs could relate to reduced emergency and recovery expenditures in the future less implementation costs for the life of the project.

[27] Socially vulnerable populations may be derived from the following criteria: poverty/low income, racial/ethnic minority status, immigrant status, education level, institutionalization, renter-occupied household status, single senior-citizen household status.

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F. Glossary

BFE – Base Flood Elevation

CDBG-DR – Community Development Block Grant – Disaster Recovery

CERT – Community Emergency Response Team

FEMA – Federal Emergency Management Agency

FIRM – Flood insurance Rate Map

GB – Gerritsen Beach

GBFD – Gerrittsen Beach Fire Department

GIS – Geographic Information System

HUD – Department of Housing and Urban Development

HTFC – Housing Trust Fund Corporation

MOU – Memorandum of Understanding

MTA – Metropolitan Transportation Authority

NOAA – National Oceanic and Atmospheric Administration

NDRF – National Disaster Recovery Framework

NFIP – National Flood Insurance Program

NRDF – National Disaster Recovery Framework

NRF – National Response Framework

NWS – National Weather Service

NYC – New York City

NYC DOT – Department of Transportation

NYCHA – New York City Housing Authority

NYC OEM – New York City Office of Emergency Management

NYPD – New York Police Department

NYRCR – New York Rising Community Reconstruction Program

NYSHCR – New York State Homes and Community Renewal

NYS DOS – New York State Department of State

OCR – Office of Community Renewal

REDC – Regional Economic Development Council

SB – Sheepshead Bay

SBA – Small Business Administration

SBHS – Sheepshead Bay High School

SLOSH – Sea, Lake, and Overland Surges from Hurricanes

www.stormrecovery.ny.gov/nyrcr