

Broad Channel

NY Rising Community Reconstruction Plan

March 2014



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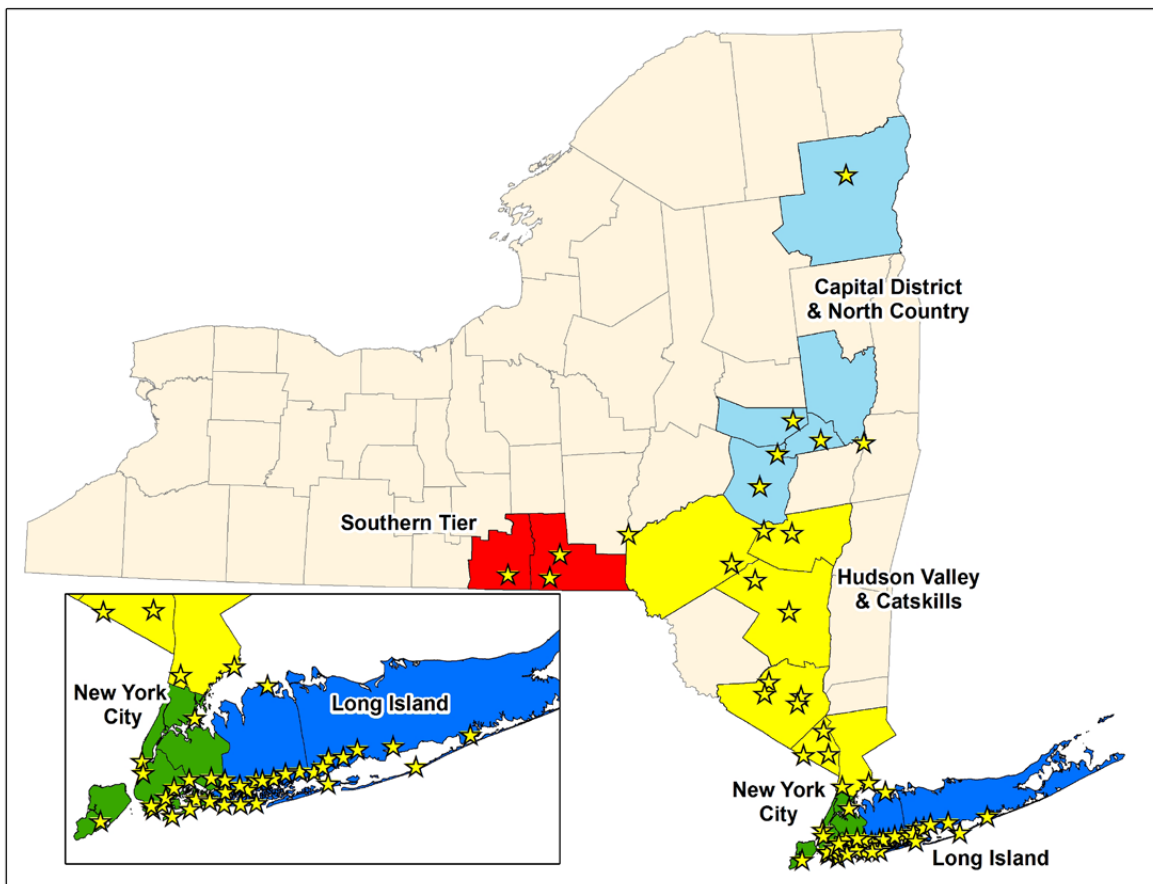
All photographs were taken by the Consultant Team unless otherwise noted.

Foreword

Introduction

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

To meet these pressing needs, Governor Andrew M. Cuomo led the charge to develop an innovative, community-driven planning program on a scale unprecedented and with resources unparalleled. The NY Rising Community Reconstruction (NYRCR) Program 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.

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 Broad Channel Community is eligible for up to \$6.06 million in CDBG-DR implementation funds.

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 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.

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Executive summary

Broad
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**Broad Channel
NY RISING COMMUNITY**



Broad Channel is an island set within Jamaica Bay in the New York City Borough of Queens, connected to the mainland of southern Queens via the Joseph A. Addabbo Bridge, and to the Rockaway Peninsula via the Cross Bay Veterans Memorial Bridge. Boasting direct water connections and a bucolic natural setting, and surrounded on both sides by the Jamaica Bay Wildlife refuge, Broad Channel is a truly unique urban experience.

This long narrow island is home to approximately 2,500 residents living in mostly single-family homes built prior to 1960 along blocks that fan out on both sides of Cross Bay Boulevard. Almost all of Broad Channel workers commute off-island, with half of the employed population traveling outside of Queens to work destinations. The island functions as a single neighborhood and is very involved with its local community centers. These centers, despite incurring significant damage from Superstorm Sandy (Sandy), became the places of refuge, services, food, and assistance in the days and weeks following the storm.

The Governor's Office of Storm Recovery has allocated up to \$6.06 million in federal Community Development Block Grant–Disaster Recovery (CDBG-DR) monies to fund eligible recovery and resiliency projects in Broad Channel. Understanding that this funding cannot solve all challenges, the NY Rising Community Reconstruction (NYRCR) Broad Channel Planning Committee (the Committee) has focused on putting forth projects that can be completed with available funds. Each project would also be connected to sustainability—either through enhanced environmental performance, sustainable products or energy sources, use of natural products or a strategy that provides economies of scale through partnerships. Finally, the Committee wants to achieve pragmatic innovative strategies that could grow to much larger initiatives. Through these pilots, the NYRCR Broad Channel Community (the Community) hopes to leverage its funding to realize a larger resiliency vision.

Recovering from the storm

The surge from Sandy swept across the island, covering everything in its path. Automobiles, boats, homes, and businesses were lost, and the recovery has been slow and challenging. Some houses were completely lost, and more than a year later, the businesses that anchor Cross Bay Boulevard are still trying to re-open. Sandy laid bare the infrastructure deficiencies of the island: inadequate sewer hook-ups, streets that flood, dependency on heating oil and propane, and larger infrastructure that is not equipped to hold back flood waters. Most importantly, Sandy dealt a huge blow to the social infrastructure of the Community. Its community centers were flooded and damaged and have been unable to make needed repairs. Even the Historical Society—the official repository of the archives and historical records of this unique island—suffered damage and lost records that cannot be retrieved.

Critical issues

Broad Channel faces an uncertain future from the threat of sea level rise and increased storm activity. Broad Channel needs to develop a strategy for protection that continues to provide access to water and integration with nature. Broad Channel is not going to grow significantly; in fact, it is at risk of losing housing, businesses, and community centers, which could lead to economic decline and a loss of community cohesion. Broad Channel's success and attraction lies in its connection to the concept of Community and the Community's connection to its waterfront. If this connection is lost, Broad Channel may undergo dramatic change. The Community is also in desperate need of infrastructure upgrades, especially related to heat and power. In order to achieve this goal, Broad Channel is looking to increase access to alternative energy to reduce its reliance on off-island energy and power sources.

A community-driven process

Community Vision Statement

*The Broad Channel community, recognizing and embracing its unique relationship with water, is focused on **short-term innovative, implementable, and sustainable** projects to protect its critical infrastructure, natural and cultural amenities, and the social and community centers that shape the fabric of this unique place. These short-term strategic actions represent the initial steps towards shaping a resilient future for a community that seeks to live in harmony with nature and in partnership with the surrounding Jamaica Bay.*

Public engagement

This NYRCR Plan is the product of a collaborative community-based process led by the Committee. Input on needs projects was gathered through three Public Engagement Events and feedback received from the public. Based on this feedback, the Committee has developed a plan that seeks to address the specific and unique needs of the Community.

The Committee recognized at the outset that this small Community is experiencing meeting fatigue, that there is a great deal of confusion surrounding the multitude of initiatives in the wake of Sandy, and that a meaningful dialogue with the Community could be achieved only through a clear explanation of how the NYRCR Program will help the Community. The first meeting—held simultaneously with the monthly civic association meeting—was well attended by the public and by local elected officials, and the Committee drove home the specific value of this effort and the opportunity for the Community. Subsequent Public Engagement Events built on this foundation and walked the Community through the Committee's mantra of innovative, sustainable, and implementable projects that would build the foundation for a resilient future.



A blueprint for future resiliency

The NYRCR Plan for Broad Channel offers a blueprint for future resiliency that is based on a considered and thorough analysis of existing conditions. This planning process has resulted in nine strategies and ten Proposed and Featured Projects to improve the resiliency of Broad Channel, as described below.

Recovery support functions

There are six Recovery Support Functions, established by President Barack Obama in 2011 through the National Disaster Recovery Framework, which structure this NYRCR Plan. These Recovery Support Functions were utilized when developing needs, opportunities, strategies, and projects to ensure that a comprehensive approach is reinforced throughout the effort to shape a well-rounded resiliency strategy for the Community.

Figure 1: Community reconstruction plan – six recovery support functions



Community Planning and
Capacity Building



Health and Social
Services



Economic Development



Housing



Infrastructure System



Natural and Cultural
Resources



Needs and opportunities

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

- Retain community services and emergency response
- Develop resiliency strategies for Jamaica Bay
- Retain and enhance the unique relationship with nature
- Improve and diversify infrastructure systems
- Ensure business stability by improving conditions for existing and new businesses
- Make housing more sustainable and resilient to climate change

While these needs are significant, a number of opportunities emerge to lead the Community towards resilient solutions. A nature-based approach can build off the existing wetlands and natural assets around Broad Channel. Its community facilities are networked and physically positioned to work as a relief campus. Most importantly, the Community is extremely well organized and can marshal its capacity to support initiatives and garner consensus toward implementing specific projects.

Strategies

The plan develops strategies to address the critical needs previously identified. The following strategies pilot innovative solutions for layered coastal protection, and to build community resiliency, integrate sustainability into every strategy, and focus on implementable projects:

- Improve resiliency of key emergency response, and community and cultural centers
- Protect and enhance the culture and history of Broad Channel
- Develop a regional resiliency strategy for Jamaica Bay
- Develop a layered approach to coastal protection that incorporates natural strategies
- Improve the resiliency and connectivity of the local infrastructure network
- Address localized flooding in the community
- Expand energy alternatives and diversify energy sources
- Protect vital economic corridors
- Protect housing from sea-level rise and future storm events





Innovative, implementable, and sustainable projects

Proposed and featured projects

The Proposed and Featured Projects are the product of a collaborative, community process led by the Committee with the public's input. Proposed Projects are recommended by the Committee for full funding through the NYRCR process. Featured Projects are innovative projects that may require additional funding sources for implementation, and for which the Committee has recommended funding an initial phase of implementation. The projects are not listed in any priority order.

American Legion Hall Resiliency Improvements (Proposed)

This project is a series of capital improvements to harden the facility to maximize its role as a relief center for community members. The project would ensure its safety and reliability during emergencies, including a new heating, ventilation, and air conditioning system so that the facility can act as a community heating/cooling center during extreme weather conditions.

Broad Channel Athletic Club (BCAC) Resiliency Improvements (Proposed)

This project would protect BCAC's assets and improve its capacity as a relief center through construction of a back-up generator, and storage facility to enable the BCAC to provide both indoor and outdoor relief services to the Community. This project would support the strategy of improving the resiliency of key community centers by hardening the BCAC facilities and ensure that it would be a functioning facility for community members, especially immediately following an emergency.

Broad Channel Volunteer Fire Department (BCVFD) Resiliency Improvements (Proposed)

This project would construct a new 10,000-square-foot telecommunications center. The objective of the project is to build out the second floor of a proposed new firehouse for this use to enable the BCVFD to serve as the third operation of the Broad Channel relief campus. The telecommunications center could be used by New York City Office of Emergency Management and other agencies during an emergency event.

Broad Channel Veterans of Foreign Wars Hall Resiliency Improvements (Proposed)

The project would upgrade the facility to make its entrance points and restrooms American with Disabilities Act accessible. The project would increase the accessibility for elderly and disabled populations. It would also provide an alternative location for the recovery campus facilities.

Broad Channel Historical Society Digitization (Featured)

The project would digitize the archival collection to protect its contents from future disaster events. Digitizing the collection would protect the archival assets, and increase access to the collection by creating a Virtual Museum that would be accessible to the public. The Virtual Museum would function as a community integration and educational tool for local residents and communities throughout the New York metropolitan area.

Lanark Road Stabilization, Sewer and Water Connection (Proposed)

The Proposed Project would provide sewer and water connections to the residential homes on Lanark Road, south of East 9th Road. The project would establish an in-ground sewer and water connection to the homes where one does not currently exist.

East 12th Road Boardwalk Repair and New Sewer Connection (Proposed)

This project would rebuild the boardwalk that connects residences and the Iroquois Yacht Club back to the mainland along East 12th Road. The project would construct a boardwalk and add sewer and water connections to the homes.

Cross Bay Boulevard Complete Streets Project – Phase 1 (Proposed)

This project would install permeable pavers along the sidewalk and solar-powered streetlights along the Broad Channel central business district and provide back-up generators for the businesses to ensure continued operation during power outages. The project would

introduce a sustainable complete streets pilot program that could be replicated for other business locations and would help to identify and brand the business areas on the island.

Sunset Cove Restoration Project (Featured)

This project would support the inclusion of an oyster reef and breakwater in the Sunset Cove ecosystem restoration project—an element that would enhance the resiliency of the overall project and surrounding assets as well as restore ecological activity to the area. This project would be integrated into a larger restoration project being spearheaded by the New York City Parks Department.

Relief Campus Berm – Phase 1 (Proposed)

This project would fund a berm that would protect the relief campus against a 6-foot to 7-foot storm-flood elevation as a first phase of a larger, comprehensive flood-protection strategy for a 100-year storm. The berm would be between 4 feet and 6 feet, extending between local high points on New York City Parks and Recreation Department and National Park Service property and would be planted and reinforced to extend its life during storm events.

Broad Channel wants to preserve its unique connection to nature and to Jamaica Bay while adapting to the impacts of climate change. The NYRCR Plan sets forth the initial projects that would achieve this goal by strengthening the connection with nature, introducing sustainable strategies, and strengthening the centers that help to make this place into a community.

I. Community overview



Geographic scope of NYRCR Plan

Residents of Broad Channel passionately refer to their community as “The Venice of New York.” Boasting a direct connection to water and a unique, natural setting in the center of Jamaica Bay, roughly 2,500 residents call Broad Channel home. The settlement of Broad Channel dates back to the 17th century when Dutch immigrants used the island as a base for fishing and oyster farming. The island remained a small village through much of the early development of New York City. Population rose significantly in the 1900s with the construction of the Woodhaven and Rockaway Railroad and Cross Bay Boulevard, which connected the island to the mainland. The close relationship between the residents of Broad Channel and Jamaica Bay continues to the present day.

Broad Channel boasts unparalleled views of Jamaica Bay with direct access to wetlands and waterways, birdlife, and fishing—all within a subway ride of the largest metropolis in America. With a few small restaurants set out along the water, a main street that houses its few shops and offices, multiple yacht clubs that form a basis for social interaction, local community centers and meeting houses, and opportunities to live on the water without having to live extravagantly, Broad Channel is a small village in a natural setting set within an urban footprint.



Figure I-1: Broad Channel planning area



Source: NYC Department of City Planning: MapPLUTO, v.13.1, street centerlines, building footprints; NYC DOITT: Transit lines, NYC Open Space.

Community overview

The NY Rising Community Reconstruction (NYRCR) Broad Channel Community (the Community) is a long, thin spit of land, more than half of which is protected national parkland as part of the Jamaica Bay Wildlife Refuge under the jurisdiction of the National Park Service's (NPS) Gateway National Recreation Area. The Planning Area designated by the NYRCR Planning Committee (the Committee) was set around the places where people reside. Gateway National Recreation Area has been placed outside the study area boundary, recognizing, however, that this land remains integral to the island's resiliency plan.

As you enter from the north, the island contains a thin neck of houses, businesses, and community facilities fronting Cross Bay Boulevard, the neighborhood's main thoroughfare. The first major residential pocket runs from 6th to 10th Streets between Shad Creek Road on the West and Cross Bay Boulevard and the subway station on the east. Public School 47, a New York City kindergarten through 8th grade public school and the major business district in the Community sit within this area.

The west side of Cross Bay Boulevard from 10th Road down to 20th Road is known locally as the Canal Blocks, a series of one-block streets separated by channels providing homes with backyard waterfront access. On the east, these roads dead-end just past Cross Bay Boulevard and most houses and businesses face Cross Bay Boulevard with their backyards descending into Jamaica Bay. Broad Channel Park, including Broad Channel Branch Queens Public Library, sits in this area, and multiple yacht clubs are set out into the water along the eastern side of Broad Channel.

Because the island is relatively small, Broad Channel has always operated as a single neighborhood. The community contains one civic association, and community

members generally come together as a group to review projects and issues pertinent to the island. Community centers are vital components of the community structure on Broad Channel, providing the structure for organized activities.

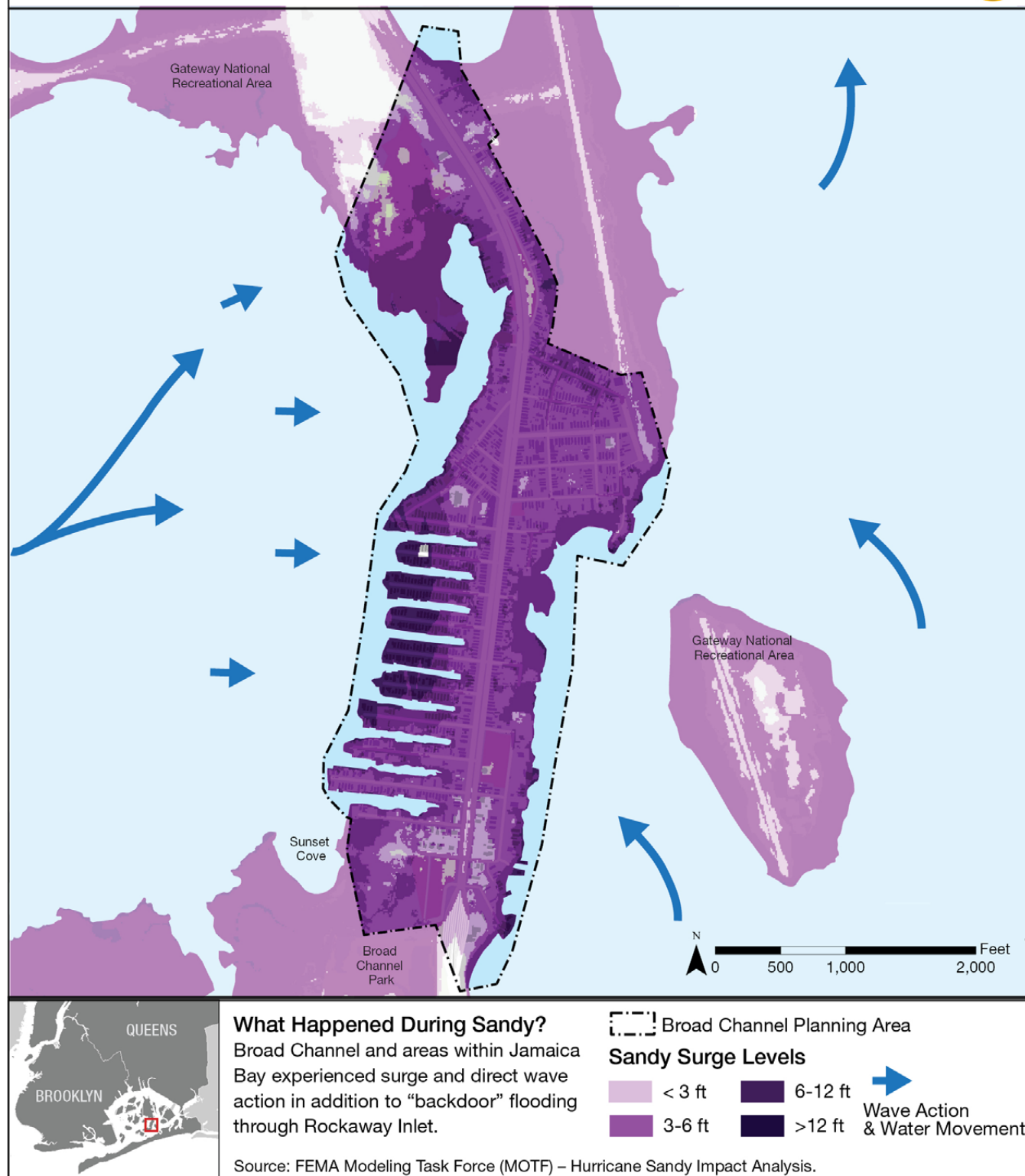
According to the 2010 census, the Broad Channel Planning Area contains 915 houses and 2,443 residents. Broad Channel's residents are slightly older than the New York City average. The median age in Broad Channel is 40.4 years as compared to 35.5 in New York City as a whole and 37.2 for Queens.¹ This suggests that the senior population will increase in the coming years and may require special consideration when implementing resiliency plans. While incomes vary, Broad Channel is home to residents with a higher-than-average income when compared to statistics for Queens (\$56,780) and New York City (\$51,865). In 2012, the median household income in the area was \$68,854.²

Broad Channel is almost exclusively residential, with a small number of supporting businesses. Zoned as a "lower-density residential district," 84% of the area's building stock comprises single-family detached houses. The majority (79%) of these homes are owner-occupied, as compared to 44% for Queens County and 32% for New York City at large.³ There are few retail and commercial amenities in Broad Channel, mostly located along Cross Bay Boulevard. While local businesses supply some necessary items and services, the island relies heavily on businesses outside the neighborhood for its supplies and services.

Most residents travel outside of Broad Channel for work. According to 2012 estimates, 99% of the labor force worked outside of the home, and almost half (40.4%) traveled outside of Queens County to their place of employment, with 22.5% traveling 60 or more minutes.⁴



Figure I-2: Superstorm Sandy flood extent



Description of storm damages

Local impacts

The Community began to feel the effects of Superstorm Sandy (Sandy) well before the main surge struck the island. The low tide that occurred a full two tidal cycles prior to the storm was unusually high for the area, signaling to the residents that the storm would be combined with a considerable moon tide condition, exacerbating the storm's effects. The storm enveloped the island in water, causing significant flooding throughout the entire populated zone and impacting businesses and homes east and west of Cross Bay Boulevard. The surge was strong enough to destroy some houses, severely damage others, and flood businesses. While all sections of the island experienced flooding and destruction, the eastern side of the island was particularly hard hit. This was likely due to the combination of high tide, full moon, and a strong northeasterly wind (Figure I-2). These factors were compounded by the fact that this side of the island is relatively unprotected, with many houses set out into the Bay on stilts. Multiple houses were significantly damaged and some were completely lost. Natural areas were impacted. Sand and debris piled up on beaches and into salt marshes, wetlands and beaches suffered erosion. Two freshwater ponds—East and West Ponds—were breached and inundated with saltwater, altering the support structure for local habitat.⁵

Recovering from the storm

The residents and businesses of Broad Channel suffered significant damage. All homes lost power. Propane and heating tanks attached to homes were often washed away, leaving residents and some businesses without means of heating or cooking. Many people lost automobiles and boats in the water or dry-docked locally on the island. Residents were without cell phone

communication for several days, which was an issue throughout southern Queens. Residents had to wait for temporary remote cell towers to be erected on the island before regaining service.

Without power and communications, and despite sustaining heavy damage, multiple Broad Channel community facilities stepped up, opened their doors, organized with relief agencies, and became the local refuge where supplies were distributed and other recovery efforts were concentrated. The Broad Channel Athletic Club, the American Legion, and the Veterans of Foreign Wars became the de facto relief centers for the community, serving meals, storing and doling out supplies, and coordinating with relief organizations to help local residents.

Lingering effects

Damage caused by Sandy continues to be felt in Broad Channel. The commercial district lost multiple stores and more than a year later, stores are still undergoing repair, some are just now reopening and many are still working to reopen. It was several months before many homes were habitable, and access, electrical power, and flood damage to interiors continues to plague many homes. Many are still rebuilding and some were completely lost.

While community centers on the island continue to serve the community, many have not been able to fully make repairs and are continuing to operate despite losing kitchens, heating, ventilation, and air conditioning systems and electrical power. More than a year after Sandy, active recovery is still taking place, and rebuilding continues to be the major focal point for the Community.

Critical issues

The connection to Jamaica Bay is one of the primary attractions for living in Broad Channel. For a community that treasures its direct connection both to nature and to the water, adapting to climate change is going to present difficult challenges. Reconciling this direct connection to water against protecting the Community from future flooding and storm damage is a critical issue. Protection cannot alter this relationship so significantly that the value of the connection to water is lost.

The Committee understands that without Jamaica Bay there is no Broad Channel, and thus planning efforts are done through the lens of creating a social and physical community that is integrated with its surrounding natural assets. The Committee is focused on restoring Jamaica Bay's natural environment to enhance quality-of-life, while providing a resilient place for future generations to live, work, and enjoy. The Community prizes its natural surroundings and sees its solutions to climate change impacts as being nature-based. The goal of the Committee is to develop projects that adhere to the principles of sustainability, green innovation, and preservation of Jamaica Bay.

Broad Channel is a small, tightly knit neighborhood that thrives upon community connectivity. For residents of Broad Channel, the damage was not just physical. Community centers, where people gather to meet, share stories, and conduct business—the places that make a community a community—were hit hard and need help to recover. These facilities were the places the Community turned to in their time of need in the weeks and months after the storm. The continuation of this sense of community is essential to the long-term sustainability of Broad Channel and this starts with protecting its vital community centers.

The business community in Broad Channel was also hard hit by Sandy. The small number of businesses that make their home along Cross Bay Boulevard suffered enormous damage, and many have struggled to recover. If businesses are lost, the community becomes entirely dependent upon off-island shopping for all of its necessities and services, lowering the quality-of-life here. Additionally, these businesses provide employment opportunities for young residents of the community.



Front entrance of VFW Hall



Damaged residential building

Maintaining, protecting, and strengthening the business base in Broad Channel is important to the livelihood of the community.

Sandy brought into sharp focus the multiple local infrastructure challenges faced on Broad Channel. A number of locations are vulnerable to flooding. Low points in the sewer system cause flooding and ponding during moon tide conditions. Some homes and yacht clubs lack vehicular access and can be reached only by boardwalks. Infrastructure like the 4th Road culvert, designed to create tidal flow, actually contributes to flood conditions and will need to be retrofitted. Cross Bay Boulevard, seen as a high point, was breached. Limited accessibility and infrastructure that contributes to flooding will need to be analyzed and mitigated.

Not having a dedicated natural gas line makes Broad Channel highly dependent upon electricity, and on propane and oil heat. Propane and oil tanks bolted to buildings proved to be an unreliable power supply during Sandy, and there were no locations on the island that provided alternative power or back-up power generation. A diversification of power options would greatly benefit the island.

These individual issues point to a recognition that Broad Channel needs to identify holistic, innovative and sustainable new strategies to combat the effects of climate change.



Aqua House – severely damaged during Superstorm Sandy



Fire truck damaged during storm Credit: BC VFD



Vision statement

“The Broad Channel community, recognizing and embracing its unique relationship with water, is focused on short-term **innovative, implementable, and sustainable projects to protect its critical infrastructure, natural and cultural amenities and the social and community centers that shape the fabric of this unique place. These short-term strategic actions represent the initial steps towards shaping a resilient future for a community that seeks to live in harmony with nature and in partnership with the surrounding Jamaica Bay.”**

Perhaps more than any other community in this region, Broad Channel shares an affinity with water. The connection to water is what drew people to this place and the reason people wish to stay. This unique relationship with the water defines Broad Channel. Broad Channel residents are keenly interested in the various local and regional plans for making Jamaica Bay resilient. They recognize the importance of these strategies, both for protection of the island and the impacts on the Bay itself, its wildlife, and the ecosystem it supports.

Broad Channel, nestled in the middle of a massive natural ecosystem, sees itself as the poster child for an innovative and integrated approach to flood protection. The community is surrounded by natural beauty, both on land in the Jamaica Bay Wildlife Refuge and the mostly natural coastal edge, and in the surrounding waters and wetland islands of Jamaica Bay. And while this island community is certainly no stranger to flooding, gray (hard) infrastructure solutions may no longer be the answer to combating sea-level rise and flooding. The Community

supports solutions that can be integrated into its natural setting. Soft solutions for the Bay, integrated with landside protection, fit into the context of this unique place.

Broad Channel is more than just a cluster of houses, it is a Community. The loss of the sense of Community would be as devastating to the future of Broad Channel as any physical asset. Resiliency starts with the preservation of those assets that create and enhance a Community.

Broad Channel also recognizes that although it will take a long time to implement lasting change in Jamaica Bay, action is needed now. The Community is very focused on implementable near-term steps that will set the tone for future additional resiliency actions. While staying plugged into the larger projects and discussions taking place for Jamaica Bay, Broad Channel recognizes that there are a number of actions that can be taken locally in the next two years that will increase the resiliency of the island and pilot larger, more ambitious efforts.



Figure I-3: Jamaica Bay regional projects map



Relationship to regional plans

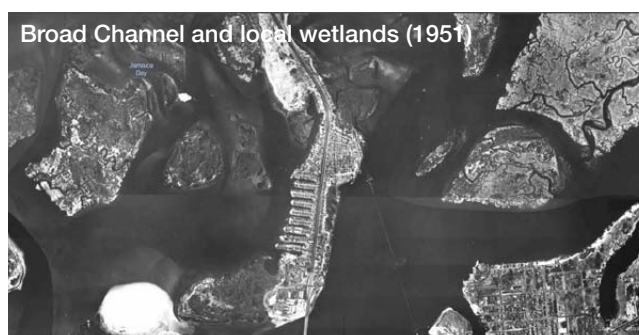
Regional perspectives: Jamaica Bay

Shared risk, shared resiliency

Connected hydrologically and ecologically, Jamaica Bay is a unifying feature tying together six NYRCR Planning Areas in New York City: Breezy Point, Rockaway West, Rockaway East, Broad Channel, New and Old Howard Beach, and Gerritsen Beach/Sheepshead Bay. A seventh Planning Area—the Southern Brooklyn Peninsula, which includes Brighton Beach, Coney Island, Manhattan Beach, and Sea Gate—is in close proximity at the mouth of Jamaica Bay. The Bay and its tributaries have a far-reaching impact that extends beyond New York City. The Villages of Cedarhurst, Lawrence, Hewlett Neck, Hewlett Harbor, and the Hewlett, Woodmere, Meadowmere, Inwood, and South Valley Stream Community Planning Areas in Nassau County are also affected by what happens in the Bay. With their connected shoreline, these communities share a unique ecological amenity, and future resilience strategies that may be undertaken could have a profound impact upon that relationship.

All of the Jamaica Bay communities suffered significantly during Superstorm Sandy—some from flooding or surge and some from wave action damage. According to an assessment conducted by New York City Department of Buildings, 37% of the buildings destroyed during Sandy were located in this region. Homes, businesses, beaches, parklands, schools, roadways, and mass transit were all damaged; the area also endured one of the most extensive and long-lasting power outages in the city.

Flooding risks are likely to be exacerbated throughout Jamaica Bay by projected sea-level rise associated with climate change. According to the Federal Emergency Management Agency's (FEMA) preliminary work maps, the 100-year floodplain in the area has expanded for the borough of Queens by 40% since 1983, and floodplain expansion has been especially dramatic for the Jamaica Bay/South Queens area; the number of buildings in the floodplain has risen by 70%.⁶ It is anticipated that this



Source: NYC DOITT, NYCityMap

trend will continue, and the low-lying areas surrounding bay communities are likely to continue to experience more frequent flooding and greater flood depths.

Many Jamaica Bay communities also face insufficient emergency access. Single-access routes to communities such as Breezy Point, Broad Channel, and Howard

Beach—including bridges and roadways that were damaged or flooded—also constrained emergency response and hindered evacuation.

There are also ecological factors to consider: Jamaica Bay is a tidal estuary. Though severely degraded during the 19th and 20th centuries, the bay remains a dynamic ecosystem, which provides critical habitat to a variety of species, including a number of protected and threatened birds. Habitat loss and degradation of the bay's chemical, physical, and biological environment has largely been due to human activities; however, over the last two decades, Federal and City of New York policies have yielded dramatic improvements in the bay's water and habitat quality.

In this connected system, projects and interventions in one area of Jamaica Bay can have ecological and coastal protection ramifications across the estuary. The cumulative impact of individual projects implemented in different locations around the bay can be greater than the sum of their individual impacts. At the same time, interactions between projects can sometimes have negative effects.

Planning for Jamaica Bay

The NYRCR Program understands that solutions for Jamaica Bay will affect all of the communities that front its borders and extended waterways. This includes communities from New York City and Long Island, as well as communities that have yet to be incorporated through the NYRCR Program. Recognizing that strategies for Jamaica Bay are complicated and that consensus building will be achieved through dialogue, the NYRCR Program has formed the Jamaica Bay Regional Working Group to bring all affected communities together to research current and planned projects, meet with local, State, and Federal officials, and groups working in Jamaica Bay. This Working Group began to meet in early 2014 and will continue to meet over the next several months to analyze options and opportunities, discuss goals and challenges, and strive to arrive at a consensus on a long-term approach to resiliency in Jamaica Bay. (More information on the work and recommendations of the Jamaica Bay Regional Working Group can be found in Section V – Additional materials.)



To maximize benefits and minimize risk, coordination among NYRCR Communities as well as the various Federal, State, and City of New York agencies active within the Jamaica Bay will be needed. In addition to the NYRCR effort, there are many agencies, organizations and stakeholders working in the bay. The newly formed Jamaica Bay Resiliency Institute—established through an initiative to be led by the City University of New York in partnership with the City of New York, the NPS, and the Trust for Public Land, among other organizations—is a potential partner and presents an opportunity for NYRCR Communities in and around Jamaica Bay to collaborate with other organizations and agencies.

To avoid duplication of plans and to best identify how the NYRCR Program may fill existing gaps, past and ongoing plans, studies, and projects in Jamaica Bay were reviewed.

Existing plans, studies, and projects

Jamaica Bay initiatives

NYC Department of Environmental Protection's (NYC DEP) Jamaica Bay Watershed Protection Plan.

Authorized in 2005, this plan includes several ongoing studies and projects in the bay, which could provide resiliency benefits for NYRCR Communities. These include studies that pre-dated Superstorm Sandy as well as post-Sandy updates to the previous plans and studies.

Gateway National Park General Management Plan (GMP).

The majority of the undeveloped land in and around Jamaica Bay is part of Gateway National Recreation Area (GNRA), one of the nation's few urban national parks, encompassing 26,607 acres in Brooklyn, Queens, Staten Island, and New Jersey. Given this large presence, the NPS will be an important player in resiliency efforts in the bay. The NPS is updating the GMP, which has been prepared over the last four years and will guide future management of the park. As the Committee looks to integrate protection into the edge, all of these assets could be affected, and any action taken will need to be in compliance with the GMP.



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

Hudson Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP). Adopted in 2009, the USACE and Port Authority of New York and New Jersey developed the HRE-CRP in collaboration with Federal, State, municipal, and non-governmental organizations as well as other regional stakeholders. It sets forth a consensus vision, master plan, and strategy for ecosystem future restoration in the New York/New Jersey Harbor. The plan identified 39 potential restoration sites in and around Jamaica Bay.

Jamaica Bay, Marine Park and Plumb Beach, New York Ecosystem Restoration Feasibility Study. This study is a joint undertaking of the USACE and the NYC DEP. It was initiated following Sandy and is intended to provide an expedited limited reevaluation of USACE restoration projects in the bay to address post-Sandy changes and explore the potential for these projects to provide coastal storm risk management benefits on top of the ecological benefits for which they were initially conceived. The interim draft report identified eight priority restoration sites (550 acres) from the HRE-CRP recommendations: Dead Horse Bay, Paerdegat Basin, Fresh Creek, Spring Creek, Hawtree Point, Bayswater State Park, Dubos Point, and Brant Point. In addition, the feasibility study will look at the ongoing Marsh Island Restoration Projects, relevant to Broad Channel due to their strategic location around the island. The study is also looking at Gerritsen Creek and Upper Spring Creek, as well as ongoing USACE Storm Reduction Studies and Navigation projects in the area.

East Rockaway Inlet to Rockaway Inlet (Rockaway Beach) Reformulation Study. This project reevaluates recommendations by the existing USACE plan for the area in light of the impacts of Sandy. Phase 1, for which the draft report should be available for public review by November 2014, is focused on the ocean side of the Rockaway Peninsula. Phase 2, for which the draft report is expected in November 2015, will investigate and evaluate potential coastal storm risk management reduction measures to address flooding on the Jamaica Bay side of the peninsula and throughout the bay.

There are a number of additional ecosystem restoration and resiliency projects relevant to Broad Channel that are moving forward in the bay but are not explicitly a part of the USACE studies. Foremost among these are the restoration proposals for Sunset Cove and Broad Channel American Park. These projects are being developed as part of the New York City Department of Parks and Recreation's (NYC DPR) ongoing Rockaway Parks Conceptual Plan Planning effort. As currently conceived, these projects would enhance recreational amenities at Broad Channel American Park and would restore habitat at Sunset Cove including wetland and upland maritime forest which would provide coastal storm risk reduction benefits as well as habitat benefits to the island. While these projects are not yet funded, NYC DPR has completed soil testing and surveys of the area and has submitted an application to the U.S. Department of Interior/National Fish and Wildlife Foundation's (USDOI/NFWF) Hurricane Sandy Coastal Resiliency Competitive Grant program for \$5 million to fund implementation of the Sunset Cove project. Additionally, other funding opportunities are also being explored by community groups working in the bay.

Additional citywide initiatives

Special Initiative for Rebuilding and Resiliency.

On June 11, 2013, then Mayor Michael Bloomberg announced the release of *A Stronger, More Resilient New York* (SIRR Report), forming New York City's plan for rebuilding post-Sandy and ensuring resiliency into the future. The plan contains actionable recommendations both for rebuilding communities in the city affected by Sandy and for increasing the resiliency of buildings and infrastructure citywide. More broadly, the plan lays out numerous citywide initiatives to improve resiliency for systems including coastal protection, buildings, insurance, utilities, liquid fuels, health care, telecommunications, transportation, parks, water and wastewater and other critical networks. The report and latest updates on implementation can be found on the SIRR website: <http://www.nyc.gov/html/sirr/>.

The New York City Comprehensive Waterfront Plan—

Vision 2020 (CWP). This is a comprehensive analysis and overall vision for New York City'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 16 boroughs), and increasing the resiliency of the city in respect to climate change and sea-level rise.

Waterfront Revitalization Program (WRP). The program is New York City's principal coastal management tool, and implements the CWP. It establishes New York 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.



Dan Mundy, Sr., and Dan Mundy, Jr., of the Jamaica Bay Ecowatchers were honored with the first-ever Citizen's Coastal Conservation Award in recognition of their outstanding work preserving and protecting Jamaica Bay.

Credit: Jamaica Bay Ecowatchers:
<http://jamaicabayecowatchers.org/>



Youth Volunteers planting Spartina Plug for the wetland restoration project on Rulers Bar

Credit: ecowatchers1, Flickr:
<http://www.flickr.com/photos/60358599@N03/8929438267/in/set-72157633888694168/>

Designing for Flood Risk. Prepared by the New York City Department of City Planning (NYC DCP), this study 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 NYC DCP's Flood Resilience Zoning text amendment adopted by the New York City Council in 2013.

The Urban Waterfront Adaptive Strategies (UWAS).

This report, prepared by the NYC DCP, provides a systematic assessment of the coastal flood hazards from climate change and sea-level rise that face New York City. 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.

Particularly relevant to NYRCR Communities are ongoing and potential future updates to the building and zoning code. New York City's Building Resiliency Task Force identified 33 recommendations to the City Council. Many of these recommendations are still in various states of review by the council, but 16 initiatives have been passed. In addition, the NYC DCP's Flood Resilience Zoning Text Amendment was approved by City Council on October 9, 2013.

NYC Recovery Program. In addition to resiliency, the City of New York has launched several initiatives to help residents across the five boroughs recover from the damage caused by Sandy. The "Build It Back" program seeks to assist homeowners, landlords, and tenants whose homes were damaged by Sandy. The NYC Recovery Program is also offering business loans and grants to small business owners damaged by the storm.



Transporting the spartina plants

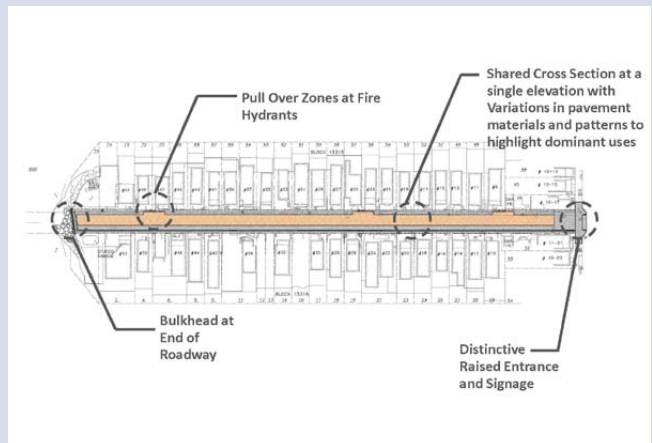
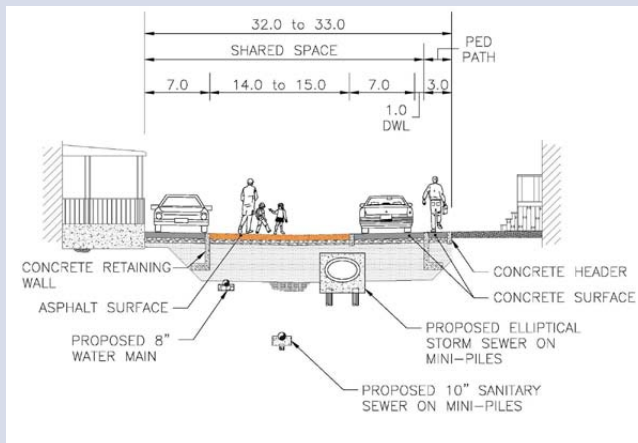
Credit: ecowatchers1, Flickr: <http://www.flickr.com/photos/60358599@N03/8756274868/>

Most of these recovery programs support resiliency investments and will help improve individual homes and businesses in the communities surrounding Jamaica Bay. More information on the NYC Recovery Program can be found at <http://www.nyc.gov/html/recovery/>. (The Governor's Office of Storm Recovery administers housing and small business recovery programs in communities outside of New York City that were impacted by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee.)

FEMA Flood Maps and Flood Risk Assessment. The agency describes its assessment of flood risk through flood maps referred to as Flood Insurance Rate Maps (FIRMs). These maps are used by the National Flood Insurance Program (NFIP) to set flood insurance rates. When Sandy hit New York City, the FIRMs in use were based on information from 1983. Superstorm Sandy inundation extended well beyond what these maps estimated would be the 100-year floodplain, calling attention to the fact that an update to these maps was needed. In fact, before the storm, FEMA had begun a

coastal flood study to update FIRMs for portions of New York and New Jersey using improved methods and data to better reflect coastal flood risk.

After Sandy, FEMA first released Advisory Base Flood Elevation (ABFE) maps based on the partially completed flood study for certain communities which were designed to help in rebuilding and recovery efforts. In June of 2013, FEMA released preliminary work maps for New York City, including the full results of the coastal flood study. The preliminary work maps are based on the same underlying data as the earlier ABFE maps, but include the results of a more refined analysis of shoreline conditions, including the effects of erosion and wave run-up. The maps are a draft product that FEMA shared in advance of the preliminary FIRMs, which were released at the end of 2013. The final updated FIRMs are anticipated to be released in 2015. These final FIRMs will guide new flood insurance rates for homeowners and businesses in the floodplain.



Local initiatives: Broad Channel street raising

New York City Department of Transportation and New York City Department of Environmental Protection project to raise the streets of West 11th through West 13th Roads. The next phase of the project would raise West 14th through West 19th Roads.

FEMA's flood maps do not take into account future conditions and thus do not factor in potential sea-level rise. The New York City Panel on Climate Change (NPCC) is continuing to analyze potential climate change impacts on New York City, namely sea-level rise. The NPCC released a report, *Climate Risk Information 2013: Observations, Climate Change Projections, and Maps*, in conjunction with the SIRR Report and provides New York City's estimates for sea-level rise over various time frames. They are expected to update these estimates in the near future. In addition, New York City has hired the Stevens Institute of Technology to map flood zones with added sea-level rise for future decades. This is being done within the NPCC framework and will be reported and released through NPCC in the winter of 2014.

In a move to bring flood insurance rate relief to coastal communities, on March 4, 2014, the U.S. House of Representatives passed a bill that would limit flood insurance premium increases to 15% of the average rate in a particular flood zone or 18% for each individual policy. The U.S. Senate approved the same bill on March 13, 2014. On March 21, 2014, President Obama signed the Homeowner Flood Insurance Affordability Act into law.

Local initiatives

The NYC DEP and New York City Department of Transportation (NYC DOT) are developing new street raising initiatives. This program will be piloted in Broad Channel and is scheduled to raise West 11th through West 13th Roads in 2014 and West 14th through West 19th Roads in 2015. The street project will consist of raising the existing street, and installing new storm sewer, water, and sanitary sewer mains.

Summary

The following key takeaways from review of existing plans, studies, and projects that specifically address Broad Channel illustrate that gaps in planning can be addressed through NYRCR:

- Planning for Jamaica Bay restoration and resilience is already being carried out, led by USACE. Broad Channel initiatives can pilot more innovative integrated natural strategies for flood protection that could be replicated throughout Jamaica Bay and across the region.
- Infrastructure projects—including roadway, transit, sewer, and bulkhead—are under construction, including some important projects on Broad Channel that could be expanded to further mitigate flood damage from future storms.

Based on review of existing plans and initial engagement, existing gaps in planning include the following:

- An understanding of the need for infrastructure improvements (such as additional street raisings or bulkhead repair)
- Identification of funding streams for natural resources restoration
- The status of large-scale infrastructure improvements
- A strategy for local nature-based resiliency in and around Broad Channel
- Deciding how best to harden community social services
- Development of evacuation plans for disabled and senior populations

II. Assessment of risk and needs



Recovery support functions

Early in the planning process, the NY Rising Community Reconstruction (NYRCR) Broad Channel Planning Committee (the Committee) and the public identified a set of needs and opportunities that embody the critical issues facing the community after Superstorm Sandy (Sandy). Through the framework of Recovery Support Functions established in the NYRCR planning process, these needs and opportunities developed into a set of strategies that shaped how the Committee and the NYRCR Broad Channel Community (the Community) prioritized the selection of projects and allocation of federal Community Development Block Grant-Disaster Recovery (CDBG-DR) funding.

A number of the projects developed to meet these needs involve multiple Recovery Support Functions. Tracking the Recovery Support Functions through the asset inventory, needs and opportunities, strategies, and project development will help to organize the plan around this set of principles. By designing with these principles in mind, each project will strive to involve co-benefits, solve for complex problems, and plan holistically for the varied needs of the Community.

Recovery support functions

Throughout the NYRCR Plan, six **Recovery Support Functions** are used to guide the identification of issues, assist in categorizing assets and assessing risk, frame needs and opportunities, and organize resiliency strategies. These following functions are derived from FEMA's National Disaster Recovery Framework (NDRF) developed by President Barack Obama in 2011 and will help coordinate this plan with New York State and Federal programs:



Community Planning and Capacity Building

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



Health and Social Services

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



Economic Development

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



Housing

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



Infrastructure Systems

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



Natural and Cultural Resources

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

Description of community assets and assessment of risk

Description of community assets

The goal of the asset inventory process is to assemble a complete description of the assets located within the community, targeting assets whose loss or impairment due to flood and storm events would compromise essential social, economic, or environmental functions or critical facilities of a community. The inventory includes sufficient information to assess risk to the assets under current and future conditions. Assets include a variety of valued places and resources within a community. Assets may facilitate economic and social activities or refer to critical infrastructure required to support those activities. Assets may also be part of the built or the natural environment.

Broad Channel's asset inventory has been developed based on a combination of public data and input from the Committee and the public. The inventory and associated maps were initially generated using publicly available land use and infrastructure data to identify assets within the planning study area. (The primary data source used was the New York City Department of City Planning's MapPluto data, release 13v1.) The first draft of an asset inventory was presented at the first Committee meeting. The maps were refined based upon input from the Committee and presented to the Community at the initial Public Engagement Event. Attendees identified any missing and priority assets. The Committee then reviewed and confirmed the inventory.

The asset inventory is organized by key NYRCR asset class and recovery support function. In the case of Broad Channel, assets related to community planning and capacity building and health and social services are combined as there is extensive overlap between these two categories.

Health and social services and community planning and capacity building assets

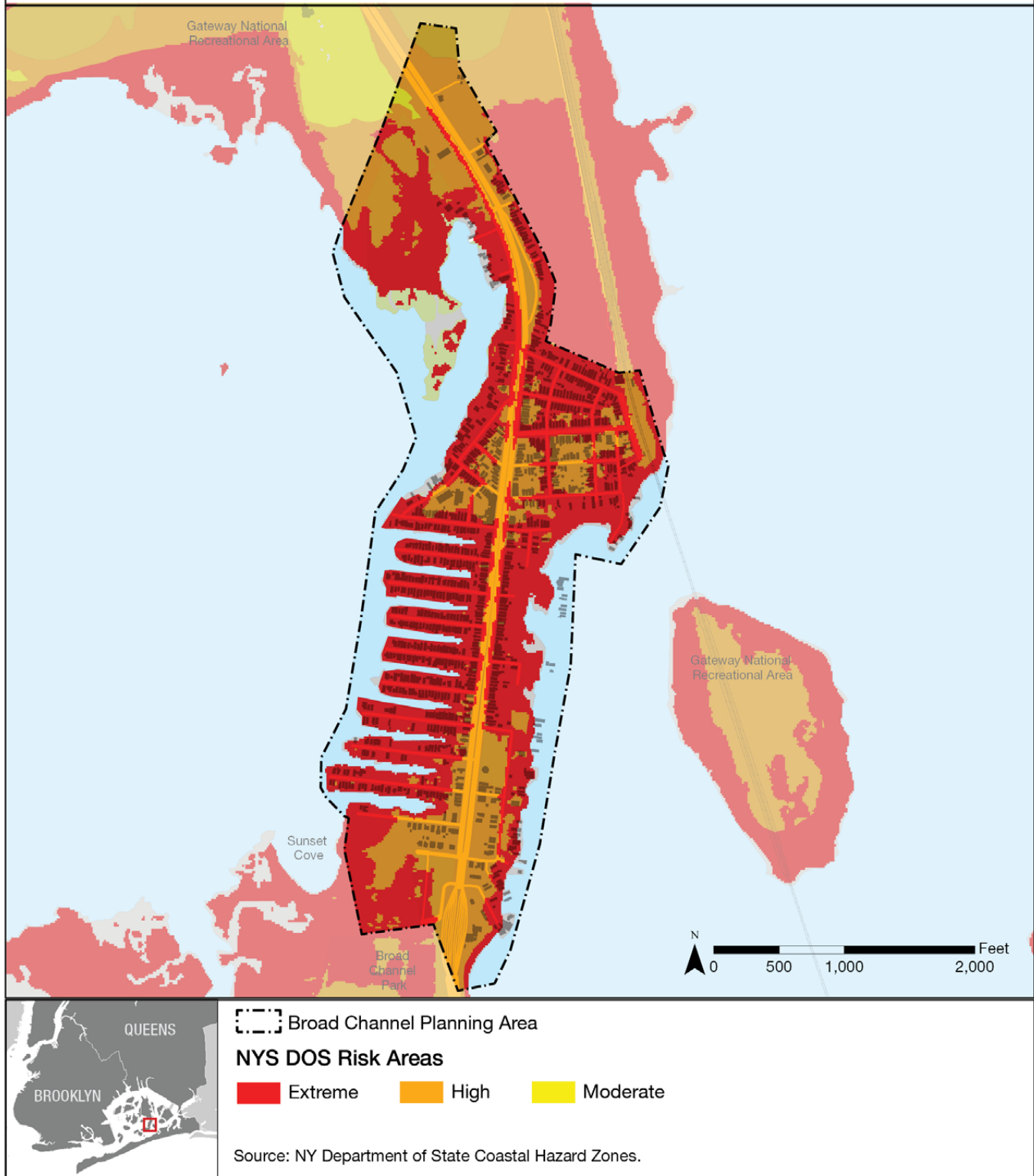


Broad Channel contains a few important social service and community centers. Public School 47 sits west of Cross Bay Boulevard and just north of 10th Road. The local library is located next to Broad Channel Park in the southern part of the island on the east side of Cross Bay Boulevard. The Broad Channel Volunteer Fire Department (BCVFD) sits at the corner of Church and Noel Roads in the northeast section of the island, but is scheduled to move to a new home in the northernmost section of the inhabited part of the island to create the largest concentration of community assets serving the Community. The Community would like to move its Historical Society into the current BCVFD firehouse if sufficient funds can be raised to restore and upgrade the facility for its use. There are currently no health service facilities located in Broad Channel.

The northern edge of the community is home to multiple community facilities, including the Broad Channel Athletic Club (BCAC) and the American Legion Hall. Slightly to the south lie the Veterans of Foreign Wars (VFW) Hall and the Shad Creek Association building. This concentration of community uses for recreation, meetings, and community events lie in a high-risk area, adjacent to a large section of Broad Channel wetlands, but it is one of the highest points on the island. The Community highly values the BCAC, the American Legion, and the VFW and would like to protect them as part of larger asset and community resiliency projects.



Figure II-1: NYS DOS risk map



Risk area definitions

The NYS DOS, with the assistance of the National Oceanic and Atmospheric Administration, mapped geographic areas representing the likelihood for coastal flooding. They identified three risk areas:

Extreme – Areas currently at risk of frequent inundation and vulnerable to erosion and wave action over 3 feet (FEMA V Zone), subject to shallow coastal flooding (within the National Weather Service’s shallow coastal flooding advisory threshold), or likely to be inundated in the future due to sea-level rise (assumes 3 feet).

High – Areas outside the extreme risk area that are currently at risk of infrequent inundation (FEMA A Zone, meaning there is a 1% annual chance of flooding) or at future risk of shallow coastal flooding with sea level rise (assumes 3 feet).

Moderate – Areas outside the extreme and high risk areas but currently at moderate risk of inundation from infrequent events (FEMA shaded X Zone, meaning there is a 0.2% annual chance of flooding) or at risk of being in the 100-year floodplain with sea-level rise (assumes 3 feet), and any areas expected to be inundated by a Category 3 hurricane.

A more detailed description of the NYS DOS Risk Assessment Area Mapping Methodology can be found at <http://stormrecovery.ny.gov/community-reconstruction-program>.

Economic development assets



Broad Channel has a limited number of economic assets. The deli and small grocery establishments, and restaurants and offices between 9th and 10th Roads along the west side of Cross Bay Boulevard, represent Broad Channel’s central business district. Additional offices, eateries and even boat dealerships dot the rest of the Cross Bay corridor with a second, smaller concentration of economic activity located between 18th and 20th Road at the southern end of the island. The largest business operation, Call-A-Head Corporation, sits at the northern end of the island, and there are also a few maritime-related boat rental and repair facilities along the water’s edge.

Housing assets



Ninety-four percent of homes in Broad Channel were built before 1960, and many are constructed of combustible materials.¹ Both of these characteristics were associated with greater damage from Sandy’s impacts; the New York City Mayor’s Special Initiative for Rebuilding and Resiliency (SIRR) report found that 95% of buildings throughout New York City that were tagged by the New York City Department of Buildings as red (for structural damage) or that were destroyed by Superstorm Sandy were built before 1961.²

Every house on Broad Channel has been deemed as a critical asset. Houses line the neighborhood’s central spine of Cross Bay Boulevard and run east-west along a series of connecting streets both to the east and to the west. Broad Channel contains mostly wood-frame houses, many of which are either directly fronting or backing onto water, and all are within close proximity to open water. There are a large number of houses that are either built on stilts or raised on blocks. Almost all homes are either single- or two-family residences of one- or two-story construction.

Infrastructure assets

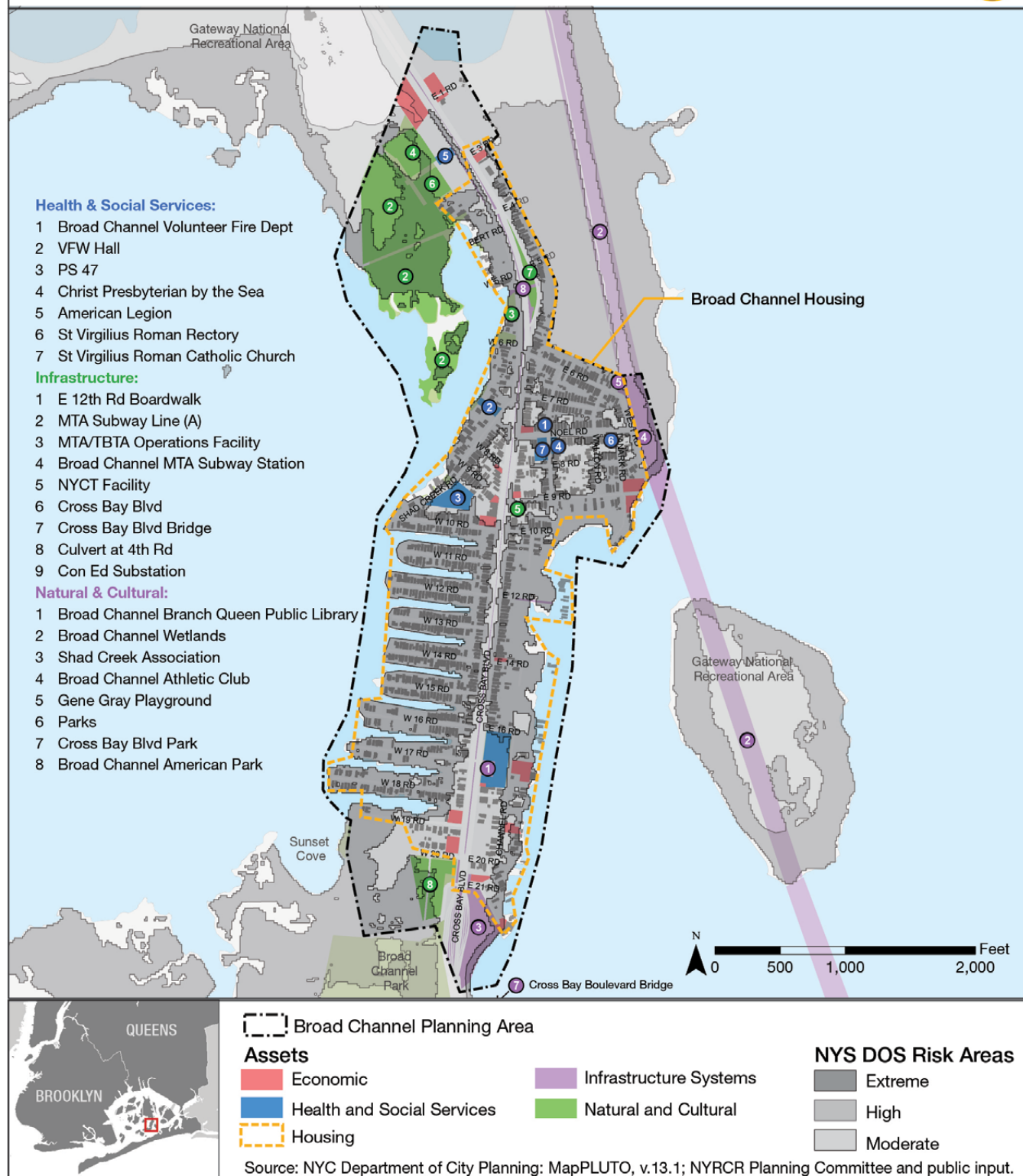


There are a number of critical infrastructure assets located in Broad Channel. Given the community’s size and location within Jamaica Bay, these assets are particularly vulnerable to flooding and are lacking in redundant systems.

Broad Channel is connected to the surrounding communities via Cross Bay Boulevard. The roadway connects the neighborhood to Howard Beach on the mainland via the Joseph P. Addabbo Memorial Bridge, and to the Rockaway Peninsula via the tolled Metropolitan Transportation Authority (MTA) Cross Bay Veterans Memorial Bridge. The MTA’s A-train line, which



Figure II-2: Asset Map



was knocked out of service for eight months because of Sandy, stops in Broad Channel. Broad Channel is also served by two local bus lines (Q52 and Q53) and two express bus lines (QM16 and QM17), which run to midtown Manhattan. Cross Bay Boulevard is under consideration for the expansion of the MTA's Select Bus Service, which will provide for greater service frequency along Cross Bay Boulevard and faster headways to destinations.

The Broad Channel electrical power grid is connected from remote power generators and substations. Power on Broad Channel may be lost when remote facilities are compromised. There is no dedicated natural gas line into Broad Channel, so residents rely upon electricity and propane for cooking and oil for heating. Broad Channel's utility infrastructure depends heavily on its connectivity to the Rockaway Peninsula and Howard Beach.

The storm sewer infrastructure can also exacerbate flooding problems. The culvert that allows water to pass beneath Cross Bay Boulevard to flush the wetlands in the northeastern portion of the island can also become a source of flooding into the community during times of extreme tides. Many Broad Channel streets are prone to flooding, with flooding sometimes originating through the local sewer outfall system. Some sewer outfall locations may need to be modified to prevent water flowing into local streets through the system during high-tide events.

Broad Channel contains a number of streets that lack sewer, water, and even vehicular access. Roadways like Lanark Road have always lacked sewer and water connection. East 12th Road is an example where an entire block of houses is disconnected from the city infrastructure and accessible only by a wooden footbridge. The Committee is hoping to connect all currently disconnected sections of Broad Channel to the city's utility system.

Natural and cultural resources assets



Jamaica Bay itself represents the most important natural asset for Broad Channel. Natural conditions in the bay have been deteriorating. Wetland islands have been disappearing at a rate that far exceeds restoration efforts. Much of the erosion can be attributed to runoff from developments and landfills, as well as raw sewage and treated freshwater from sewage treatment plants. While conditions have improved in recent years, much has been lost and needs to be restored.

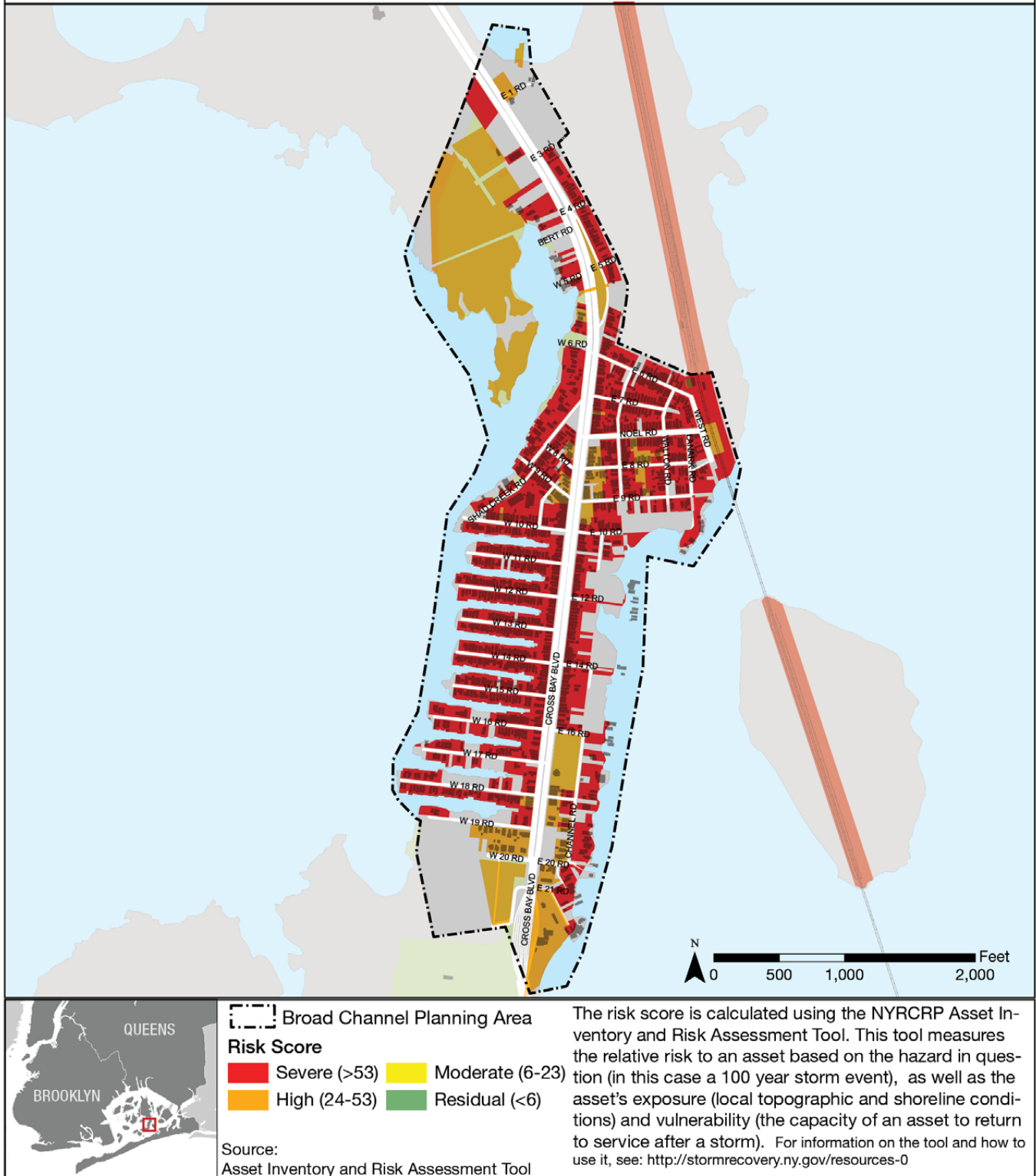
The inhabited portion of Broad Channel makes up only about one-third of the island's total land mass. Much of the rest, including a two-mile stretch of natural wetlands and ponds along the north end of the island, is part of the Jamaica Bay Wildlife Refuge, which is managed by the National Park Service (NPS) as part of Gateway National Recreation Area (GNRA). This regional natural attraction boasts beaches, West Pond, East Pond, a kayak launch, and the nature center.

Both freshwater ponds surrounding Broad Channel were breached during Sandy and tidal flow has been mixing with this unique freshwater pond. The NPS is in the midst of an environmental review to determine an appropriate solution to mitigate the breach and restore West Pond and the surrounding area to its pre-Sandy condition. East Pond was also breached during Sandy but was repaired by the MTA to facilitate repair of the A Train.

There are four active recreational areas in Broad Channel: in the south, Broad Channel American Park, which includes Sunset Cove and Gene Gray Playground; in the north, on the fields managed by the BCAC; and on the east side of Cross Bay Boulevard adjacent to the Broad Channel Branch Queens Public Library, Broad Channel Park. The New York City Department of Parks and Recreation is looking to upgrade and rebuild Broad Channel American Park by relocating the parking area, restoring the ball field and modifying access, while making stormwater management upgrades to the site.



Figure II-3: Geographic distribution of risk scores



Assessment of risk to assets and systems

Community planning and capacity building and health and social services assets at risk

Critical Broad Channel community assets that lie in the New York State Department of State (NYS DOS) extreme risk area include the American Legion Post 1404, the Broad Channel Athletic Club (BCAC), the Broad Channel Volunteer Fire Department (BCVFD), the Veterans of Foreign Wars Post 260 (VFW), the Christ Presbyterian by the Sea, the Saint Virgilius Roman Catholic Church, PS 47, the Shad Creek Association and several yacht clubs. Additionally, several assets lie in the high-risk area including the Broad Channel Branch Queens Public Library.

The BCVFD lost equipment during the storm and its building was damaged. The Broad Channel Historical Society, which stored its archives at the Broad Channel Branch Queens Public Library, lost valuable historical records due to flooding. The BCAC lost its storage facility and suffered additional damage. The VFW suffered damage to its entry doors, and the American Legion suffered heavy damages to its heating, ventilation and air conditioning system, and lost its kitchen and much of its power infrastructure on the ground floor.

Housing and Economic Development assets at risk

All of Broad Channel lies within the 100-year floodplain. The vast majority of Broad Channel lies below the base flood elevation, suggesting that it could be subject to much more frequent innovation. Using the NYS DOS methodology, all residential and commercial assets on the island are deemed as either extreme or high risk.

Assessing risk

Risk, in this context, is the potential for an asset to be damaged or destroyed in a future storm event. The assessment of risk to assets or systems of assets in a community produced important information to evaluate needs and opportunities and help guide Committee decisions about resiliency strategies and projects. NYS DOS developed a risk assessment tool that is aimed at understanding flood risk to community functions to support this process. The tool assigns each asset a risk score by evaluating three factors:

Hazard – the likelihood and magnitude of future storm events

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

Vulnerability – the capacity of an asset to return to service after a storm, taking into account its material strength relative to the coastal hazard as well as its regenerative capacity

Collectively, hazard, exposure, and vulnerability determine the risk that an asset could be damaged or destroyed by a coastal storm event. This analysis identifies which assets within the Community are most at risk from future storms in comparison to other assets. Furthermore, it allows potential projects to be evaluated by their ability to reduce risk to assets. For access to the NYS DOS Risk Assessment Tool and additional information how to use it, see <http://stormrecovery.ny.gov/resources-0>

Natural and cultural resources and infrastructure systems assets at risk

The following key systems are at risk in Broad Channel:

- **Provision of Gas for Cooking and Heating** – Broad Channel does not have a natural gas connection, and in addition to electricity, many residents rely upon propane for cooking and oil for heating. Sandy dislodged many of the propane and oil tanks from homes, which polluted Jamaica Bay and left residents without access to this necessary provision.
- **Provision of Water and Wastewater** – Much of the community suffered from sewer backups as a result of Sandy. Lanark Road (south of East 9th Road) and the East 12th Road Boardwalk lack sewer connections. Residents of these blocks have expressed a desire to be connected to the system, which would improve local environmental conditions.
- **Transportation Systems** – Broad Channel's transportation systems are at risk because the island is connected to Howard Beach to the north by the Joseph P. Addabbo Memorial Bridge and to the Rockaway Peninsula to the south by the Cross Bay Veterans Memorial Bridge. Because Broad Channel relies on the two bridges as means of access, the vulnerability of those bridges presents a risk to

emergency access during a disaster event. The A-train line and the station on Broad Channel are also at risk. During Sandy, 1,500 feet of track were washed out and service did not resume until the end of May 2013.

- **Local Streets and Access** – Many low-lying points in the street system are prone to flooding. With limited access centered on Cross Bay Boulevard, flooding on individual streets will often strand residents. Many houses are not connected to direct street access, utilizing boardwalks to reach homes set out along the edge or into the water. In some cases, like East 12th Road Boardwalk, entire streets are boardwalk structures. Many of these boardwalks were partially damaged during Sandy, leaving residents at risk of being cut off from access and infrastructure connections.

This analysis has been used to inform the definition of projects, particularly those that protect assets from flooding. Section IV discusses how the Planning Committee's Proposed and Featured Projects reduce the risk to assets identified here. A more detailed description of the Risk Assessment Methodology can be found on the NYRCR website, and the output from the Risk Assessment Tool is included in the Additional Materials section



Credit: Vinny O'Hare

Future conditions: dealing with a changing climate

Climate change is a real and significant concern for New York's coastal communities. Two impacts of climate change have the most bearing on the future risk to New York's coastal communities from future storm events and flooding: (1) sea-level rise and (2) increased frequency and intensity of storm events. On March 31, 2014, the International Panel on Climate Change (IPCC) released *Climate Change 2014: Impacts, Adaptation and Vulnerability*,¹ reiterating the risk to coastal communities across the globe and assigning a high confidence that risks from extreme weather events and of sea-level rise will continue to increase due to climate change. Closer to home, the New York Panel on Climate Change (NPCC) continues to look at the potential risks presented to New York City in light of climate change. In its *Climate Risk Information 2013*,² the NPCC made the following projections for 2050:

- Sea level will increase between 7 and 31 inches with a mid-range projection of 11 to 24 inches.
- The annual chance of today's 100-year storm (which is a 1% chance) will increase to between 1.4% and 5.5% with a mid-range estimate of 1.7% to 3.2%.
- Flood heights associated with a 100-year storm event will increase between 0.6 and 2.6 feet, with a mid-range projection of 0.9 to 2.0 feet.
- Precipitation (rain/snowfall) will increase by 1% to 15% with a mid-range projection of 5% to 10%.

These projected changes all increase the extent and likelihood of flooding in New York's coastal communities.

Notes:

1 International Panel on Climate Change (IPCC). *Climate Change 2014: Impacts, Adaptation and Vulnerability* (3/31/2014), <http://www.ipcc.ch/report/ar5/wg2/>.

2 New York Panel on Climate Change (NPCC). *New York Panel on Climate Change (NPCC). (2013). http://www.nyc.gov/html/planyc2030/downloads/pdf/npcc_climate_risk_information_2013_report.pdf*.



Ecowatchers: Rulers Bar Island wetland replenishment Credit: ecowatchers1. Flickr: <https://www.flickr.com/photos/60358599@N03/sets/72157634868849702/>

Assessment of needs and opportunities

In Broad Channel, the primary needs and opportunities focus on rebuilding community capacity, solving local infrastructure problems, and piloting innovative coastal protection measures.

The focus in Broad Channel is squarely centered on recovery. No one in the Community was immune from the effects of Sandy, and the Community has united to shoulder the burden, with neighbors, community organizations and businesses all pitching in to help those in need. Broad Channel needs reflect this focus on Community. The Committee recognizes that while true resiliency is a long-term objective, the immediate steps taken need to set the blueprint for a resilient future. It is also clear that those steps to improve Broad Channel cannot be undertaken in isolation. Broad Channel needs to coordinate its strategies with the larger plan of action for Jamaica Bay. Broad Channel also needs to preserve its symbiotic relationship with nature. Protection must enhance this connection and utilize nature-based strategies to protect against storm surge and sea-level rise. The Community realizes that resilience must think past Sandy to other potential climate change impacts. Broad Channel has a number of infrastructure deficiencies, especially relating to heat and power, where they are highly dependent upon off-island resources. A diversification of power and use of alternative energy technologies should also become part of Broad Channel's future.

Each need identifies corresponding recovery support functions and potential opportunities. In the case of Broad Channel, greater emphasis may be placed on certain recovery support functions and many needs incorporate multiple recovery support functions. This is representative of the Community strategy to implement a series of projects that will work together to solve for multiple needs simultaneously. The strategies, which form the basis of the resiliency plan, solve for the following needs:

NYRCR project development process

The projects in this plan were developed through the following Community-based process:

- Resiliency needs and opportunities were brainstormed through extensive public engagement. Needs were discussed in the context of reducing short and long-term risk and increasing the resiliency of assets, systems, and people. Opportunities to build off existing community strengths were also identified.
- With a thorough, baseline understanding of the Community's resiliency needs and opportunities, the Committee identified overarching strategies to address the most critical needs in the community, and to take advantage of existing opportunities. Public input guided the refinement of these strategies.
- In order to implement strategies, the Committee identified specific projects. These projects directly address the needs and opportunities identified at the beginning of the process.

- Retain community services and emergency response (Community Planning and Capacity Building, Health and Social Services)
- Develop resiliency strategies for Jamaica Bay (Natural and Cultural Resource)
- Retain and enhance the unique relationship with nature (Natural and Cultural Resource)
- Improve and diversify infrastructure systems (Infrastructure)
- Ensure business stability by improving conditions for existing and new businesses (Economic Development)
- Make housing more sustainable and resilient to climate change (Housing)

Retain community services and emergency response



An event of Superstorm Sandy's magnitude has the potential to have lasting and long-term impacts on the social infrastructure, cultural identity, and economy of the Community. Recognizing that this storm has affected both individuals and the larger community, the Committee is focused on rebuilding the facilities that are central to the culture of Broad Channel.

Many important community spaces were damaged during the storm. The Community desires to rebuild these assets, make them more resilient, and to utilize them as recovery centers after future disasters, and other resiliency strategies to protect what is effectively a campus of community uses that serve Broad Channel's community, recreation, and public-gathering needs.

Overall, Broad Channel needs more emergency and health services, available on a regular basis, but especially during and after an emergency. This is particularly the case for its senior and other vulnerable populations.

Opportunities:

- The concentration of community uses, especially in northern Broad Channel, represent opportunity for shared protection.
- There are opportunities to develop and rebuild multipurpose resilient community or social service centers that could also function as centers for recovery following a storm.
- Financing strategies to fund new health care facilities for the island.
- Piloting of sustainable strategies as part of the rebuilding of community centers.



Develop resiliency strategies for Jamaica Bay



The fate of Broad Channel is inextricably linked to the larger regional strategy for protection of Jamaica Bay. The large number of projects and plans for Jamaica Bay has been well documented. Discussions continue on next steps in terms of covering ecological strategies into resiliency strategies.

Opportunities:

- Wetland restoration could provide a measure of protection for Broad Channel
- Opportunities for increasing coastal protection through natural systems would provide significant co-benefits to Broad Channel and Jamaica Bay.
- Extending wetlands and building out along the natural shoreline could be elements of a Jamaica Bay strategy that includes local Broad Channel benefits.

Retain and enhance the unique relationship with nature



Broad Channel is characterized by a unique connection to nature. Broad Channel was largely settled in the early to mid-1900s with houses set up against wetlands and out over the water. The Community is concerned about the loss of wetlands, which would further erode protection of yards and homes in Broad Channel. Recognizing that much of the edge is soft and that gray (hard) protection measures would be in conflict with the current natural edge, the Community is looking to nature-based protection strategies that will preserve wetlands and habitat and add to the natural setting that makes Broad Channel unique.

Opportunities:

- Significant portions of the edge comprise wetlands and natural features.
- Piloting nature-based protection that could be replicated in Jamaica Bay and throughout the region.
- The wildlife refuge and other natural features around the island could also factor into restoration efforts.



Improve and diversify infrastructure systems



There are a number of major, long-term deficiencies that must be addressed if the Community is going to increase its resiliency in the face of climate change and future storm events. The houses at the end of East 12th Road and along Lanark Road represent some of the unique conditions on Broad Channel as both blocks lack sewer infrastructure. The Community hopes to resolve these infrastructure deficiencies so that all homes and businesses on the island can be connected into the larger network. With new connections, the Broad Channel Community will also be improving environmental conditions in the bay.

The larger sewer and drainage infrastructure network could also provide opportunities to increase protection against flooding. The strategic placement of backflow preventers and flood gates at culverts would control water flow and reduce some of the moon tide flooding that takes place in the eastern part of Broad Channel. These measures could be undertaken by the NYC Department of Environmental Protection (NYC DEP) in the near future. As all of Broad Channel is low-lying, many of its streets are routinely flooded during moon-tide events. Elevating streets may be one option for reducing localized flooding.

There is no natural gas pipeline to Broad Channel and the Community is concerned about the lack of diversity of power options in the face of climate change conditions. With local propane supply limited and trending downwards, the need for a more resilient long-term energy solution here is keenly felt.

Opportunities:

- Alternative power for community centers and other key island facilities.
- A few key storm protection infrastructure elements could greatly enhance local protection against flooding.
- Connections to New York City infrastructure will improve the environment.
- Connections to off-island infrastructure can increase power and heat diversity.



Ensure business stability by improving conditions for existing and new businesses



Cross Bay Boulevard, although in a high-risk area, is one of the high points on the island and is the economic artery of this community. Cross Bay Boulevard is home to most of the businesses that serve the community. Overall, there is a need to restore and increase business presence on the island, to help it remain a thriving community. While there are some businesses that the community can rely on, there are a number of community needs that are not serviced locally, including a pharmacy. A strategy that can both protect and brand the business district will help to maintain and increase business presence on the island.

Opportunities:

- Localized protection for businesses
- Streetscape improvements
- Back-up power
- Development of a business improvement district or other similar structure to more effectively organize and explore funding opportunities

Make housing more sustainable and resilient to climate change



Many of the houses in Broad Channel were originally built on stilts, and many houses reach out over the water. Several others are raised above crawl spaces, which is emblematic of the fact that these houses are built close to the water. One way to make housing more resilient is to raise the housing stock to guard against future flooding. While most Broad Channel houses are able to be retrofitted to be raised or lifted higher than current levels to rise above base flood elevation, the raising of houses is financially and physically challenging; however, it can be done in such a way as not to profoundly transform the nature of this waterfront community. Localized improvements, such as the street raising project being undertaken by New York City Department of Transportation (NYC DOT) and NYC DEP for 11th through 13th Roads, new infrastructure protections such as a tide gate on the culvert at 4th Road and other edge improvements can also protect housing against flooding.

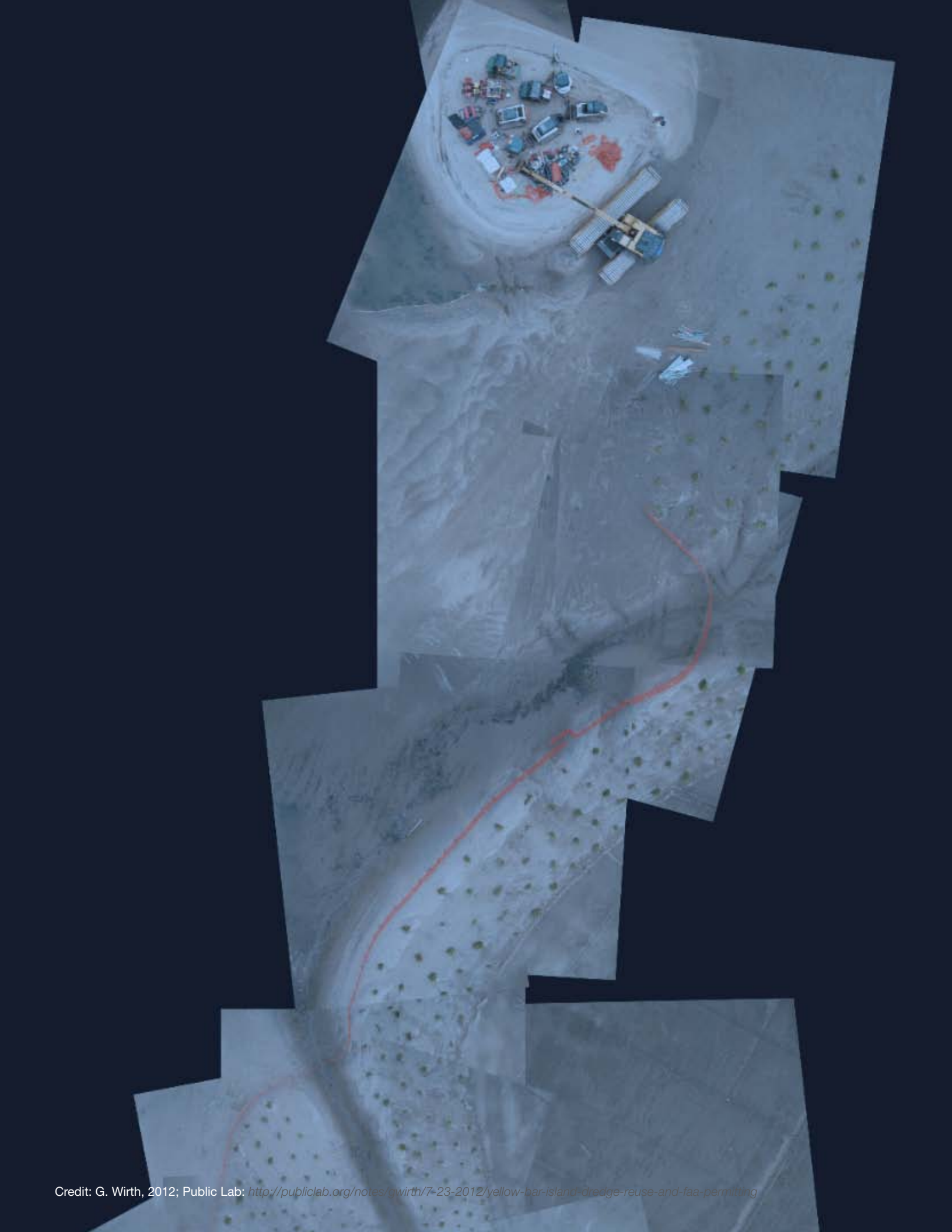
Opportunities:

- Housing stock able to be raised
- Local infrastructure strategies can protect homes



III. Reconstruction and resiliency strategies





Superstorm Sandy (Sandy) was a game-changing event. The NY Rising Community Reconstruction (NYRCR) Broad Channel Community (the Community) has experienced flooding in the past, but Sandy swept over the island, leaving the entire community under water. For the Community, Sandy was a devastating storm that requires new thinking in terms of preparedness and resiliency. The NYRCR Planning Committee (the Committee) has shaped a plan that pilots innovative solutions for layered coastal protection, builds community resiliency, integrates sustainability into every strategy, and focuses on implementable projects so that the Community sees near-term benefits that can leverage additional action and funding and become the rallying point for the implementation of a long-term resiliency strategy.

Improve resiliency of key emergency response, community and cultural centers



Broad Channel's social infrastructure has, for generations, centered around its community centers. When Sandy struck, these centers, despite suffering significant damage, stepped in to help community members rebuild and recover. This is a community of families, many of whom have been connected to Broad Channel for generations. The Committee recognized at the outset that long-term resilience starts with the community. For Broad Channel to be resilient to future climate change impacts, it must maintain and increase the resiliency of the institutions that offered support during the storm. The Community will implement strategies to harden its most important community centers, ensuring their use after an emergency. By focusing on the protection of the key community assets, the Committee will provide an opportunity for its community facilities to provide relief after a crisis in addition to their daily functions in the Community. By hardening and supporting its emergency response, it will provide Broad Channel with a local component connected to the larger regional relief effort.

The **American Legion Hall**, the **Broad Channel Athletic Club (BCAC)**, and the **Broad Channel Volunteer Fire Department (BCVFD)** are key organizations that

provided critical relief to the Community after Sandy. Capital improvements to these three facilities will make them more resilient in the event of another storm and increase their capability to act as relief centers and staging areas for emergency services. Although these projects are separate, the goal is for all three to work in concert as a **Recovery Campus—a relief hub** where community members can receive information and support during critical times. The organizations that run these facilities already work closely on community-based daily and weekly programs and can expand upon their normal community services by providing communication, goods and services and technical assistance in times of need. Improvements could extend to sustainability measures and provide the capability to provide heating and cooling during heat waves and power loss conditions.

The **Broad Channel Veterans of Foreign Wars Hall** provides meeting space for several Broad Channel groups, including many that serve vulnerable populations, such as the elderly and disabled. Improvements to the facility will increase access for those populations.



Broad Channel Branch Queens Public Library



Broad Channel Park

Table III-1 – Strategy: Improve resiliency of key emergency response, community and cultural centers (Proposed and Featured Projects)

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
American Legion Hall Resiliency Improvements	Make recovery and resiliency improvements to American Legion Hall	\$800,000	Proposed	N
Broad Channel Athletic Club (BCAC) Resiliency Improvements	Make recovery and resiliency improvements to BCAC	\$750,000	Proposed	N
Broad Channel Volunteer Fire Department (BCVFD) Resiliency Improvements	Build the communications center for the BCVFD	\$750,000	Proposed	N
Broad Channel Veterans of Foreign Wars (VFW) Hall Resiliency Improvements	Make recovery and resiliency improvements to VFW Hall	\$300,000	Proposed	N
Broad Channel Historical Society Digitization	Digitizing the archival collection to protect its contents from future disaster events	\$20,000	Featured	N
Recovery Campus Berm – Phase 1	Phase 1 of the berm around the recovery campus	\$3.5M	Proposed	N

Protect and enhance the culture and history of Broad Channel



Broad Channel residents are proud of the Community's unique history, culture, and experience. Part of ensuring a resilient community is offering opportunities for residents to share that history and culture. Protecting Broad Channel's physical archives and creating a cultural center are ways to accomplish this goal.

An important part of community building in Broad Channel is the shared history among members of the island's close-knit population. The **Broad Channel Historical Society Digitization Project** would protect the Community's historical records and create an educational tool for community members. The Community strongly supports any measures that would help the Historical Society protect its historical archives and support efforts to find a permanent home for the historical society to display the history of Broad Channel for visitors and residents to experience its rich and unique history and culture.



Barbara Toborg displaying exhibits from the Historical Society
Credit: Broad Channel Branch Queens Public Library

Table III-2 – Strategy: Protect and enhance the culture and history of Broad Channel (Proposed and Featured Projects)				
Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Broad Channel Historical Society Digitization	Digitizing the archival collection to protect its contents from future disaster events	\$20,000	Featured	N

Develop a regional resiliency strategy for Jamaica Bay



The Committee recognizes that Jamaica Bay is a vital regional environmental asset that is already at risk. As noted, Federal, State, and local agencies are already developing strategies to restore this critical environmental asset. Since Superstorm Sandy, these studies and associated pilot projects have begun to evolve into a shared environmental and flood protection effort. For example, the *Strategic Initiative for Rebuilding and Resiliency* (SIRR) report produced by the City of New York, studied long-range bay and harbor-wide flood protection solutions. The Committee is aware of these efforts, and members of the Committee have been working with these agencies for several years to promote environmental improvements in Jamaica Bay. The Committee recognizes that the fate of the bay and the future of Broad Channel are inextricably linked and are active participants in the ongoing regional dialogue taking place.

Through the Jamaica Bay Working Group formed out of the NYRCR effort, Broad Channel, along with other NYRCR Communities are collaborating with Federal, State of New York, and City of New York partners to determine the best approach moving forward. However, the Committee recognizes that any holistic action that may result will be tremendously expensive and decades in its formation and implementation. Recognizing the uncertainty of larger-scale solutions and the timeframe that would be needed for implementation, the Committee has resolved to recommend further study of a Jamaica Bay-wide solution, but also to look at piloting small-scale technologically innovative protection strategies within Broad Channel that could guide a larger strategic approach for the bay.

No specific Proposed or Featured Project was identified for this strategy.



View of Jamaica Bay



Ecowatchers: Rulers Bar Island wetland replenishment
Credit: ecowatchers1. Flickr: <https://www.flickr.com/photos/60358599@N03/sets/72157634868849702/>

Develop a layered approach to coastal protection that incorporates natural strategies



Reducing the impact of storm surge in Jamaica Bay and protecting against future storm events is a top priority for the Community. The Community will implement this strategy through projects that mitigate storm impact through layered coastal protection. From the onset of the planning process, the Committee and the public have communicated their desire to be “green” innovators, utilizing natural protection measures that enhance and preserve the open green space that is integrated into the neighborhood. The development of nature-based layered protection measures along the edge of Broad Channel and out into Jamaica Bay will be achieved only through partnerships with stakeholder agencies at the City, State, and Federal levels. One such partnership, where the community can help to pilot layered nature-based coastal protection, is Sunset Cove, along the southwestern edge of Broad Channel. By partnering with the New York City Department of Parks and Recreation to transform this ecological restoration project into a protection and habitat creation project, Broad Channel can initiate a new approach to Jamaica Bay protection that can be replicated throughout the bay and the region. Broad Channel is proposing to fund \$500,000 towards the **Sunset Cove** project to incorporate a nature-based edge-protection pilot.



Rock revetment along Canal Blocks



Wetlands along eastern edge of Broad Channel

Table III-3 – Strategy: Develop a layered approach to coastal protection that incorporates natural strategies (Proposed and Featured Projects)

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Sunset Cove Restoration Project	Implement the Sunset Cove edge protection strategy	\$500,000	Featured	N
Recovery Campus Berm – Phase 1	Phase 1 of the berm around the recovery campus	\$3.5M	Proposed	N

Improve the resiliency and connectivity of the local infrastructure network



The Committee has developed a number of projects that will increase the resiliency of neighborhood homes, businesses, and community facilities by strengthening the local infrastructure tied to these assets. Improvements to local infrastructure will create protection zones for assets that will mitigate future damage in the event of another storm or emergency. Improving connectivity will improve the local environment and increase the resilience of blocks and neighborhood. Areas that have poor access and lack even basic connectivity to New York City's sewer and water system like **East 12th Road Boardwalk** and **Lanark Road** should be connected up to make these neighborhoods more resilient and improve local environmental conditions.

The Committee is highly supportive of the efforts of New York City Department of Environmental Protection (NYC DEP) and New York City Department of Transportation (NYC DOT) to raise streets along the Canal Blocks and supports the expansion of that effort from 13th Road down to 19th Road.



East 12th Road boardwalk



Lanark Road

Table III-4 – Strategy: Improve the resiliency and connectivity of the local infrastructure network (Proposed and Featured Projects)

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Lanark Road Stabilization, Sewer and Water Connection	Provide sewer and water connection to homes on Lanark Road. – Stabilize Lanark Road and remove ponding condition	\$2.5M	Proposed	N
East 12 th Road Boardwalk Repair and New Sewer Connection	Provide a new boardwalk structure along East 12 th Road that can accommodate sewer and water connection	\$1.5M	Proposed	N
Cross Bay Boulevard Complete Streets Pilot Project – Phase 1	Generators, solar powered lighting and permeable pavers	\$600,000	Proposed	N

Address localized flooding in the community



The Community has identified projects to mitigate flooding in flood-prone sections of Broad Channel. These smaller, targeted solutions, coupled with long-term resiliency plans, would mitigate the damage of future storms on homes, businesses, community facilities, and localized infrastructure.

The committee has identified the culvert at 4th Road and the backflow preventer at West Road as two low points in the system that could prevent moon-tide flooding if better protected.



Flooding in Broad Channel American Park

**Table III-5 – Strategy: Address localized flooding in the community
(Proposed and Featured Projects)**

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Lanark Road Stabilization, Sewer and Water Connection	Provide sewer and water connection to homes on Lanark Road. Stabilize Lanark Road and remove ponding condition	\$2.5M	Proposed	N
Sunset Cove Restoration Project	Implement the Sunset Cove edge protection strategy	\$500,000	Featured	N
Recovery Campus Berm	Phase 1 of the berm around the recovery campus	\$3.5M	Proposed	N

Expand energy alternatives and diversify energy sources



Broad Channel residents use propane and electricity for cooking and oil for heating. This proved to be a vulnerability during and after the storm. The Community has no control over the larger power grid supplied by Con Edison. By incorporating power strategies into multiple projects, a greater diversity of power choices, back-up generation capabilities, and a greater reliance on alternative energy sources will help Broad Channel adapt more effectively to climate change.



Exterior propane tanks

Table III-6 – Strategy: Expand energy alternatives and diversify energy sources (Proposed and Feature Projects)

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
American Legion Hall Resiliency Improvements	Make recovery and resiliency improvements to American Legion	\$800,000	Proposed	N
Broad Channel Athletic Club (BCAC) Resiliency Improvements	Make recovery and resiliency improvements to BCAC	\$750,000	Proposed	N
Cross Bay Boulevard Complete Street Pilot Project – Phase 1	Generators, solar powered lighting and permeable pavers	\$600,000	Proposed	N

Protect vital economic corridors



The businesses along Cross Bay Boulevard in Broad Channel are a key to the economic development of the neighborhood. Protecting the commercial center both physically and economically is vital to ensuring the livelihood of the Community. Developing sustainable strategies for Cross Bay Boulevard can increase economic vitality, encourage business growth and create opportunities to increase resiliency.

The **Cross Bay Boulevard Complete Street – Phase 1** project seeks to make both public and private improvements to the central business district to enhance resiliency and “brand” the business district to increase attractiveness. Back-up power, pervious sidewalk treatments and solar lighting will create the first of hopefully many streets that will become more resilient to the impacts of climate change.



Retail on Cross Bay Boulevard at 9th Road



Retail along Cross Bay Boulevard

**Table III-7 – Strategy: Protect vital economic corridors
(Proposed and Feature Projects)**

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Cross Bay Boulevard Complete Streets Pilot Project – Phase 1	Generators, solar powered lighting and permeable pavers	\$600,000	Proposed	N

Protect housing from sea level rise and future storm events



An important part of creating a resilient community is giving homeowners the tools to protect their homes in the event of an emergency. This strategy may include creating a toolbox of options for homeowners, including technical assistance on how to protect their assets against future flooding.



Home set above street level in Broad Channel

Table III-8 – Strategy: Protect housing from sea level rise and future storm events (Proposed and Featured Projects)

Project name	Short project description	Estimated cost	Proposed or featured project	Regional project (Y/N)
Lanark Road Stabilization, Sewer and Water Connection	Provide sewer and water connection to homes on Lanark Road. Stabilize Lanark Road and remove ponding condition	\$2.5M	Proposed	N
East 12 th Road Boardwalk Repair and New Sewer Connection	Provide a new boardwalk structure along East 12 th Road that can accommodate sewer and water connection	\$1.5M	Proposed	N
Sunset Cove Restoration Project	Implement the Sunset Cove edge protection strategy	\$500,000	Featured	N
Recovery Campus Berm	Phase 1 of the berm around the recovery campus	\$3.5M	Proposed	N

	American Legion Hall Resiliency Improvements	Broad Channel Athletic Club Resiliency Improvements	Broad Channel Volunteer Fire Wars Hall Resiliency Improvements	Broad Channel Veterans of Foreign Broad Channel Resiliency Improvements	Lanark Road Historical Society Digitization	East 12 th Road Stabilization, Sewer and Water Connection	Cross Bay Boulevard Repair and Pilot Project – Phase 1	Sunset Cove Complete Street	Recovery Campus Berm – Phase 1
Strategies									
Improve resiliency of key emergency response, community and cultural centers									
Protect and enhance the culture and history of Broad Channel									
Develop a regional resiliency strategy for Jamaica Bay									
Develop a layered approach to coastal protection that incorporates natural strategies									
Improve the resiliency and connectivity of the local infrastructure network									
Address localized flooding in the community									
Expand energy alternatives and diversify energy sources									
Protect vital economic corridors									
Protect housing from sea level rise and future storm events									

IV. Implementation – project profiles



Guided by its resiliency strategies, the NY Rising Community Reconstruction Plan (NYRCR) Broad Channel Planning Committee (the Committee) focused on creating a list of connected, innovative, sustainable and implementable near-term projects that would set the community on a path towards a resilient future. The State of New York has allocated the NYRCR Broad Channel Community (the Community) up to \$6.06 million in Community Development Block Grant – Disaster Recovery (CDBG-DR) dollars to fund eligible projects identified in this NYRCR Plan. Understanding that this funding cannot solve all challenges, the Committee focused on projects that have a high likelihood of implementation in the short term, selecting 10 projects that could most effectively represent the initial steps of a comprehensive resiliency strategy for Broad Channel.

Broad Channel relies heavily on its community facilities for daily and weekly activities—as centers for meetings and community gathering—and in times of need, as the providers of information, supplies, food, and services. Strengthening these buildings would strengthen the Community. The Community is very focused on sustainability, with a long-term goal of energy self-sufficiency and alternative energy generation. Integrating back-up generators and solar-lighting strategies into community centers and businesses will create multiple locations that will have power if the grid goes out, allowing the Community to get supplies, charge electronic equipment, and get to a cool or heated place when power is lost in local homes.

Broad Channel seeks to tackle coastal protection through nature-based strategies. The **Sunset Cove** project would strengthen the edge while piloting a sustainable, naturally layered protection measure that would create opportunities for new habitat creation for the Community. The project reflects the important relationship the Community maintains with Jamaica Bay and its desire to maintain that ecosystem.

Protecting against the 100-year flood will be expensive and in many locations challenging where space is limited, and existing elevations are particularly low. The Committee developed the **Recovery Campus Berm Protection** project to pilot the first phase of more extensive flood relief.

The Committee focused on filling infrastructure deficiencies exploited by the storm. Projects for the improvement of **Lanark Road** and the **East 12th Road Boardwalk** would link homes (which are highly vulnerable to flooding) to the City of New York's drainage utilities. These projects would improve drainage and provide ecosystem benefits by reducing wastewater discharge into Jamaica Bay.

The Broad Channel business community is small. The loss of any business would further destabilize the local economy. Without a business core, the Community would suffer as people would need to travel off island for all of its shopping and service needs. The **Cross Bay Boulevard Complete Streets – Phase 1** project would provide business resiliency while enhancing business attractiveness.

The Committee has developed strategic pilot projects that illustrate innovative practices that can prove resiliency value at a small scale. As these get implemented, they can catalyze larger initiatives that can be replicated across the island and throughout the region.

The Committee is focused on pragmatic innovation. The Committee has considered how each project could include innovative solutions to save money, combine value to multiple parties, pilot strategies that could grow into much larger initiatives, and create new ways to use nature as part of coastal protection.

To provide cost estimates that account for the preliminary level of design work that has been conducted, conservative markups were included. As a percentage of estimated hard costs these include general requirement (10%), general contractor overhead and profit (21%), design contingency (25%), soft cost allowance (30%),

and 3% annual escalation. All construction job estimates are based on local construction cost and construction wage data, as well as standard industry assumptions of labor as a percentage of total hard costs.¹

Proposed and featured projects

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.



Figure IV-1: Broad Channel project overview



American Legion Hall Resiliency Improvements

Proposed Project

The American Legion Hall is the key community gathering space in Broad Channel and one of three buildings envisioned as part of the Broad Channel relief campus. The building requires repairs and improvements to harden the facility against future storm events and provide a refuge for cooling and heating.

The Broad Channel American Legion Hall Resiliency Improvements project would be a series of capital improvements to harden the facility to maximize its role as a relief center for community members. The project would ensure the facility's safety and reliability during emergencies.

The project would include the rehabilitation and construction of the following elements of the hall:

- **Water resilient exterior and entry points:** During Superstorm Sandy (Sandy), the Broad Channel Volunteer Fire Department's Emergency Medical Technician crew was sent to the hall, located on one of the highest points in Broad Channel, to provide emergency assistance. Although the crew was on the second floor, the water entered the hall and rose to that level, making the emergency

crews' rescue efforts more difficult. The building would be constructed to be flood-proof, making it a safe staging area for community members post emergency.

- **Upgrading heating, ventilation and air conditioning (HVAC) system:** The project would replace the existing damaged HVAC system with an upgraded system capable of transforming the American Legion Hall into an official heating and cooling center for vulnerable populations. This would maximize the capability of the facility to act as a relief center.
- **Emergency power:** The back-up generator would allow the hall to become an immediate staging area in the event of a disaster; and would facilitate the hall's usage by residents following a major disaster. The generator would be permanently attached to the facility, making it an integral fixture of the hall.



- Exterior flood lighting: Hall improvements would include exterior flood lighting around the facility to make the exterior of the facility a safe and usable space for emergency personnel and residents setting up emergency services outside after an emergency.

Cost estimate

\$800,000

The project cost would include design and engineering, supplies and materials, construction costs, general contractor overhead and profit, general requirements, and would take into account general construction contingencies.

Benefits/co-benefits

The primary benefits of the project would be the creation of a safe space for community members in the event of another storm or emergency and the provision of a space of sufficient size to organize and distribute goods, services and programs during times of needed relief.

Health and social benefits

HIGH

If the American Legion Resiliency Improvements project is funded, the project would benefit the entire Community. The improvements to the hall and surrounding facility would provide a safe environment for community members to gather, and a location for emergency responders to distribute critical supplies and services to those in need.

The American Legion is located on the northwestern section of Broad Channel, on higher ground near the Broad Channel Athletic Club and the future site of the

Project Summary

Recovery Support Functions

Cost

\$800,000



Community Planning and Capacity Building

Risk Reduction

HIGH



Health and Social Services

Health & Social Benefits

HIGH

Broad Channel Volunteer Fire Department. These three organizations have partnered informally to create a recovery campus, where their facilities collectively can protect residents against storm impacts. All three organizations are integral to the community network. Working together as a recovery campus following disaster events, these organizations would provide critical support to neighborhood residents and benefit from economies of scale in providing disaster relief and community support.

Cost-benefit analysis

The substantial benefits justify the estimated \$800,000 cost of the project. The Broad Channel American Legion is one of the key community organizations and centers for the tight-knit community of approximately 2,400 people on the island of Broad Channel. The social benefits that the organization provides to community members year round, and the substantial role that the facility played during Sandy and during the neighborhood's recovery indicate the critical impact that completing the project would have on the Community's welfare both during the normal course of events and in the case of another emergency. The high support from the Committee and impact on risk reduction justify the funding of this project.

The improvements funded through this project have the potential to remain in good working condition for decades, creating a sustainable emergency relief plan for community members for the long-term future. The leadership of the Broad Channel American Legion and support from the Community ensures that project would be carried out with low negative impact from unforeseen factors.

Risk reduction

HIGH

The American Legion Hall Resiliency Improvements project would have a high impact on reducing risk to the population by creating a safe and reliable relief center for neighborhood residents. The project would also increase safety outside the facility by including improvements that would increase the usability of the parking lot as a staging area.

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

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

Jurisdiction

The proposed project would be in Broad Channel and would therefore fall under the jurisdiction of the City of New York.



Broad Channel Athletic Club Resiliency Improvements

Proposed Project

The Broad Channel Athletic Club (BCAC) is focused on services and organized activities for youth. Hardening the athletic club and replacing its storage facility would enable the BCAC to function as one of the three facilities in the Broad Channel relief campus.

The Broad Channel Athletic Club (BCAC) Resiliency Improvements project would protect BCAC's assets and improve its capacity as a relief center through construction of a back-up generator and storage facility. This project supports the strategy of improving the resiliency of key community centers by hardening the BCAC facilities and ensures that it would be a functioning facility for community members, especially following an emergency.

The project would include the restoration and construction of the following components of the BCAC:

- **New storage facility:** Restoration activity would include the construction of a multilevel facility to store athletic and field-maintenance equipment, and shelving to provide for the protection of electrical equipment. The goal would be to look at innovative technologies to develop a low-cost, high, usable storage facility that would be resilient to future storm events. The storage area would provide space for emergency response supplies for the community. The new storage facility would open up space in the main building to transform it into a staging area for disaster events.



- **Emergency power:** Back-up generators would allow the BCAC to become an immediate staging area in the event of a disaster or major power outage, as well as facilitate the club's usage by residents. The generator would be permanently attached to the facility, making it an integral fixture of the BCAC.
- **Athletic field and parking lot lighting:** Improved field and parking lot lighting would allow tents, food distribution, and staging areas to be set up at the BCAC athletic fields during an emergency event. Lighting would be critical so that relief efforts could continue to function through the evening during an emergency.

Cost estimate

\$750,000

The project cost includes design and engineering, supplies and materials, construction costs, general contractor overhead and profit, general requirements, and takes into account general construction contingencies.

Benefits/co-benefits

The primary benefit of the BCAC Resiliency Improvements project would be the creation of a safe space for community members to seek critical supplies after another storm or emergency.

Health and social benefits

HIGH

If the BCAC Resiliency Improvements project is funded, the project would benefit the entire community of Broad Channel. The improvements would allow the organization to house community members and distribute critical

Project Summary

<p>Recovery Support Functions</p>  <p>Community Planning and Capacity Building</p>	<p>Cost</p> <p>\$750,000</p>
 <p>Health and Social Services</p>	<p>Risk Reduction</p> <p>HIGH</p>
	<p>Health & Social Benefits</p> <p>HIGH</p>

supplies in the case of an emergency. The BCAC is located on one of the highest pieces of land on the island of Broad Channel. The location and features of the building naturally give community members the most relative protection from a future storm when the facility is used as a recovery center.

The improvements funded through this project have the potential to remain in good working condition for decades, creating a sustainable emergency relief plan for community members for the long-term future. The BCAC has significant experience with grant administration and its presence within the community ensures that project would be carried out with low, negative impact from unforeseen external factors.

Cost-benefit analysis

The substantial benefits listed above justify the estimated \$750,000 cost of the project. The high support from the Committee and impact on risk reduction also justify the funding of this project. The BCAC is one of the key community organizations and centers on the island of Broad Channel. The social benefits that the organization provides to families year round indicates the high impact that completing the project would have on the community's welfare both during the normal course of events and in the case of another emergency.

Post-Superstorm Sandy, BCAC received \$225,000 in grant funding from the Robin Hood Foundation to assist families in the community to rebuild after the storm. The leadership of the organization and its experience administering grant funding and related projects would ensure that this project is properly carried out.

Risk reduction

HIGH

The BCAC Resiliency Improvements project would have a high impact on reducing risk to the community by creating a safe and reliable recovery center. The project would create a storage facility to store emergency supplies, protect BCAC equipment, and free up space in

the main facility to house community members after an emergency event. The back-up generator would create a safe and habitable place for community members to settle and recharge if they are forced from their homes.

The project's main benefits would be the social benefits an improved BCAC facility would provide to families and community members.

Implementation timeframe

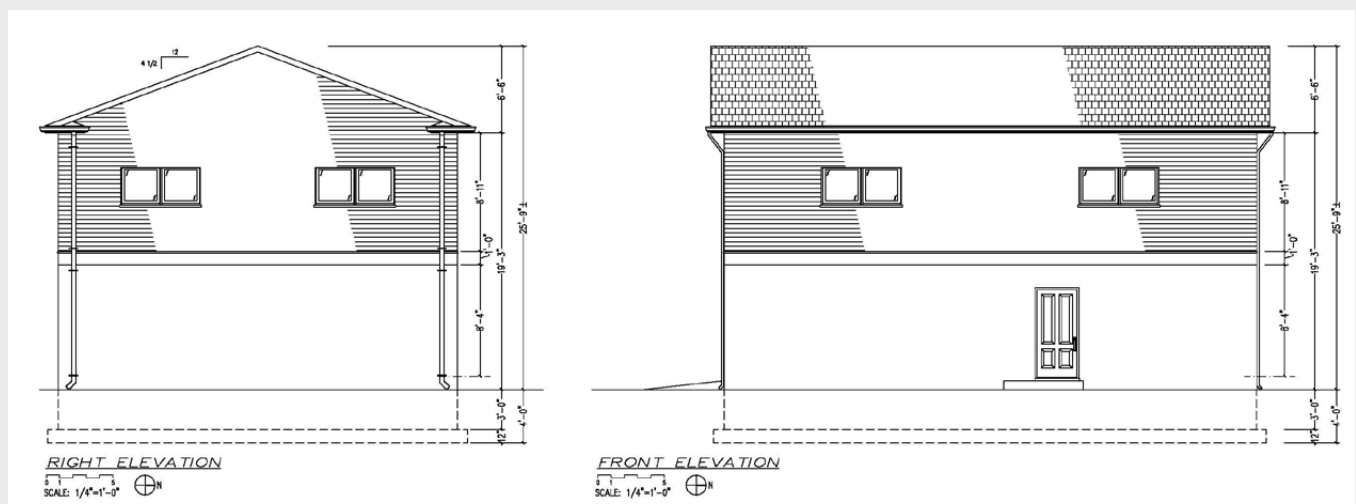
It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

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

Jurisdiction

The proposed project would be located in Broad Channel and would therefore fall under the jurisdiction of the City of New York.



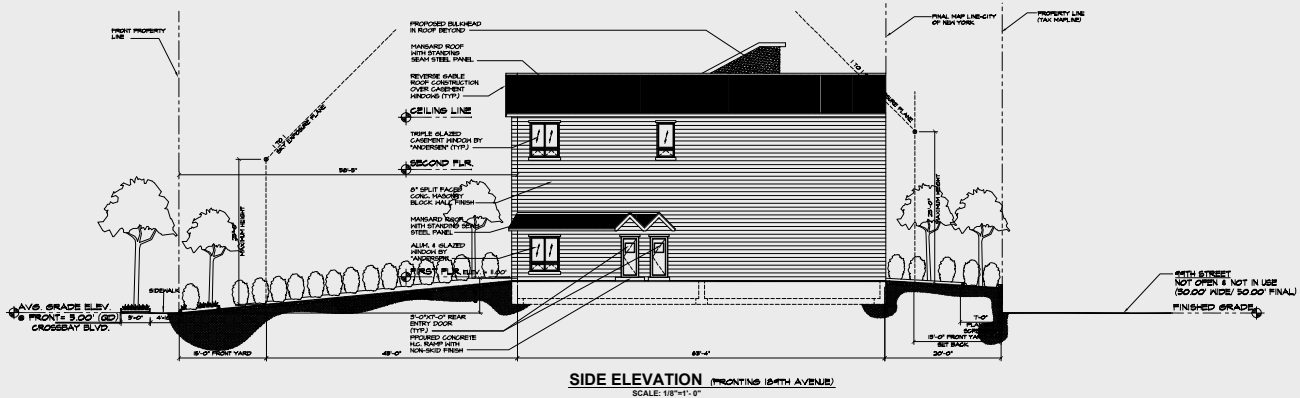
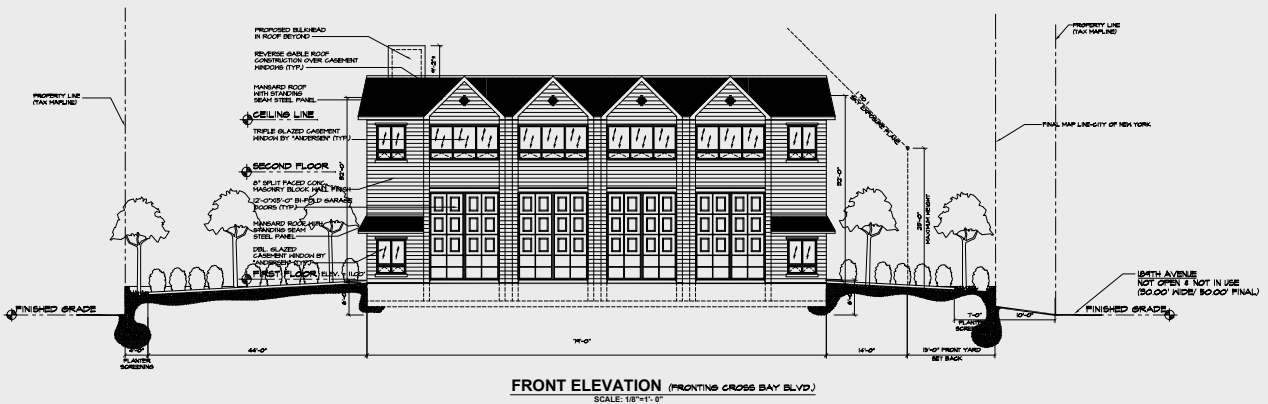
Proposed schematic Credit: Avid Designs



Broad Channel Volunteer Fire Department Resiliency Improvements

Proposed Project

The Broad Channel Volunteer Fire Department (BCVFD) project would involve the construction of the second phase of a new 10,000-square-foot department facility. The first phase of the project is currently going forward under the supervision of the Dormitory Authority of the State of New York (DASNY). The objective of the project would be to build out the second floor, including kitchen, bathroom, and workroom facilities for staff, as well as a full telecommunications center that could be used by New York City Office of Emergency Management (NYC OEM) and other agencies during an emergency event.



Proposed Broad Channel Volunteer Fire Department building Credit: John D. Calcagnile, Architect, 2013

The project would meet the Community's need to improve emergency response and community services by completing the construction of the new department facility and creating a communications center that would allow the BCVFD to be optimal first responders during an emergency. In addition, the facility would be constructed to the latest NYC Department of Buildings and FEMA Flood Elevation requirements.

Cost estimate

\$750,000

The project would include design and engineering, supplies and materials, construction costs, general contractor overhead and profit, general requirements, taking into account general construction contingencies.

Benefit/co-benefits

Health and social benefits

HIGH

If funded, the BCVFD project would benefit the entire Broad Channel community. The completed construction of the facility would allow the BCVFD to occupy the new space and provide a critical service to the community. The completion of the second floor of the facility would also provide additional community space, as well as ensure that BCVFD members are in a safe and comfortable environment during shifts. The creation of the communications center would facilitate communication with other emergency response agencies and coordination during an emergency. The Community would benefit from the improved capacity and services of the BCVFD on the island.

Project Summary

Recovery Support Functions

Cost
\$750,000



Community
Planning and
Capacity Building

Risk Reduction

HIGH



Health and Social
Services

Health & Social Benefits

HIGH

The new BCVFD facility would be located in the northeastern section of Broad Channel, on higher ground near the Broad Channel Athletic Club and the American Legion Hall. The three organizations have partnered informally to create a recovery campus, where their facilities collectively could serve residents in the event of an emergency. Located at the southwest corner of the proposed campus, the new BCVFD facility would serve as an anchor for this campus. All three organizations are integral parts of the community. Working together as a recovery campus following disaster events, these organizations would provide critical support to neighborhood residents and benefit from economies of scale in providing disaster relief and community support.



Existing Broad Channel Volunteer Fire Department building *Credit: John D. Calcagnile, 2013*

Cost-benefit analysis

The substantial benefits justify the estimated \$750,000 cost. The BCFVD would be the only emergency response organization located in Broad Channel. As the BCFVD is also one of the key community organizations on the island, a large majority of Broad Channel residents have served at one time or another in the VFD. The social benefits that the organization provides to community members year round, and the substantial role that the facility played during Superstorm Sandy and during the neighborhood's recovery indicate the high impact that completing the project would have on the Community's welfare both during the normal course of events and in the case of another emergency. The high support from the Broad Channel Planning Committee and impact on risk reduction justify the funding of this project.

The improvements funded through this project have the potential to remain in good working condition for decades; creating a sustainable emergency relief plan for community members for the long-term future. The leadership of the BCFVD and support from the Community would ensure that project would be carried out with low negative impact from unforeseen factors.



Risk reduction

HIGH

The primary benefit of the BCFVD project would be the creation of a high-end emergency response facility that would allow volunteer firefighters and other emergency organizations to provide critical services to community members when needed. The BCFVD project would have a high impact on reducing risk to the community by creating an optimal facility for the community's first responders. The project would create a communications center that the BCFVD and other emergency agencies (e.g., New York City Fire Department, NYC OEM) could use in the event of an emergency.

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

A New York City Department of Buildings Certificate of Occupancy and other building permits would be required.

Jurisdiction

The proposed project would be deployed in Broad Channel and would therefore fall under the jurisdiction of the City of New York.



Broad Channel Volunteer Fire Department during the storm *Credit: Broad Channel Volunteer Fire Department*

"This was the morning tide before the worst of the storm later that night. The BCVFD had to abandon the firehouse during the height of the storm and move the base of operation to higher ground at the American Legion Hall on Cross Bay Boulevard. This effort, however, was thwarted by the water that destroyed the Hall's building and the entire neighborhood."

-The Forum



High water mark during Superstorm Sandy inside Broad Channel Volunteer Fire Department
Credit: Broad Channel Volunteer Fire Department

Broad Channel Veterans of Foreign Wars Hall Resiliency Improvements

Proposed Project

The Veterans of Foreign Wars (VFW) Hall Improvement project would upgrade the facility to make its entrance points and restrooms American with Disabilities Act (ADA) accessible. The project would increase the accessibility for elderly and disabled populations. It would also provide an alternative location for the recovery campus facilities.

The project includes the following components:

- **Main entrance restoration:** Reconstruct the main entrance to pre-Superstorm Sandy (Sandy) conditions to restore its operability as a meeting place for residents and visitors.
- **ADA accessibility:** Make VFW Hall accessible to vulnerable populations by installing an ADA ramp to the facility and making public restrooms ADA accessible.

Cost estimate

\$300,000

The project's cost includes architecture and engineering work, materials, construction, and general contracting contingencies.

Benefit/co-benefits

Health and social benefits

MEDIUM

If funded, the project would benefit vulnerable populations, specifically the elderly and disabled, of Broad Channel. The improvements would increase accessibility to the facility, improving its capability to be an auxiliary relief center on the island.

Cost-benefit analysis

The benefits justify the estimated cost. The social benefits that the organization provides to community members year round, and the important role that the facility played during Sandy illustrate the critical service the VFW provides for the Community.

The improvements funded through this project have the potential to remain in good working condition for decades; creating a sustainable emergency relief plan for community members for the long-term future. The leadership of the Broad Channel Planning Committee and support from the Community would ensure that project is carried out with low negative impact from unforeseen factors.

Risk reduction

MEDIUM

The main benefit of the project would be the increased accessibility of disabled and elderly residents to the facility following an emergency.

The project would have a moderate impact on risk to the Community by increasing accessibility for more vulnerable populations and providing an additional recovery center in another section of the island.

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

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

Jurisdiction

The proposed project would be in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Project Summary

**Recovery Support
Functions**

Cost
\$300,000



Community
Planning and
Capacity Building

Risk Reduction

MEDIUM



Health and Social
Services

**Health & Social
Benefits**

MEDIUM



Broad Channel Historical Society Digitization

Featured Project

To maintain the historical archive as a community asset and an integral public service documenting the progression of the residents and neighborhood over time, the Broad Channel Historical Society has proposed to digitize the archival collection to protect its contents from future disaster events. Digitizing the collection would protect the archival assets, and increase access to the collection by creating a Virtual Museum that would be open to the public. The Virtual Museum would function as a community integration and educational tool for local residents and communities throughout the New York metropolitan area.

The project components would include:

- **Acquiring and entering metadata:** Inclusion and use of metadata (i.e., location, donor information, dates of occurrence, etc.) would enhance the historical and scholarly value of the collection. Additional procedures include file-naming and indexing collection.
- **Scan collection:** Scan the collection in multiple formats to ensure its longevity, as well as creating back-up files.
- **Virtual museum:** Plan, design, and implement a Virtual Museum that would be publicly accessible to large audiences. Purchase server space to house the museum.

Cost estimate

\$20,000

The cost includes the hiring of a consultant to assist with the cataloging and scanning of archives, as well as development of the virtual platform.



Broad Channel Historical Society collections Credit: Broad Channel Historical Society

Benefit/co-benefits

Health and social benefits

HIGH

The largest benefit felt by the Community from the digitization project would be the social benefit of preserving the culture and history of Broad Channel. It is difficult to put a cost on personal valuables, but preserving the the history of a community is important to the crafting and continuation of its identity. The project would increase accessibility of the historical collection by putting it on a virtual platform that would be accessible to community members outside of the physical location of the hard copy archives. The addition of the virtual platform may also increase accessibility of the cultural and historical asset to those that would not access the archives otherwise.

The long-term goal of the project would be to create a permanent, interactive center that would house the physical collection in the future. The digitization of the collection would be the first step in bringing that additional



social benefit to fruition. The creation of the cultural center would be a second phase, which has been added as an Additional Resiliency Recommendations (Table V-1).

Cost-benefit analysis

The cost of the project justifies the cultural and social benefit that the project would have on the Broad Channel community, for those located in the immediate area, and those located outside the physical community. The archives embody Broad Channel's shared history, which is extremely strong due to the small size of the island's population. The social benefit of the project would be sustainable indefinitely because of the archives permanence through digitization. Due to the Community's leadership and the importance of this project to its members, it should have few challenges once funding is secured.

The community is looking into other funding sources beyond Broad Channel's Community Development Block Grant-Disaster Recovery allocation, through Federal, State, local, and philanthropic vehicles.

Risk reduction

LOW

The project would not reduce risk to traditional community assets, such as facilities or natural resources, but would reduce the risk that the Community's cultural assets would be lost to current residents and future generations during a future storm event. The digitization of the historical archives would ensure the accessibility of the hard copy collection in the event that it is damaged further or destroyed in another serious event.

Project Summary

Recovery Support Functions



Community Planning and Capacity Building

Cost
\$20,000

Risk Reduction

LOW



Natural and Cultural Resources

Health & Social Benefits

HIGH

Implementation timeframe

It is anticipated that completion of the project would be completed within three months.

Regulatory requirements

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

Jurisdiction

The proposed project would be in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Lanark Road Stabilization, Sewer and Water Connection

Proposed Project

The Lanark Road Block Association submitted to the Broad Channel Planning Committee (the Committee) a project to provide sewer and water connections to the six residential homes on Lanark Road, south of East 9th Road. The project would establish an in-ground sewer and water connection to the homes where one currently does not exist.

The project consists of two key elements:

- **Installation of sewer and water lines in the ground on Lanark Road:** The sewer connection would be an ejector system that is typical of New York City private sewer connections. The water connection would include a meter at the end to allow the New York City Department of Environmental Protection (NYC DEP) to correctly bill the residents for their water usage.
- **The second component would be the shoring up of Lanark Road:** The road is eroding and needs roadway side slope protection, which could include riprap. Regulatory issues with New York State Department of Environmental Conservation (NYS DEC) would have to be resolved before this project could move forward.

Cost estimate

\$2.5 MILLION

The cost of the installation of the sewer and water connection would include architecture and engineering work, materials, construction, and general contracting contingencies. The reinforcement of the road needs further discussion with NYS DEC in regards to removal of fill and shoring up of roadway infrastructure. The costs are still to be determined.

Benefit/co-benefits

Environmental benefits

HIGH

This area is currently not serviced by a sanitary sewer system. The sewer connection would contribute to NYC DEP's Jamaica Bay Watershed Protection Plan's goal of restoring and maintaining the water quality and ecological integrity of the bay.

Cost-benefit analysis

The proposed project could result in a wide range of benefits, including risk reduction benefits for the residents of Lanark Road during emergencies, as well as environmental benefits. The improvements funded through this project have the potential to remain in good working condition for decades; creating a sustainable, permanent solution to a decades old issue for the community. The cost-benefit would have to be re-examined after the road reinforcement costs have been determined.

Risk reduction

MEDIUM

The project would have important risk reduction and environmental benefits. The project would end the negative impact that Lanark Road homes have on the ecological environment and water quality in Jamaica Bay and improve long-term accessibility to that section of the community.

Reinforcing Lanark Road would reduce the risk of homes becoming inaccessible and in case of an emergency that first responders would not be able to reach the residents. The project would also introduce protection features that would stop localized flooding that occurs during high tides.

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

The project would need to apply for a private sewer easement from NYC DEP. The project would also require NYS DEC and NYC DEP permits. In addition, the project may require additional New York City Department of Transportation reviews depending on nature and extent of roadway repair.

Project Summary

Recovery Support Functions

Cost
\$2.5M



Infrastructure

Risk Reduction

MEDIUM



Housing

Environmental Benefit

HIGH

Jurisdiction

The proposed project would be deployed in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Figure IV-2: Conceptual design for Lanark Road water and drainage system

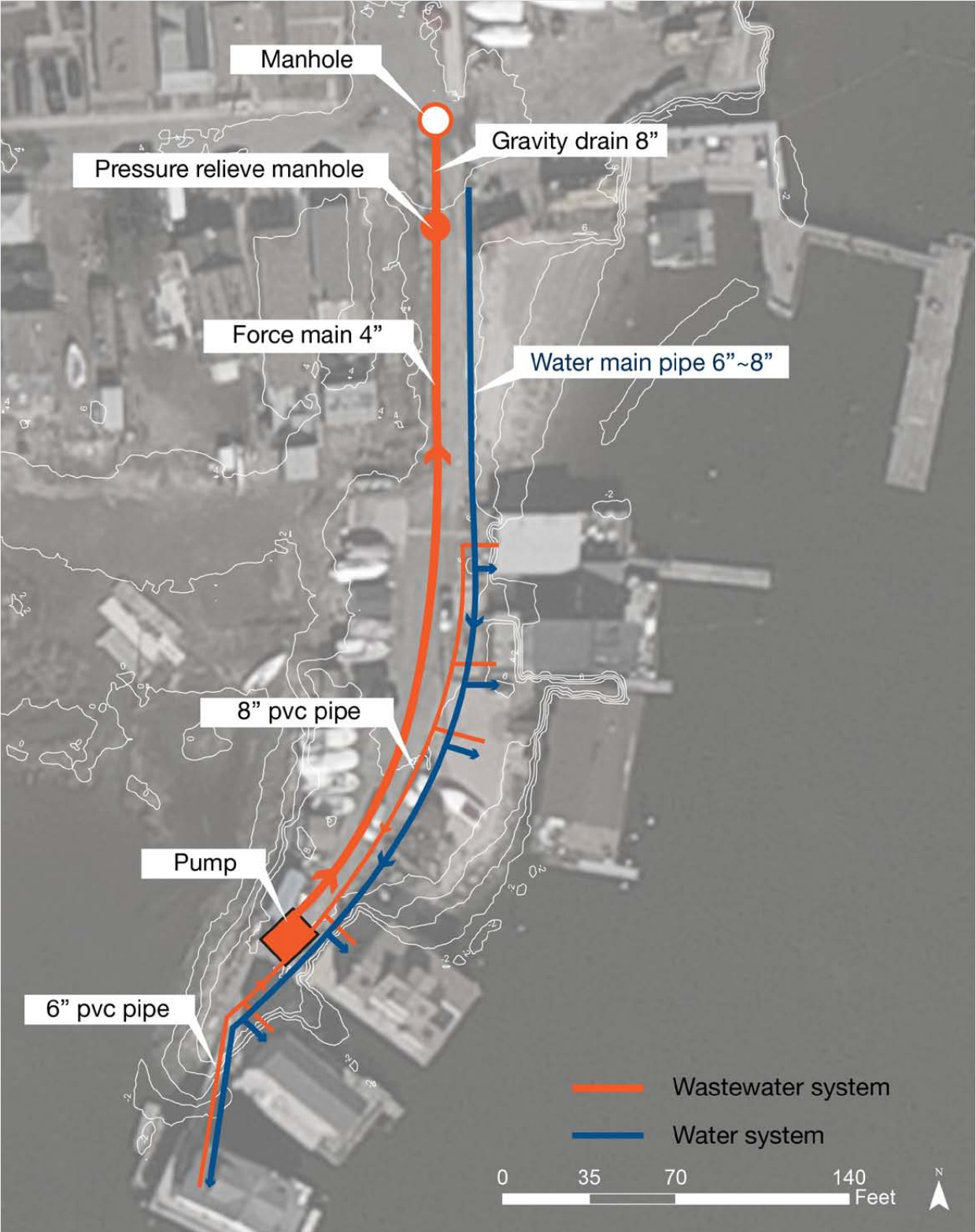
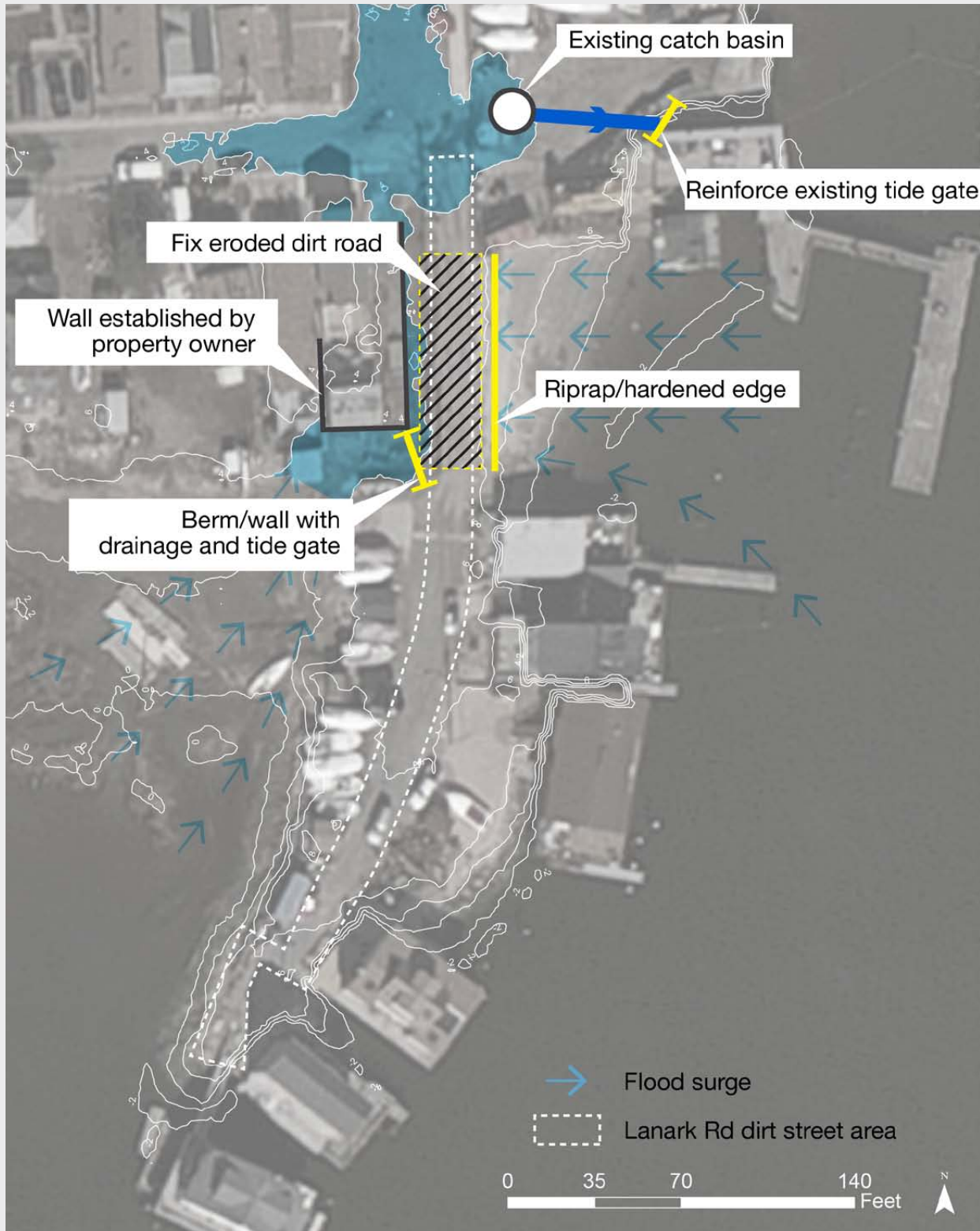


Figure IV-3: Conceptual design for Lanark Road flood mitigation and shoring

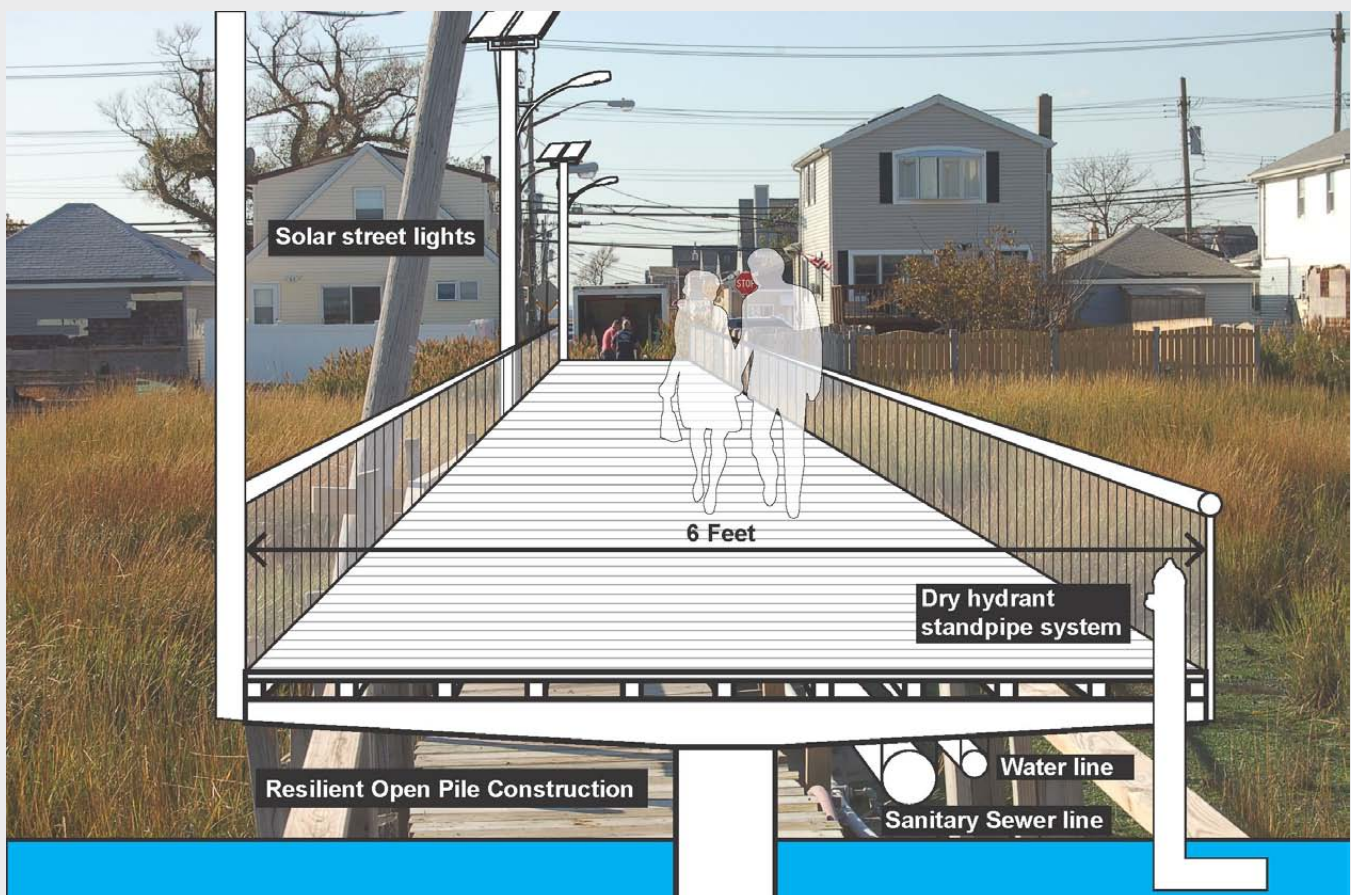


East 12th Road Boardwalk Repair and New Sewer Connection

Proposed Project

The East 12th Road Block and Bungalow Association submitted to the Broad Channel Planning Committee (the Committee) a project to rebuild the boardwalk that connects eight properties and the Iroquois Yacht Club located over Jamaica Bay to the island of Broad Channel. The project would construct a boardwalk and add sewer and water connections to the homes. Two of the homes in the area were destroyed during Hurricane Irene and one was destroyed during Superstorm Sandy, leaving only six buildings.

Figure IV-4: Proposed East 12th Road boardwalk



The project consists of two key elements:

- Reconstruction of the boardwalk with an open pile wooden structure similar to an existing boardwalk built near the intersection of Walton and East 9th Roads. That existing structure has survived both Hurricane Irene and Superstorm Sandy.
- The second component would be the sewer, dry hydrant standpipe system and a water connection to the remaining homes. The proposed sewer connection would be a vacuum sewer system that would be located on land, and toilets and showers would be retrofitted with holding tanks that are evacuated during the vacuum process. The benefit to this system would be that the line would be evacuated and emptied once flushed. This would help prevent freezing of the sanitary pipe. The water connection would also be winterized, therefore eliminating the need for heat tracing that would prevent pipes from freezing.

Cost estimate

\$1.5 MILLION

The project costs include architecture and engineering work, materials, construction, and general contracting contingencies.

Benefit/co-benefits

Environmental benefits

MEDIUM

The resiliency and health of the Broad Channel community would be closely tied to the resiliency and environmental health of Jamaica Bay. The homes on Church Road do

Project Summary

Recovery Support Functions



Infrastructure



Housing

Cost
\$1.5M

Risk Reduction

MEDIUM

Environmental Benefits

MEDIUM

Health and Social Benefits

LOW

not have a sewer connection and discharge directly into Jamaica Bay. An establishment of a sewer connection would make this a green infrastructure project in that it contributes to New York City Department of Environmental Protection's (NYC DEP) Jamaica Bay Watershed Protection Plan goal of restoring and maintaining the water quality and ecological integrity of the bay.

Health and social benefits

LOW

The project would preserve the unique character of Broad Channel. The project would directly affect the five homes that have survived as well as the Iroquois Yacht Club.



Cost-benefit analysis

The proposed project could result in a wide range of benefits, including risk reduction benefits for the residents of East 12th Road during emergencies, as well as environmental benefits. The improvements funded through this project have the potential to remain in good working condition for decades, creating a sustainable, permanent solution to a decade old issue for community.

Risk reduction

MEDIUM

Designing and funding a new boardwalk as an elevated, stronger, and more resilient access point would preserve an element of the unique character of Broad Channel into the next generation. This would service a group of homes that would be accessible only via the East 12th Road Boardwalk, a wooden structure that suffered

severe damage during Sandy. The homes serviced by this walkway are historic stilt-homes that have been featured in numerous movies and films and represent Broad Channel's waterfront roots.

Building a boardwalk that would be able to withstand future storm events would reduce the risk of homes becoming inaccessible. Additionally, construction of the boardwalk would facilitate improved emergency response to residents of these homes and the establishment of a dry hydrant standpipe system would allow first responders to extinguish fires.

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Figure IV-5: Proposed East 12th Road boardwalk drainage system



Regulatory requirements

The reconstruction of the boardwalk would require a NYS Department of Environmental Conservation (NYS DEC) permit. The connection of the sewer and water lines would require a NYC Department of Environmental Protection (NYC DEP) permit. This may also require permits or approvals from the U.S. Army Corps of

Engineers (USACE) and Coastal Zone Management (CZM) consistency concurrence from New York State Department of State (NYS DOS).

Jurisdiction

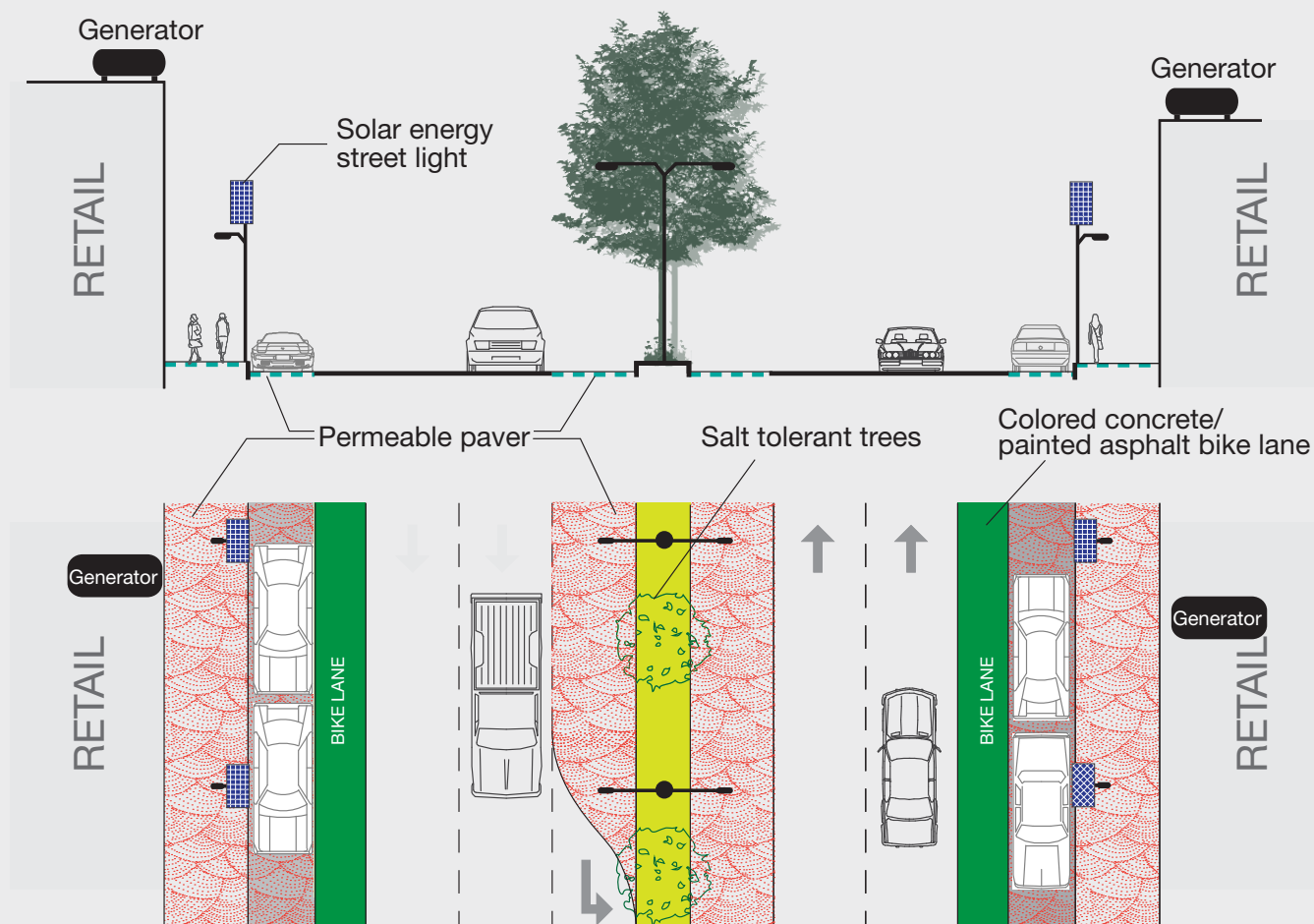
The proposed project would be deployed in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Cross Bay Boulevard Complete Streets Project – Phase 1

Proposed Project

This streetscape/landscape improvement project would include replacing sidewalks with permeable pavers, and generators for the businesses along Cross Bay Boulevard. In addition the Broad Channel Planning Committee (the Committee) has asked that street lights powered by solar or other renewable energy source be considered as part of this project.

Figure IV-6: Conceptual Cross Bay Boulevard complete streets section and plan



Cost estimate

\$600,000

This cost is based on estimates from engineers with experience on projects of similar scope and scale, and the cost has not been adapted to specific local conditions and would likely vary as the project is further developed and refined. This is a conceptual estimate of the probable cost.

Benefit/co-benefits

Economic benefits

MEDIUM

Through the use of back-up generators, businesses with perishable goods would be able to continue functioning when they would otherwise be without power, thus reducing their economic loss after a disaster. This would provide a local relief opportunity in a community with limited local options for provisioning. Permeable pavers would allow for absorption of stormwater runoff during regular rain events.

Cost-benefit analysis

The proposed project could result in a range of benefits, including economic benefits to the local businesses and the residents that rely on the perishable goods while recovering from a storm event. The extensive benefits could be sustainable over the approximately 25-year useful life of the generators, and there are no apparent negative externalities associated with the proposed project.

Project Summary

**Recovery Support
Functions**



Infrastructure

**Cost
\$600,000**

Risk Reduction

LOW



Economic
Development

Economic Benefits

MEDIUM

Risk reduction

LOW

The proposed project could result in risk reduction to assets and the population of Broad Channel by enhancing the resiliency of local businesses that are critical to disaster recovery.

The emergency generators on the roofs would allow the businesses to recover faster, and the permeable pavers would allow faster drainage. However, the project would have a very low reduction of risk.



Existing condition of Cross Bay Boulevard

Implementation timeframe

It is anticipated that construction of the project would be completed within two years.

Regulatory requirements

The permeable pavers for the sidewalks would require a sidewalk permit from NYC Department of Transportation.

Jurisdiction

The proposed project would be deployed in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Figure IV-7: Concept for Cross Bay Boulevard complete streets rendering



Sunset Cove Restoration Project

Featured Project

The Sunset Cove project represents a cutting edge and innovative nature-based approach to edge protection. By developing a break water system integrated into a larger ecosystem restoration project, Sunset Cove can be a pilot for protection within Jamaica Bay and throughout the larger region.

The Broad Channel Planning Committee (the Committee) plans to contribute up to \$500,000 of their Community Development Block Grant-Disaster Recovery (CDBG-DR) allocation toward the New York City Department of Parks and Recreation's (NYC DPR) planned Sunset Cove ecosystem restoration and resiliency project. The Committee's contribution to this project would support the inclusion of an oyster reef in the project, an element that would enhance the resiliency of the overall project and surrounding assets as well as restoring ecological activity to the area.

The project consists of two key elements:

- An oyster revetment at the shoreline would provide added wave attenuation benefits, enhancing the resiliency and long-term sustainability of the overall project.
- The project would address the need for an overall and baywide increase in spat-producing oysters to support the sustainability of the oyster shoreline through the incorporation of an oyster nursery in the

Figure IV-8: Sunset Cove restoration plan



design. Past restoration efforts have shown that, once established, oysters survive well in Jamaica Bay.

Cost estimate

\$500,000

The Committee would contribute \$500,000 to this estimated \$8 million restoration project. This contribution would be designed to fund specific components of the project, which have been analyzed and priced at roughly \$500,000.

Benefit/co-benefits

Environmental

HIGH

The larger oyster revetment and nursery, in conjunction with the larger NYC DPR project would provide significant environmental benefits through the restoration of degraded habitats in Jamaica Bay.

Specific habitat improvements include:

- CDBG-DR funded project alone:
 - Installation of oyster and shellfish habitat (0.2 acre)
- With other funds
 - Restoration of approximately 4 acres of low marsh
 - Restoration of approximately 0.5 acre of high marsh

Project Summary

<p>Recovery Support Functions</p> <div style="text-align: center;">  <p>Natural and Cultural Resources</p> </div>	<p>Cost</p> <p>\$500,000</p> <p>Risk Reduction</p> <div style="background-color: #002060; color: white; text-align: center; padding: 2px;">HIGH</div> <p>Environmental Benefits</p> <div style="background-color: #002060; color: white; text-align: center; padding: 2px;">HIGH</div> <p>Health and Social Benefits</p> <div style="display: flex; align-items: center;"> <div style="background-color: #002060; color: white; text-align: center; padding: 2px;">MEDIUM</div> <div style="background-color: #cccccc; width: 40px; height: 15px; margin-left: 5px;"></div> </div>
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- Restoration of approximately 4 acres of scrubland
- Restoration of approximately 3.5 acres of coastal forest
- Establishment of a 2-acre berm within the scrubland and forest

In addition to the improvement of the environmental health of the area, the project would provide recreational and educational benefits to residents of Broad Channel as well as the larger Jamaica Bay community.

Health and social benefits

MEDIUM

It is intended that ongoing maintenance and monitoring of the oyster nursery and revetment would be done by local volunteer organizations and schoolchildren. There would be a strong opportunity to partner with local environmental organizations, who are engaged in ongoing restoration efforts around the bay—as well as citywide groups such as the New York Harbor School—who have recently launched the “Billion Oysters Project” to restore oysters to New York Harbor. The school is also developing an “oyster gardening manual,” which provides public school teachers with a manual for how to incorporate oyster restoration and monitoring into their science curriculums.

In addition, the larger Sunset Cove Restoration project would also include educational opportunities as well as recreational amenities including:

- Construction of an overlook and boardwalk
- Canoe/kayak launch (end of West 19th Road)
- Engagement of community groups, volunteers, youth, and paid trainees in planting of significant portions of salt marsh and upland habitats

A potentially significant benefit would come from the replication of this project throughout Jamaica Bay and in other similar estuary and water edge conditions where sea level rise is taking place.

Cost-benefit analysis

The substantial benefits justify the \$500,000 contribution to the project. The project would also pilot new strategies to address past concerns with oyster restoration in the bay.

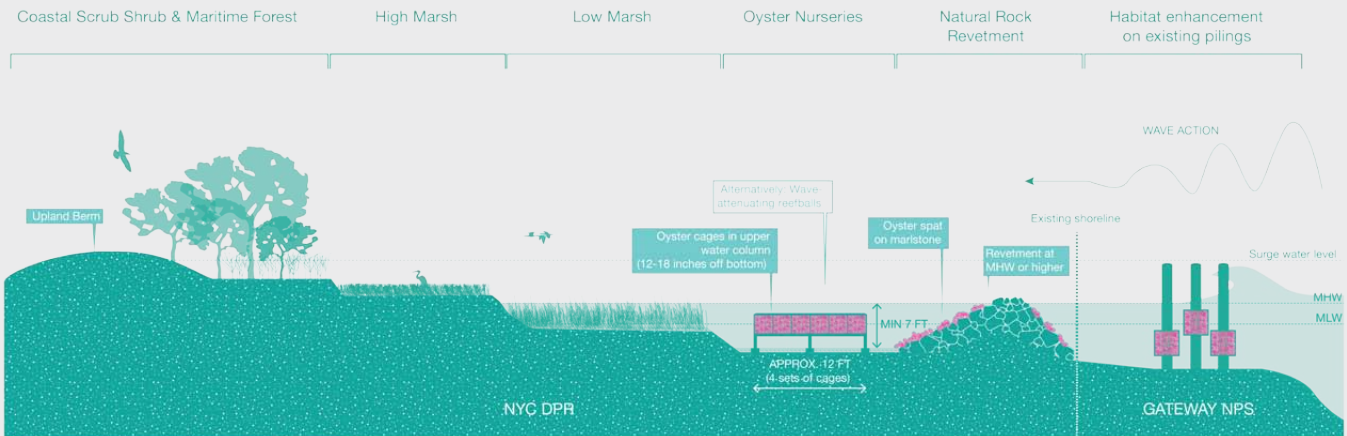
Risk reduction

HIGH

The proposed oyster revetment would provide wave attenuation that would protect the planned habitat improvements, recreational amenities, and surrounding existing assets from wave and erosion damage.

Additionally, the larger restoration project—the oyster revetment, marsh, maritime forest, and berm—would collectively provide protection from waves and reduce surge impacts to surrounding assets including the Cross Bay Veterans Memorial Bridge Toll Plaza, and houses on West 20th and West 19th Road.

Figure IV-9: Strategies of incorporation of oysters



Implementation timeframe

NYC DPR has submitted a grant application for \$5 million to the U.S. Department of the Interior (USDOI) National Fish and Wildlife Foundation's (NFWF) Hurricane Sandy Coastal Resiliency Competitive Grants Program. The project would be completed within 2–3 years once commenced.

Regulatory requirements

It is anticipated that the project would have to go through a National Environmental Protection Act environmental review process. This may also require permits or approvals from the New York State Department of Environmental Conservation (NYS DEC), U.S. Army Corps of Engineers (USACE) and Coastal Zone Management (CZM) consistency concurrence from New York State Department of State (NYS DOS).

Jurisdiction

The project would fall under the jurisdiction of NYC DPR.

Figure IV-10: Sunset Cove project locator



Oyster spat set on marl stone. Credit: Karl Willey, Chesapeake Bay Foundation (www.cbf.org)



Recovery Campus Berm – Phase 1

Proposed Project

This project would fund a berm that would protect the relief campus against a 6- to 7-foot storm flood elevation as a first phase of a larger comprehensive 100-year flood protection strategy. The berm would extend between local high points on New York City Parks Department property and would be planted and reinforced to extend its life during storm events. This first phase project can be incorporated into the larger long-term protection strategy for the relief campus.

The Broad Channel Planning Committee (the Committee) is prepared to fund an interim protection berm on New York City Department of Parks and Recreation (NYC DPR) land directly behind the proposed relief campus in Broad Channel.

The berm would be between 4 feet and 6 feet extending between local high points, planted and reinforced to extend its life during storm events. The berm would sit at the edge of the sports/athletic fields of the Broad Channel Athletic Club and could double as a natural grandstand for people watching sporting events, reducing the cost of building and maintaining temporary stands.

Cost estimate

\$3.5 MILLION

This cost estimate is based on typical cost analysis of berm construction and takes into account design, contractor overhead and profit, general requirements and construction contingencies.

Benefit/co-benefits


Economic benefits

MEDIUM

The berm would protect more than \$2 million in proposed renovation investments to community facilities in Broad Channel. The berm would also protect the athletic fields

Project Summary

Recovery Support Functions




Infrastructure

Cost

\$3.5M

Risk Reduction

LOW

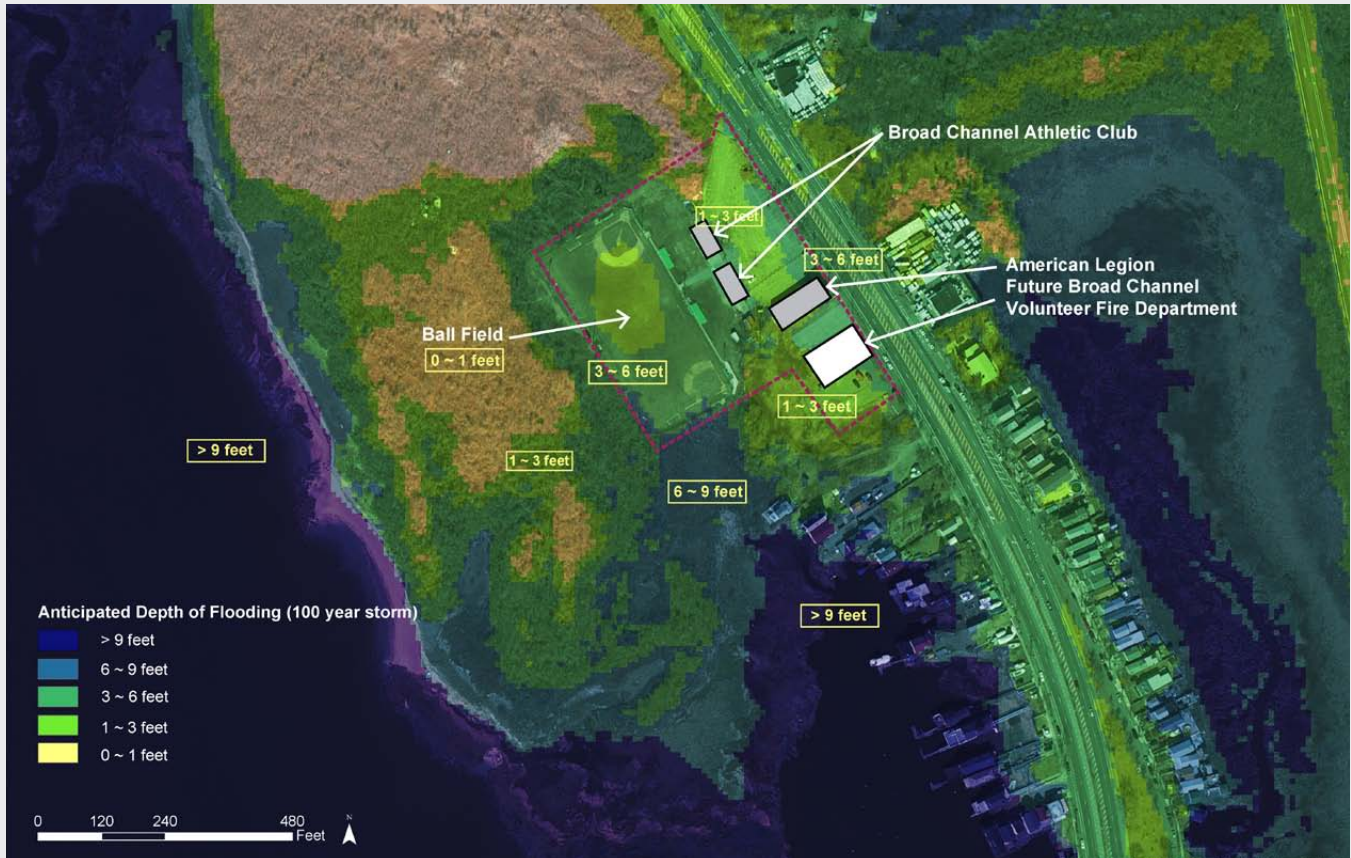


Natural and Cultural Resources

Economic Benefits

MEDIUM

and associated parking facilities from damages incurred from flooding, thus reducing the maintenance costs for these facilities and allowing them to double as relief staging areas.



Anticipated depth of flooding during 100-year storm

Cost-benefit analysis

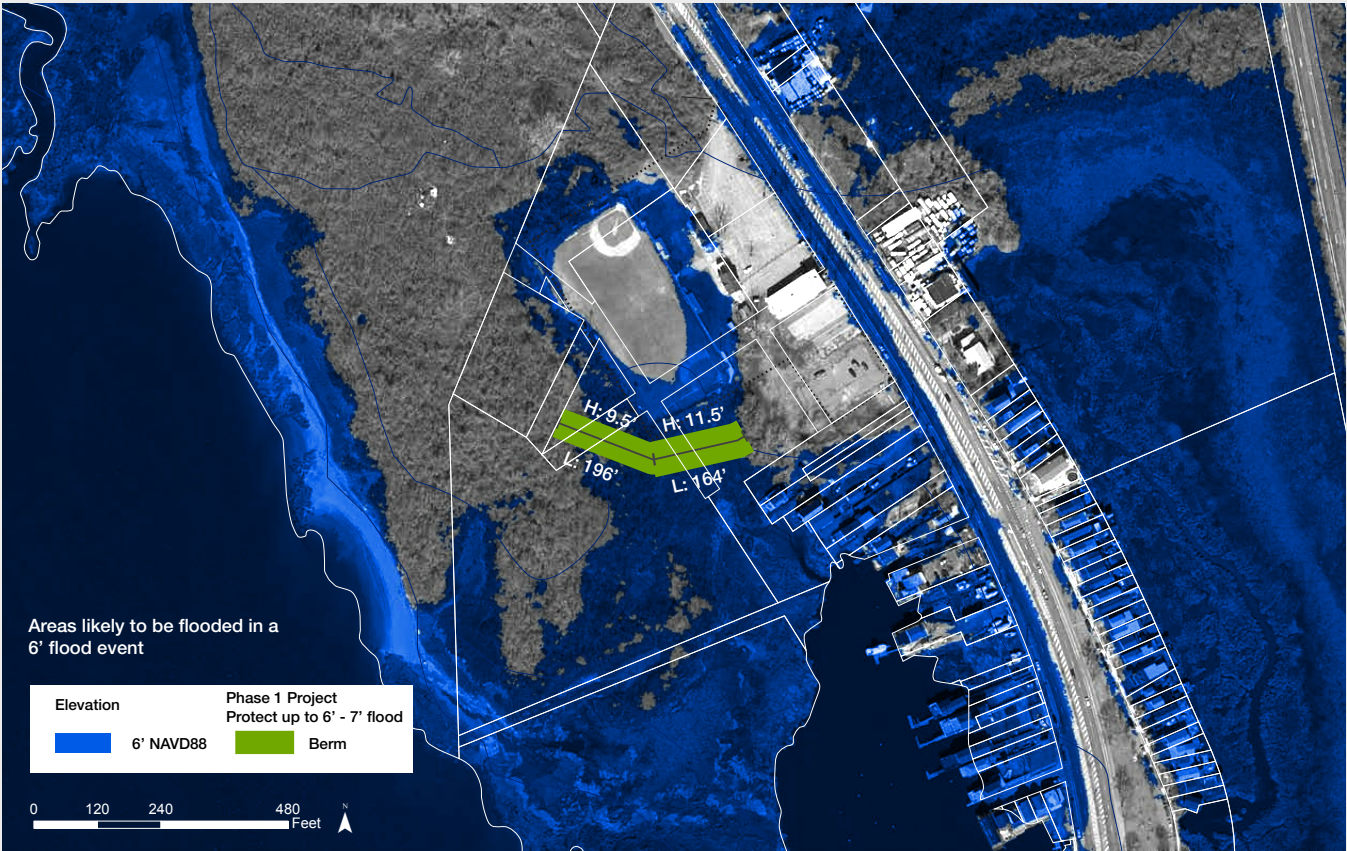
The proposed project could result in a range of benefits, including coastal protection benefits, co-benefits to augmenting the ball fields and protections against damages to the fields and parking facilities in the relief campus. The project represents a low-cost intervention that would produce a high benefit. A small berm would protect a large area of important community needs to a much higher level of protection than currently available.

Risk reduction

LOW

The proposed project could result in risk reduction and other benefits to assets and the population of Broad Channel by providing protection to the relief campus, which would be seen as the nerve center for community relief efforts. The relief campus would also serve as a critical community gathering space for Broad Channel. The berm could also enhance the sporting facility as a grandstand, contribute to the build-out of the parklands in this area, and support new plantings.

Figure IV-11: Recovery campus berm – phase 1



The berm would provide interim protection to critical Broad Channel facilities. As a component of a full-build long-term 100-year flood protection strategy, it would be a sensible low-cost phase 1 that would be affordable given the limited funds allocated to Broad Channel.

Implementation timeframe

It is anticipated that construction of the project would be completed within two – three years.

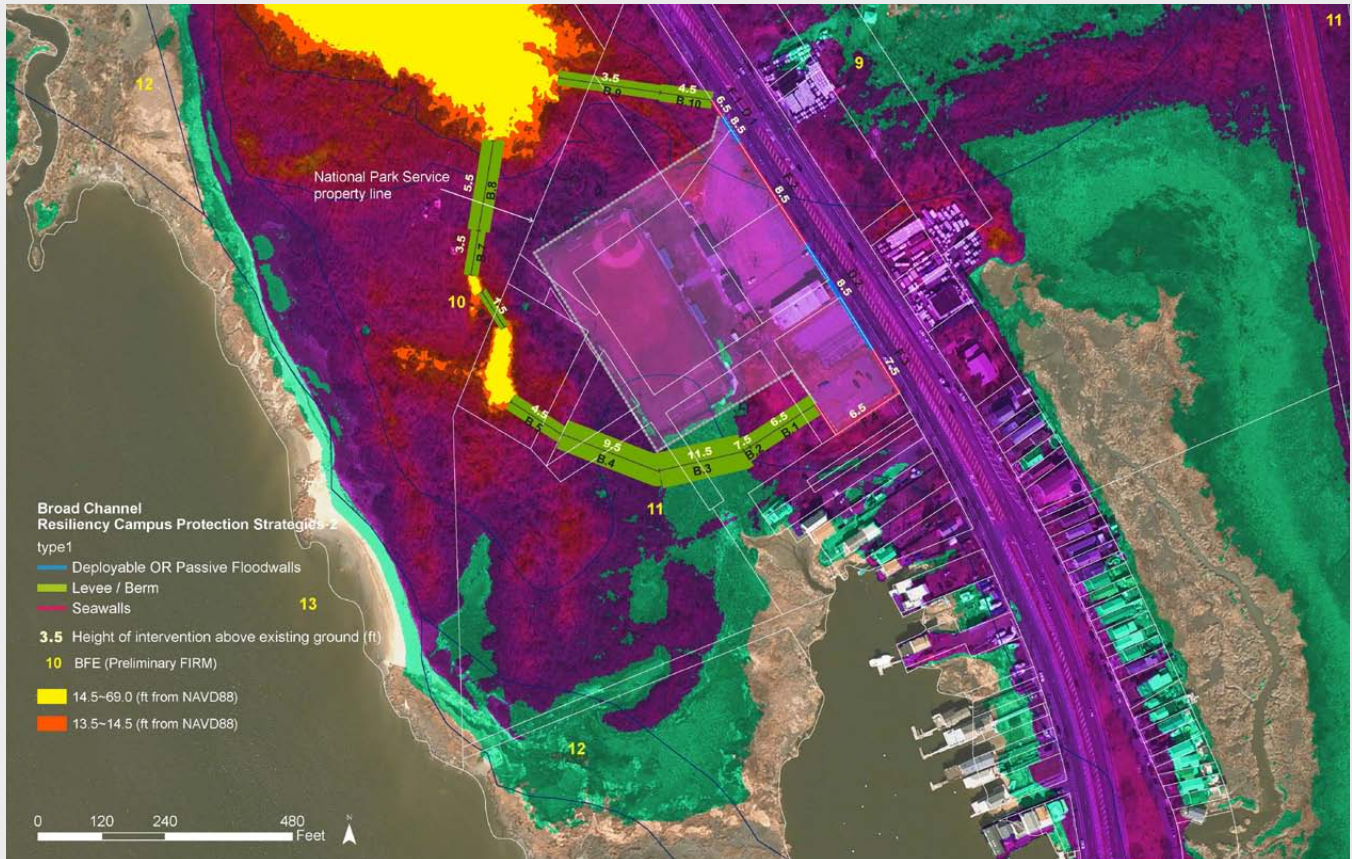
Regulatory requirements

The project would have to go through customary NYC DPR public reviews and environmental analysis.

Jurisdiction

The proposed project would be deployed in Broad Channel and would therefore fall under the jurisdiction of the City of New York.

Figure IV-12: Recovery campus berm – full-build



V. Additional materials



Additional resiliency recommendations

Additional resiliency recommendations constitute projects that are integral to the long-term resiliency plan but are not proposed for funding through the NYRCR allocation. These projects may be implemented as future phases, building off early Proposed Projects or may be implemented by other agencies as part of connected resiliency efforts. When combined with Proposed and Featured Projects, these additional resiliency recommendations would result in a comprehensive resiliency plan for Broad Channel.

Table V-1 – Additional resiliency recommendations

Strategy	Project name	Short description	Regional (Y/N)	Estimated cost
Protect and expand health care infrastructure	Create Health care opportunities	Recommend creating health care facilities that are resilient during a future storm will be an important benefit to residents, including mobile medical vans.	N	\$1M – \$25M* * Cost includes: - Staff (driver, nurse, nurse's assistant) - Overhead and administrative costs - Operating costs
Develop strategies to protect housing against sea level rise and future storm events	Consider raising houses currently at ground level	While many of the houses in Broad Channel are on stilts or raised above the ground plane, there are still others at ground level that face increased flood risk. The Committee recommends a feasibility study of elevating such houses, especially those without basements, to guard against future flooding. For this analysis, the impact on access and the relationship to the street will be an important consideration.	N	\$1M-\$25M
Address localized flooding in the community	Redesign the culvert under Cross Bay Boulevard at 4th Road	The Committee recommends that the culvert under Cross Bay Boulevard at 4 th Road be redesigned to stop the regular flooding that occurs during high tides.	N	\$500K-\$1M
Address localized flooding in the community	Replace the backflow preventer (or other appropriate treatment) at south end of West Road	Two critical weak points were seen as the most important locations to focus on to control flooding in this section of the island. There is a culvert that sits under Cross Bay Boulevard along the neck of the island allowing water to flush between the wetlands on the west and the wildlife refuge on the east. A second location that may require improvement is the sewer outfall along West Road that could include a backflow preventer to reduce flooding.	N	<\$500,000
Protect and enhance the culture and history of Broad Channel	Find a permanent home for the Historical Society	Repurpose the current Broad Channel Volunteer Fire Department building into a cultural center, which could also become the permanent home for the Broad Channel Historical Society.	N	\$500,000-\$1M

Table V-1 – Additional resiliency recommendations (continued)

Strategy	Project name	Short description	Regional (Y/N)	Estimated cost
Improve wetland and edge to reduce storm surge	Create oyster reefs to reduce storm energy and combat eutrophication	Development of oyster reefs within Jamaica Bay that could help to reduce storm energy and help mitigate the eutrophication that the Bay is experiencing. Preliminary data indicates that not only will oysters survive in Jamaica Bay, but also that they are found to be reproducing near the test site areas used to date.	Y	\$1M-\$25M
Improve wetland and edge to reduce storm surge	Pumpkin Patch Island, Duck Point, Big Egg, Little Egg	While there may be a number of locations that should be taken into consideration for new combined wetland and upland strategies, the Committee noted the particular location of Western Canal as a priority concern. The goal would be to establish a rock revetment and then, similar to the effort undertaken with the Big Egg restoration project, sediment could be pumped behind the revetment to create a zone that would help to dissipate wave action and storm energy prior to reaching the adjacent community.	Y	\$1M-\$25M
Develop a regional resiliency strategy for Jamaica Bay	Develop a regional Jamaica Bay strategy to protect Broad Channel through protection at the mouth of Jamaica Bay	The Committee recommends further investigation of a protection plan at the mouth of Jamaica Bay. A plan would need to be coordinated with other projects, including a proposed dune to protect the seaward edge of the Rockaway Peninsula as well as other protection measures within the Bay. A strategy of this magnitude would be implemented with the recognition that it is being designed to protect all of the bayside communities as well as JFK Airport.	Y	\$25M+
Develop resilient energy sources	Installation of a natural gas pipeline	Committee strongly recommends the installation of a natural gas pipeline to service Broad Channel as part of its comprehensive sustainable infrastructure strategy.	N	\$25M+

Master table of projects

Table V-2 – Projects developed by the community (proposed and featured projects, and additional resiliency recommendations)

Strategy	Project name	Short description	Project category	Estimated cost	Regional (y/n)
Improve resiliency of key cultural and community centers	American Legion Hall Resiliency Improvements	Make recovery and resiliency improvements to American Legion.	Proposed Project	\$800,000	N
	Broad Channel Athletic Club Resiliency Improvements	Make recovery and resiliency improvements to BCAC.	Proposed Project	\$750,000	N
	Broad Channel Volunteer Fire Department Resiliency Improvements	Build the communications center for the BCFD.	Proposed Project	\$750,000	N
	Broad Channel Veterans of Foreign Wars Hall Resiliency Improvements	Make recovery and resiliency improvements to VFW Hall.	Proposed Project	\$300,000	N
Protect and enhance the culture and history of Broad Channel	Broad Channel Historical Society Digitization	Digitizing the archival collection to protect its contents from future disaster events	Featured Project	\$20,000	N
	Find a permanent home for the Historical Society	Repurpose the Broad Channel Volunteer Fire Department building into a cultural center, which could also become the permanent home for the Broad Channel Historical Society.	Additional Resiliency Recommendation	\$500,000-\$1M	N
Develop a layered approach to coastal protection that incorporates natural strategies	Sunset Cove	Implement the Sunset Cove edge protection strategy	Featured Project	\$500,000	N
	Recovery Campus Berm	Phase 1 of the berm around the recovery campus	Proposed Project	\$3.5M	N
	Create oyster reefs to reduce storm energy and combat eutrophication	Development of oyster reefs within Jamaica Bay that could help to reduce storm energy	Additional Resiliency Recommendation	\$1M-\$25M	Y
	Pumpkin Patch Island, Duck Point, Big Egg, Little Egg	The goal would be to establish a rock revetment and then, similar to the effort undertaken with the Big Egg restoration project, sediment could be pumped behind the revetment to create a zone that would help to dissipate wave action and storm energy prior to reaching the adjacent community.	Additional Resiliency Recommendation	\$1M-\$25M	Y

Table V-2 – Projects developed by the community (proposed and featured projects, and additional resiliency recommendations) (continued)

Strategy	Project name	Short description	Project category	Estimated cost	Regional (y/n)
Develop a regional resiliency strategy for Jamaica Bay	Develop a regional Jamaica Bay strategy to protect Broad Channel through protection at the mouth of Jamaica Bay	The Committee recommends the further investigation of a protection plan at the mouth of Jamaica Bay.	Additional Resiliency Recommendation	\$25M+	Y
Develop resilient energy sources	Installation of a natural gas pipeline	Committee strongly recommends the installation of a natural gas pipeline to service Broad Channel as part of its comprehensive sustainable infrastructure strategy	Additional Resiliency Recommendation	\$25M+	N
Provide local infrastructure improvements to protect homes, businesses and community facilities	Lanark Road Stabilization, Sewer and Water Connection	Provide sewer and water connection to homes on Lanark Road – stabilize Lanark Road and remove ponding condition	Proposed Project	\$2.5M	N
	East 12 th Road Boardwalk Repair and New Sewer Connection	Provide a new boardwalk structure along East 12 th Road that can accommodate sewer and water connection	Proposed Project	\$1.5M	N
Address localized flooding in the community	Redesign the culvert under Cross Bay Boulevard at 4 th Road	The Committee recommends that the culvert under Cross Bay Boulevard at 4 th Road be redesigned to stop the regular flooding that occurs during high tides.	Additional Resiliency Recommendation	\$500,000-\$1M	N
	Replace the backflow preventer (or other appropriate treatment at south end of West Rd	The Committee recommends that the backflow preventer at the south end of West Road be studied to determine whether it should be replaced or if there is another appropriate treatment to stop the tidewaters.	Additional Resiliency Recommendation	<\$500,000	N

Table V-2 – Projects developed by the community (proposed and featured projects, and additional resiliency recommendations) (continued)

Strategy	Project name	Short description	Project category	Estimated cost	Regional (y/n)
Protect Vital Economic Corridors	Cross Bay Boulevard Complete Street Pilot Project – Phase 1	Generators, solar powered lighting and permeable pavers	Proposed Project	\$600,000	N
	Rebuild and make resilient businesses along Cross Bay Boulevard	Coordinate with an existing organization to develop a tool, website, manual, webinars/lectures and/or an information center that serves as a one-stop-shop for all resiliency information for commercial buildings.	Additional Resiliency Recommendation	<\$500,000	N
Protect housing from sea level rise and future storm events	Consider raising houses currently at ground level	The Committee recommends a feasibility study of elevating such houses, especially those without basements, to guard against future flooding.	Additional Resiliency Recommendation	\$1M-\$25M	N
Expand and protect health care infrastructure	Create health care opportunities – mobile van	Recommend creating health care facilities that are resilient during a future storm will be an important benefit to residents.	Additional Resiliency Recommendation	\$1M-\$25M	N

Public engagement process

Public engagement has been central to all phases of development of the Broad Channel NY Rising Community Reconstruction (NYRCR) Plan. NYRCR was designed to be a community-driven process. The Broad Channel Planning Committee (the Committee) has orchestrated three interactive Public Engagement Events and six Planning Committee Meetings over the course of seven months to solicit substantial public feedback that has been incorporated into the plan. Well over one-hundred residents, including Committee members, elected officials, and professionals participated in Broad Channel NYRCR events. The Committee utilized Community guidance and feedback to identify assets, needs, and ultimately, the projects that are proposed for funding in the NYRCR Plan. Continuous public engagement has ensured that the NYRCR Plan reflects the Community's priorities for rebuilding and resiliency.

Planning committee

The Committee members are volunteer members who represent various constituencies within the Planning Area including, but not limited to, homeowners, civic leaders and business owners. The Committee held six formal Planning Committee Meetings during plan development. Committee members engaged in lively debate during the meetings and collectively worked toward a consensus on the development of its mission, strategies and projects. All

Planning Committee Meetings were announced publicly on the NYRCR website and the Broad Channel Civic Association Facebook page. All meetings were open to the public. The first meeting was held at the Shad Creek Association and the meetings following were held at the American Legion Hall.

Committee meetings addressed all topics covered in this Plan; specific tasks and discussions held at the meetings included identification of community assets, assessment of needs and opportunities, formalization of reconstruction and resiliency strategies, creation of priority projects and finalization of Proposed and Featured Projects. The Committee spearheaded community outreach strategy, identifying avenues for outreach to the Planning Area and solicited public feedback throughout the process.

Public engagement events

Public Engagement Events were designed to be highly interactive and maximize Community feedback on the priorities and needs of the communities. Three Public Engagement Events were held prior to the submission of the NYRCR Plan. The Committee utilized the American Legion Hall, which is recognized by the Community as a key meeting place for public meetings on Broad Channel. At the Public Engagement Events, the Committee offered information about the NYRCR process; presented



outcomes and information gathered to date; and solicited feedback through dynamic discussions and interactive displays. Following each Public Engagement Event, Community feedback was aggregated and analyzed to guide discussion during Committee meetings.

Each meeting provided a briefing on the project purpose and status, a walkthrough of the plan elements, a formal question and answer period and an opportunity for individual comments and one-on-one discussions with Committee members to document comments and suggestions. Comment cards, comment boards and questionnaires were used to solicit input from the Community.

Public engagement event #1 (October 24, 2013)

Program scope; goals, and timeline; feedback on vision; community assets; and needs and opportunities

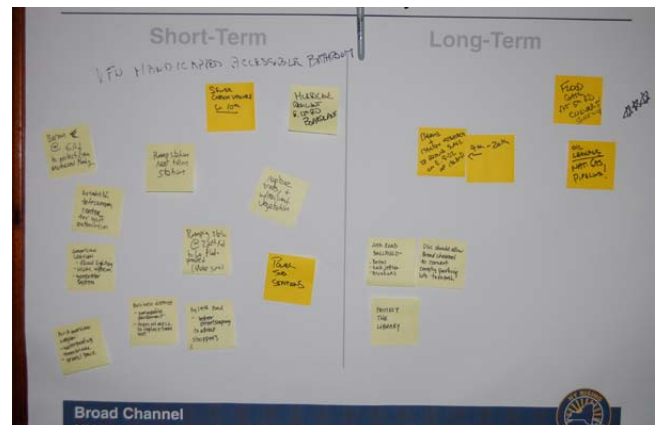
Public Engagement Event #1 showcased the NYRCR Program scope and presented the Committee's assessment of community assets and needs and opportunities. The Public Engagement Event took place in conjunction with the Broad Channel Civic Association meeting that was held at the American Legion and began with a formal presentation that introduced NYRCR and the program's objectives to the Community. Following the

presentation, an open house style event was held in which Committee members facilitated group discussion and invited community input on a number of topics including identification of assets, needs, opportunities, and goals as featured on the display boards. While the public engaged in conversation around the display boards, they were invited to take part in interactive exercises by placing stickers and notes on feedback boards. This feedback mechanism created a documented record of community discussion from the Public Engagement Event for the Committee to use during future meetings.

Public engagement event #2 (November 21, 2013)

Contents of draft conceptual plan; gathering feedback on strategies and projects

The second Public Engagement introduced the public to preliminary project concepts developed by the Committee. The meeting included a presentation by each Committee member on the projects. Community members' comments provided powerful guidance to the Committee on the types of projects to pursue that address the Broad Channel community's priorities and concerns, and substantially shaped project development going forward.



Public engagement event #3 (February 4, 2014)

Presentation of proposed and featured projects, and additional resiliency recommendations; gathering feedback on strategies and projects

The third Public Engagement Event was a critical opportunity to share the Proposed and Featured Projects with the Community and obtain feedback on these projects. The Committee hosted the meeting at the American Legion.

Public Engagement Event #3 featured the Proposed and Featured Projects in formal presentation followed by an open-house setting; Community members filtered in-and-out of the event, engaged with the material in lively discussion with fellow community members at their own leisure, and shared their opinions on the feedback boards.

Public engagement event #4 (April/May 2014)

Presentation of final plan and announcement of projects

Public Engagement Event #4 will take place in April and conclude the Public Engagement Event series. At this Public Engagement Event, the Committee will present the Proposed Projects and the NYRCR Plan to the public.

Public engagement event outreach

The Committee spearheaded outreach for Public Engagement Event meetings. Committee members leveraged community distribution channels to distribute emails and printed material—palm cards, flyers, and storefront posters—with Public Engagement Event meeting information. The Committee's public outreach strategy utilized Broad Channel's robust community distribution channels, including the Broad Channel Civic Association Facebook page and newsletter, the West 12th Road Blog, and The Wave Newspaper.

Online engagement and social media outreach

The NYRCR website, located at <https://www.stormrecover.ny.gov/nyrcr>, served as a valuable public resource. The Broad Channel NYRCR page is located at <http://stormrecovery.ny.gov/nyrcr/community/broad-channel> and featured announcements, meeting dates and locations, and materials produced by the Planning Committee throughout the process. The NYRCR website also directed visitors to the NYRCR Facebook page (located at <https://www.facebook.com/NYStormRecovery>) and Twitter account (@NYStormRecovery). Communities were also able to submit comments through the NYRCR website and by emailing info@stormrecovery.ny.gov.



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. 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.

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, through FEMA's Hazard Mitigation Grant Program (HMGP).
- **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 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.



The JBRWG comprises 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.

Community asset inventory

The following table provides the assets that were identified through the NYRCR planning process, which were then evaluated using the New York State Department of State (NYS DOS) Asset Inventory and Risk Assessment tool. The table provides the baseline “risk score” for each asset and the scores for the following three risk evaluation components: hazard, exposure, and vulnerability. Hazard scores are based on each asset’s location relative to NYS DOS risk areas and the assumption of a 100-year storm event. Exposure scores are based on landscape

attributes, which were determined using publicly available data, aerial imagery, and site reconnaissance. Vulnerability scores are based on information regarding each asset’s performance during and after recovery after Superstorm Sandy and the asset’s current state of repair as described to the Committee, the public, and in some instances, agency stakeholders and reports. More information, including a description of each table attribute, can be found at <http://stormrecovery.ny.gov/resources-0>.

Table V-3 – Community asset inventory

Asset	Risk Area	Recovery Support Function	Community Value	Risk Score
Veterans of Foreign War Hall	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
PS 47	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
Christ Presbyterian by the Sea	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
American Legion	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
St. Virgilius Rectory	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
Broad Channel Volunteer Fire Department	Extreme	Health and Social Services/Community Planning and Capacity Building	High	67.5
St. Virgilius Roman Catholic Church	Extreme	Health and Social Services/Community Planning and Capacity Building	High	54
Broad Channel Post Office	High	Health and Social Services/Community Planning and Capacity Building	High	31.5
Commercial – Extreme	Extreme	Economic Development	High	54
Commercial – High	High	Economic Development	High	42
Broad Channel Branch Queens Public Library	High	Natural and Cultural Resources	High	42
Residential – Extreme	Extreme	Housing	High	54

Table V-3: Community asset inventory (continued)

Asset	Risk Area	Recovery Support Function	Community Value	Risk Score
Residential – High	High	Housing	High	42
Cross Bay Boulevard Bridge	Extreme	Infrastructure Systems	Medium	27
MTA/TBTA Operations Facility	Extreme	Infrastructure Systems	Low	40.5
MTA Subway Line (A-train)	Extreme	Infrastructure Systems	Medium	54
Broad Channel MTA Subway Station	Extreme	Infrastructure Systems	Medium	40.5
East 12 th Road Boardwalk	Extreme	Infrastructure Systems	High	67.5
Culvert at 4 th Road	Extreme	Infrastructure Systems	High	27
Con Edison Substation	Extreme	Infrastructure Systems	High	27
New York City Transit Facility	Extreme	Infrastructure Systems	Medium	40.5
Cross Bay Boulevard	High	Infrastructure Systems	High	31.5
Broad Channel Wetlands	Extreme	Natural and Cultural Resources	Medium	40.5
Shad Creek Association	Extreme	Natural and Cultural Resources	High	40.5
Gene Gray Playground	Extreme	Natural and Cultural Resources	Medium	27
Broad Channel Athletic Club	Extreme	Natural and Cultural Resources	High	40.5
Broad Channel Park	Extreme	Natural and Cultural Resources	Medium	27
Cross Bay Boulevard Park	Extreme	Natural and Cultural Resources	Medium	27
Broad Channel American Park	Extreme	Natural and Cultural Resources	Medium	27

Endnotes

Executive summary

- 1 Five of the 102 localities in the program—Niagara, Hekimer, Oneida, Madison, and Montgomery Counties—are not funded through the Community Development Block Grant-Disaster Recovery (CDBG-DR) program.

I. Community overview

- 1 U.S. Census Bureau; Census 2010, Summary File 1
- 2 U.S. Census Bureau; American Community Survey 2008 – 2012 5-year Estimates
- 3 U.S. Census Bureau; American Community Survey 2008 – 2012 5-year Estimates
- 4 U.S. Census Bureau; American Community Survey 2008 – 2012 5-year Estimates
- 5 Assessing the Impact of Hurricane Sandy on Coastal Habitats – p. 9–10
- 6 New York City, “A Stronger, More Resilient New York.” p. 314

II. Assessment of risk and needs

- 1 U.S. Census Bureau; American Community Survey 2008 – 2012 5-year Estimates
- 2 New York City, “A Stronger, More Resilient New York.” p. 76

IV. Implementation – project profiles

- 1 Data source is Bureau of Labor Statistics, Quarterly Census of Employment and Wages 2012.

Glossary

ABFE	Advisory Base Flood Elevation
ADA	Americans with Disabilities Act
BCAC	Broad Channel Athletic Club
BCHS	Broad Channel Historical Society
BCVFD	Broad Channel Volunteer Fire Department
CDBG-DR	Community Development Block Grant-Disaster Recovery
CEQR	New York City Environmental Quality Review
CRP	Comprehensive Restoration Plan
DASNY	Dormitory Authority of the State of New York
EMS	Emergency medical services
FDNY	Fire Department of New York
FEMA	Federal Emergency Management Agency
FIRM	Referred to as Flood Insurance Rate Maps
HRE-CRP	Hudson-Raritan Estuary Comprehensive Estuary Plan
HVAC	Heating, ventilation and air conditioning
JFK	John F. Kennedy
MTA	Metropolitan Transit Authority
NEPA	National Environmental Protection Act
NFIP	National Flood Insurance Program
NPCC	New York City Panel on Climate Change
NPS	U.S. National Park Service
NYC DEP	New York City Department of Environmental Protection
NYC DOT	New York City Department of Transportation
NYC DPR	New York City Department of Parks and Recreation
NYC OEM	New York City Office of Emergency Management
NYC	New York City
NYRCR	NY Rising Community Reconstruction
NYS DEC	New York City Department of Environmental Conservation
NYS DOS	New York State Department of State
NYS	New York State
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SIRR	Special Initiative for Rebuilding and Resiliency
USDOI	United States Department of the Interior
USACE	U.S. Army Corps of Engineers
VFW	Veterans of Foreign Wars



NY Rising Community Reconstruction Plan

March 2014