



# NY RISING COMMUNITY RECONSTRUCTION PROGRAM

## BAY PARK AND VILLAGE OF EAST ROCKAWAY

### NY RISING COMMUNITY RECONSTRUCTION PLAN

MARCH 2014



## Acknowledgements

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The document was prepared by Perkins Eastman / BFJ Planning in association with the Louis Berger Group, and based on the NYRCR planning process undertaken by a multidisciplinary team consisting of Perkins Eastman, BFJ Planning, Louis Berger Group, Urbanomics, PACO Group, Rhodeside & Harwell, dLand, and John V. Waters.

Attributions: All photos are attributed to the Consultant Team unless otherwise specified

Cover photos (top left to bottom right): Potential green infrastructure improvements, homes along Grand Canal in Bay Park, Potential drainage improvements in Bay Park, Higbie Creek, Talfor Boat Basin, Public Engagement Meeting #2, Mill River as an asset for economic development, and Dock Street illustrative section.



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## Foreword

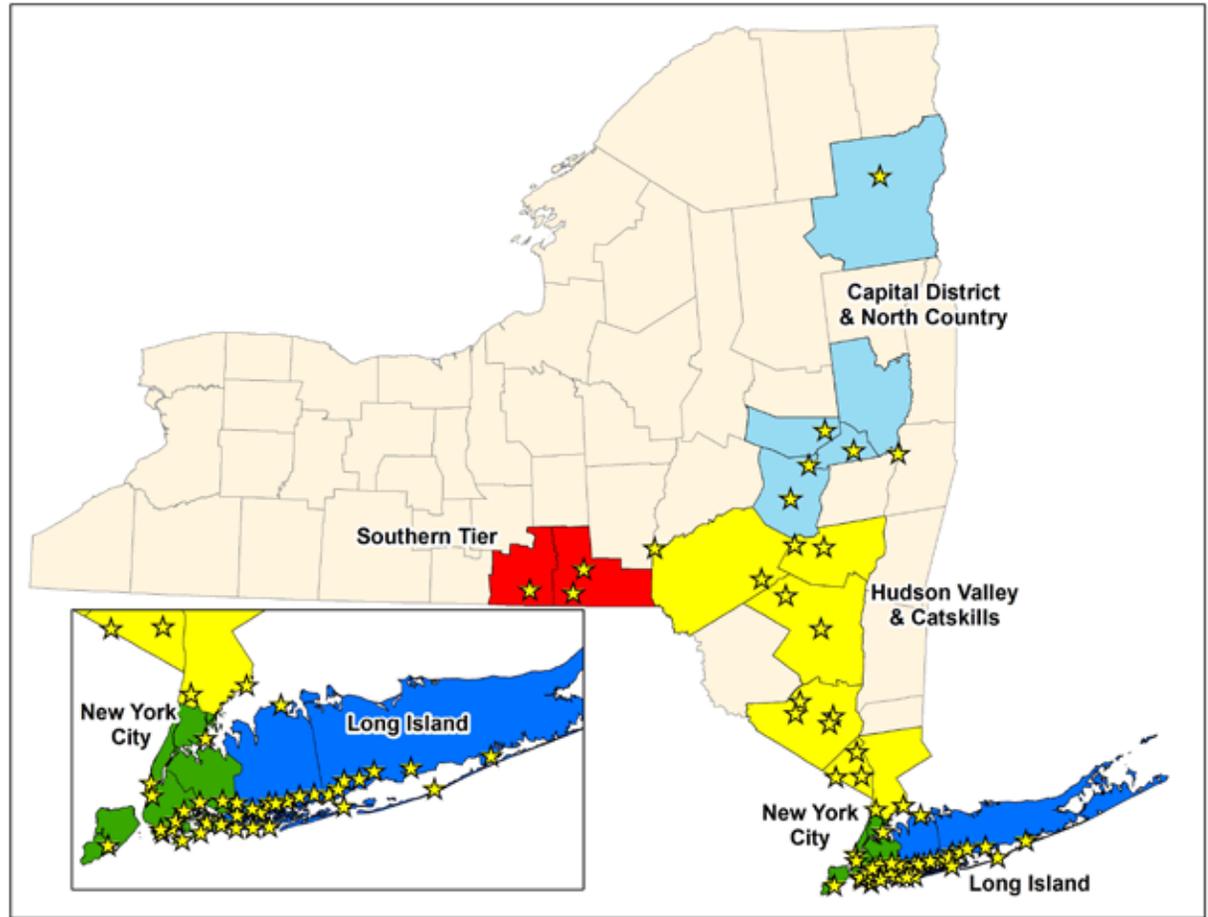
### Introduction

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

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



NY Rising Community Reconstruction Program Communities\*

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.

\*Note: map includes those NYRCR Communities funded through the CDBG-DR program, including the NYRCR Communities announced in January 2014.

## Bay Park and the Village of East Rockaway

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.<sup>1</sup>

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](http://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 more than 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 more than \$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

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

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.

NYRCR Bay Park/East Rockaway is eligible for up to \$6.65 million in CDBG-DR implementation funds.<sup>2</sup>

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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2 The following localities' allocations comprise the NYRCR Community's total allocation: Bay Park - \$3,650,555; Village of East Rockaway - \$3,000,000.

## **Bay Park and the Village of East Rockaway**

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## Executive Summary

The Village of East Rockaway and the community of Bay Park in the Town of Hempstead are home to more than 12,000 people. One of Long Island’s oldest communities, East Rockaway began as a port along the Mill River’s deep channel. Bay Park was largely developed in the 1900s with a community of modest summer homes, which became a year-round community of homeowners along West Hempstead Bay. The waterfront locations of both communities, central to their history, has become a major source of vulnerability. This was made acutely apparent during Superstorm Sandy, when the storm surge pushed seawater into the Mill River, and Bay Park’s several creeks and inlets, overflowing shoreline banks, canals, and bulkheads into the low-lying areas of land within both communities. In all, more than 1,600 housing units were flooded, with 24% of the homes in East Rockaway and 83% of those in Bay Park sustaining damage. Flooding, which has occurred with greater frequency since Superstorm Sandy, has directly affected the quality of life throughout the community and property values have suffered. In Bay Park, many homes remain vacant. The 2013 median sales price for homes in Bay Park and East Rockaway decreased more than 13% from the previous year, prior to Superstorm Sandy.

Superstorm Sandy’s impact extended well beyond the area’s homeowners. As home to the Bay Park Sewage Treatment Plant (Bay Park STP), one of Nassau County’s most important pieces of infrastructure, Bay Park was severely impacted after the facility’s electrical system flooded, rendering the facility inoperable and causing



*White Cannon Point, East Rockaway*

sewage to backup in some of the community’s homes and businesses. Superstorm Sandy also exposed the vulnerability of downtown East Rockaway, the commercial center for both communities, to storm surge. Many of Downtown’s businesses establishments, which flooded during Superstorm Sandy were only able to reopen after several months.

In September 2013, the NY Rising Community Reconstruction Planning Committee (Committee), a group of Bay Park/East Rockaway residents and civic leaders, convened with the goal of creating a plan to help Bay Park and the Village of East Rockaway rebuild from the damage caused by Superstorm Sandy and prepare for a more resilient future. Since that time, the Committee has worked closely with a team of professional consultants, representatives of New York State,



*Grand Canal, Bay Park*

and several Nassau County and Town of Hempstead agencies to develop this NYRCR Bay Park/East Rockaway Plan.

The NYRCR Bay Park/East Rockaway Plan features a series of projects identified as having the greatest benefit in increasing Bay Park and East Rockaway’s resilience to future climate related events. These projects will be implemented with \$6,656,000 in Community Development Block Grant-Disaster Recovery (CDBG-DR) funds allocated to the NYRCR Bay Park/East Rockaway Community (Community). The NYRCR Bay Park/East Rockaway Plan is community-based, the product of a robust public engagement effort involving consensus-building amongst both residents and business owners. Finally the NYRCR Bay Park/East Rockaway Plan is comprehensive, addressing six recovery support functions: Community Planning

## Bay Park and the Village of East Rockaway

& Capacity Building; Economic Resilience; Health & Social Services; Housing; Infrastructure; and, Natural & Cultural Resources.

With a fundamental focus on implementation, the NYRCR Program planning process incorporated extensive discussions with the Village of East Rockaway, Town of Hempstead and Nassau County, to confirm that relevant agencies have confidence in each project's ability to be implemented. The Committee also coordinated with agencies operating at a regional level, including the U.S. Army Corps of Engineers (USACE), and maintained an ongoing dialogue with parallel resiliency efforts, especially Rebuild by Design. As a result, the projects featured in the NYRCR Plan are supportive and complimentary of these other efforts, rather than duplicative or counterproductive.

The Committee had six meetings, and all were posted on the program website and open to the public. Additionally, three Public Engagement Events were held, (with a fourth to come after the release of this NYRCR Plan,) in which the public was invited to learn about the Committee's work to date and to provide feedback on past and future work. These Public Engagement Events were heavily advertised to attract a diverse set of members from the Community.

The NYRCR Bay Park/East Rockaway Plan is aimed at not only addressing short-term needs in the aftermath of Superstorm Sandy, but the long-term resilience of the two communities as well. The Plan includes a menu of projects that can be implemented in the short, medium and long term.



Public engagement event #1



Public engagement event #2

As part of the planning process, the Committee created a vision statement that identifies the Community's goals for the NYRCR planning process.

***The vision for the communities of Bay Park and East Rockaway as a whole is one that thrives in the face of future storm events where the small-town quality of life, walkable neighborhood character, and surrounding natural features are preserved and enhanced.***

"Proposed Projects" are projects proposed for funding through the Community's allocation of CDBG-DR funding. "Featured Projects" are projects and actions that the 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" (see Section V-A: *Additional Resiliency Recommendations*) are projects and actions that the Planning Committee would like to highlight.

The nine Proposed and nine Featured projects included in the NYRCR Plan for Bay Park/East Rockaway address each of the six strategies that emerged from the public engagement process and technical analysis:

- A: ***Protect the coastline from flooding;***
- B: ***Address recurring stormwater drainage issues;***
- C: ***Harden municipal infrastructure and improve capability to respond to storm events;***
- D: ***Improve the overall quality of life to maintain housing values and give people a reason to stay and invest in the community;***
- E: ***Strengthen and protect the local economy; and,***
- F: ***Leverage improvements to the Bay Park STP.***

The Proposed and Featured projects identified for each of these strategies are geographically identified on pages 10-11.

**Strategies**

**A: Protect the coastline from flooding**

Though Superstorm Sandy was an unprecedented event, the sources and causes of flooding observed during Superstorm Sandy are regularly reflected on a smaller scale during high tide events, rainstorms, and nor'easters, not only in Bay Park and East Rockaway, but in other communities along the south shore of Long Island as well. Nuisance flooding, which occurs approximately twice a month on spring tide and moon tides, is expected to increase as a result of anticipated increases in general sea level and frequency of extreme events such as high wind induced surges. The bay shoreline of the Town of Hempstead provides incomplete protection against tidal inundation above 7-8 feet.

In recognition of the complexity of the technical and implementation issues involved in addressing the shoreline, much of which is privately owned, the Bay Park/East Rockaway NYRCR Plan includes an ambitious and regional Proposed Project: the **South Shore Shoreline Improvement Program Study (A1)**. The study would look at methods for making coordinated improvements to achieve a contiguous shoreline in the Town of Hempstead. The goal would be to investigate mechanisms for funding, streamlining the permitting process, and creating options for incentivizing bulkhead repairs and living shoreline improvements. The NYRCR Committee recognizes the importance of this issue to the other communities along the South Shore, and their assumption is that the solutions derived from this Program could serve as a model to address conditions in those communities as well.

**B: Address recurring stormwater drainage issues**

Many roads in East Rockaway and Bay Park experience recurring flooding as the stormwater drainage system does not operate properly at lower elevations. Siltation of the pipes from recurring tidal flows has reduced the ability of the system to function at its intended capacity, which is already insufficient to handle current and future conditions.

The **East Rockaway/Bay Park Drainage Improvements (B1)** project includes a multi-phase suite of interventions that address the two areas that are subject to the most frequent flooding events: Lawson Avenue and East/West Boulevards along Higbie Creek. The project will also address excess sedimentation and bulkheading along Higbie Creek. The first phase of the project will entail a Hydrology and Hydraulic Study of the drainage system to help to identify specific plans for the subsequent phases of the project. The subsequent phases will improve drainage conditions for the two areas with a variety of interventions which may include installing check valves on outfall pipes, raising roads and re-grading surrounding properties, repairing bulkheads, and dredging water bodies such as Higbie Creek to remove excess sedimentation.

The **Green Infrastructure Implementation Program (B2)** includes measures to reduce minor localized flooding and reduce stormwater runoff through green infrastructure. This would include the reduction of impervious surfaces on streets, parking lots and public properties as well as other measures to encourage green infrastructure on private property.

**C: Harden municipal infrastructure and improve capability to respond to storm events**

The **Harden the East Rockaway Department of Public Works (DPW) Garage and John Street Recreation Center (C1)** Proposed Project would protect East Rockaway's key facilities that sit within the floodplain through dry floodproofing and movable flood barriers. The resilience of the Community's facilities and infrastructure is critical to the area's ability to mobilize, communicate and respond to future disaster events.

The **Expand Mobile Disaster Response Capacity (C4)** Featured Project would supplement this effort by purchasing a coordinated mobile emergency response unit to help the Village to perform the necessary life safety rescues required in another flood emergency.

A second Proposed Project intended to improve the community's administrative capacity to rebuild after Superstorm Sandy and follow through on long-term recovery measures is the funding of a **Local Disaster Recovery Manager (C2)**. The Local Disaster Recover Manager (LDRM) will coordinate and manage the overall long-term recovery and redevelopment of the Bay Park/East Rockaway NYRCR Community, provide administrative and grant writing support for multiple federally-funded projects and programs, and ensure that Federal funds are used properly. It is the Committee's intent that the LDRM would provide grant-writing services for the Village of East Rockaway.

## Proposed and Featured Projects

### Strategy A: Protect the coastline from flooding

A-1	South Shore Shoreline Improvement Program Study	Proposed
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### Strategy B: Address recurring stormwater drainage issues

B-1	East Rockaway – Bay Park Drainage Improvements	
B-1.1	Sub-project 1: East Rockaway – Bay Park Drainage Hydrology and Hydraulic Study	Proposed
B-1.2	Sub-project 2: Lawson Ave (part 1)	Proposed
B-1.3	Sub-project 3: Lawson Ave (part 2)	Proposed
B-1.4	Sub-project 4: West Blvd (part 1)	Proposed
B-1.5	Sub-project 5: West Blvd (part 2)	Featured
B-1.6	Sub-project 6: Road Raising of East Boulevard and connecting streets	Featured
B-2	Green Infrastructure Implementation Program	Featured

### Strategy C: Harden municipal infrastructure and improve capability to respond to storm events

C-1	Harden East Rockaway Department of Public Works (DPW) Garage and John Street Recreation Center	Proposed
C-2	Local Disaster Recovery Manager (LDRM)	Proposed
C-3	Microgrid network for backup power supply	Proposed
C-4	Expand Mobile Disaster Response Capacity in East Rockaway	Featured
C-5	Install Solar Panels at Schools	Featured

### Strategy D: Improve the overall quality of life

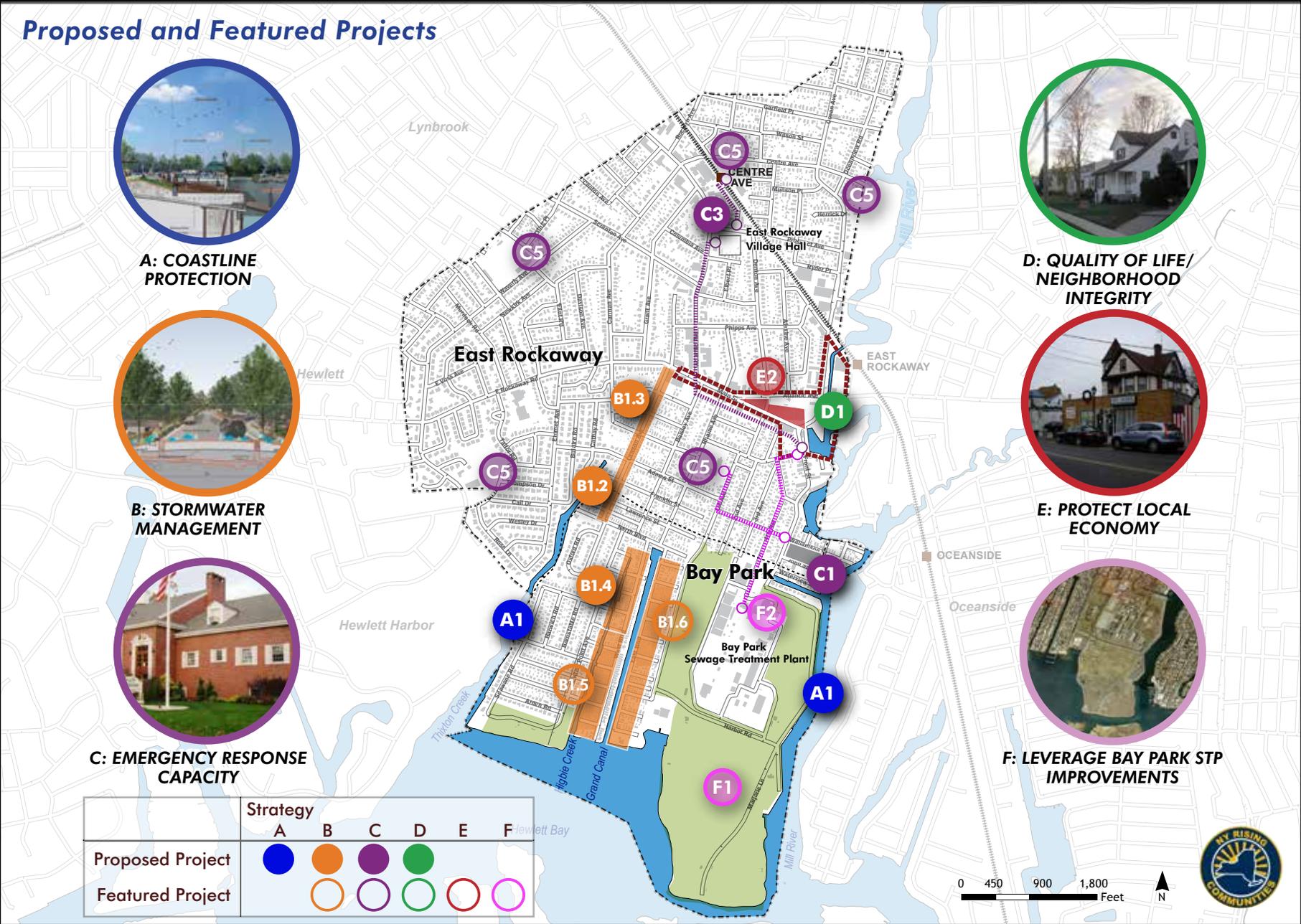
D-1/E-1	Downtown Resiliency and Redevelopment Strategic Plan	Proposed
D-2	Neighborhood Home Improvement Assistance Program	Featured

### Strategy E: Strengthen and protect the local economy

E-2	Program for Floodproofing of Downtown Businesses	Featured
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### Strategy F: Leverage improvements to Bay Park STP

F-1	Repairs to Bay County Park	Featured
F-2	Microgrid network for backup power supply at Bay Park STP	Featured



## Bay Park and the Village of East Rockaway

The NYRCR Plan includes two projects to address the resiliency of the electrical grid. The **Microgrid Network for Backup Power Supply (C3)** Proposed Project would create a microgrid network centered around the Village Hall in East Rockaway and would provide backup power to nearby critical and community facilities. The **Install Solar Panels at Schools (C5)** project would install solar panels on the roofs of three schools within the East Rockaway Union Free School District, including Centre Avenue School, Rhame Avenue School, and East Rockaway High School.

### ***D: Improve the overall quality of life to maintain housing values and give people a reason to stay and invest in the community***

The economic stress, blight, and displacement caused by Superstorm Sandy have the potential to substantially impact the neighborhoods. In the short term, Superstorm Sandy has reduced home values and weakened the economic base. In the long-term, there is the risk of losing middle-income housing to lot consolidation and high-end development. The **Downtown Resiliency and Redevelopment Strategic Plan (D1)** is a Proposed Project that will develop a plan to protect downtown East Rockaway from flooding. This plan would identify solutions for both economic development and flood protection, serving as a redevelopment plan to guide future zoning changes. This Proposed Project would leverage the area surrounding the Talfor Boat Basin as a unique waterside destination to diversify and strengthen the commercial base and provide new housing opportunities. The **Neighborhood Home**

**Improvement Assistance Program (D2)** is a Featured Project that would provide gap funding for resiliency costs not covered by either traditional lending practices or government assistance.

### ***E: Strengthen and protect the local economy***

Superstorm Sandy exposed downtown East Rockaway's vulnerability to tidal and stormwater flooding. Protecting downtown East Rockaway from inundation from the Mill River presents a complex set of long-term challenges. The Downtown Resiliency and Redevelopment Strategic Plan (D1) addresses this challenge as well. The **Program for Floodproofing Downtown Businesses (E2)** is a Featured Project that would incentivize the floodproofing of buildings by providing local businesses in downtown East Rockaway with a tax credit or stipend to utilize permanent dry floodproofing improvements, raise building utilities, or implement other resilient flood protection measures.

### ***F: Leverage improvements to Bay Park STP to provide needed local amenities***

Nassau County is in the process of repairing, upgrading and hardening the Bay Park STP. The burdens placed on the local community by the presence of the Bay Park STP were recognized by not only the NYRCR Committee, but the larger NYRCR Community as well. As such, the NYRCR Committee identified the opportunity to leverage the \$810 million investment planned for the Bay Park STP to increase the overall resiliency of the host community, as an important element of the NYRCR Plan.

The NYRCR Plan includes **Repairs at Bay County Park (F1)** as a Featured Project, advocating for Nassau County to provide further improvements to the southern and western areas of Bay County Park in Bay Park. This would entail the relocation of ball fields to allow construction staging and phasing for Bay Park STP and the Park concurrently. Such phasing will allow for the redesign of the existing ball fields as passive recreational space, and provide residents with access to the canal for fishing. Also included as a Featured Project is the establishment **Microgrid Network for Backup Power Supply at Bay Park STP (F2)**. This project would use the plant as a hub to provide a backup power supply during storm events to the plant and nearby critical facilities in the NYRCR Community.

*Picture to right: Homes in Bay Park*

A photograph of a row of waterfront houses with white railings and decks, reflected in the water. The houses are built on stilts and have various styles of railings and decks. The water is calm, creating a clear reflection of the houses and their railings. The sky is overcast and grey.

# Section I

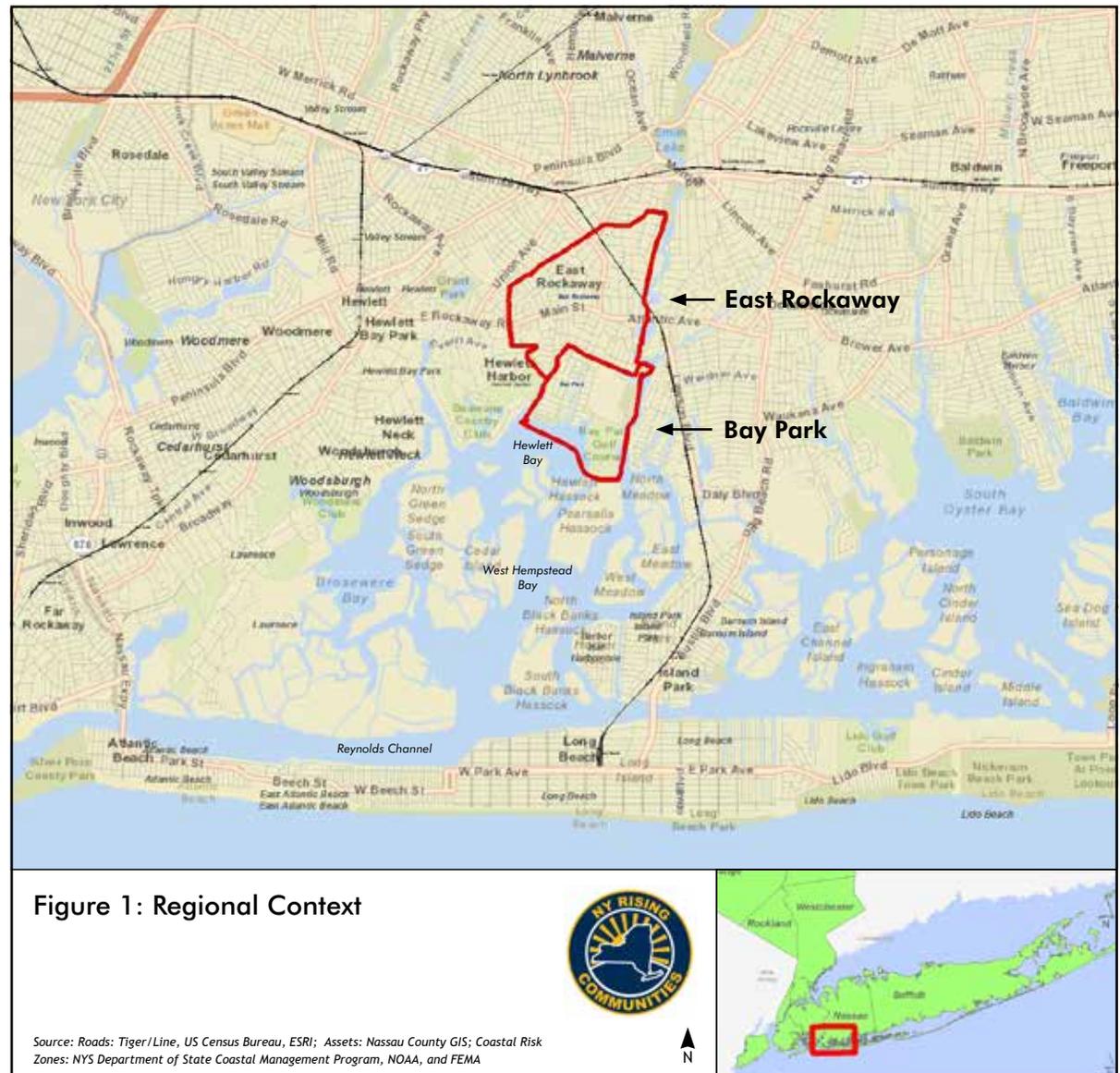
## Community Overview

## Section I: Community Overview

### A. Geographic scope of NYRCR Plan and community profile

The NY Rising Community Reconstruction (NYRCR) Bay Park/Village of East Rockaway Community (Community) planning area is comprised of two Census Designated Places (CDP), Bay Park, a hamlet of the Town of Hempstead, and the Village of East Rockaway. These neighboring communities are located in the southwest portion of the Town of Hempstead in Nassau County, on Long Island, New York. They are bordered by Hewlett and Hewlett Harbor to the west, Lynbrook to the north, Oceanside to the east and the Hewlett Bay to the south. The Long Beach barrier island protects the mainland from the Atlantic Ocean. There are four bodies of water that flow into the Hewlett Bay, which feeds into West Hempstead Bay: Mill River, Thixton Creek, Grand Canal, and Higbie Creek. Mill River extends approximately 2.5 miles inland to Smith Pond, just north of the Sunrise Highway (Route 27).

West Hempstead Bay is part of the larger Hempstead Bays – South Oyster Bay Complex as identified by the U. S. Fish and Wildlife Service’s habitat complexes of the New York Bight, which includes the entire aquatic habitat of West, Middle, and East Hempstead Bays and South Oyster Bay. This complex includes the area of open water, salt marsh islands, and intertidal mudflats located between the barrier island chain section of Jones Beach and Long Beach and the south shore of Long Island between the communities of Lawrence and Amityville.<sup>3</sup>



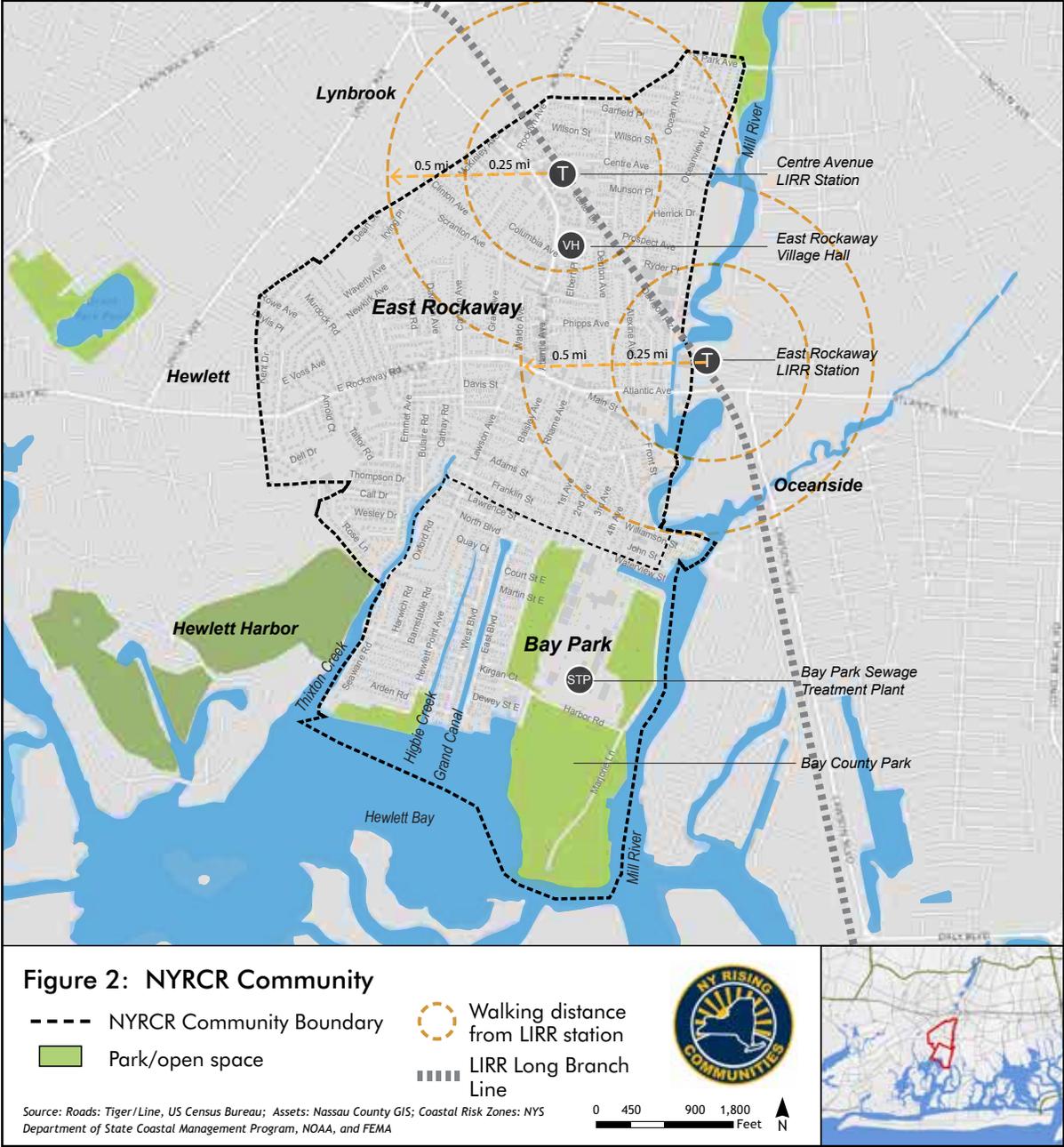
**History**

East Rockaway, first settled in 1688, is one of the oldest settlements on Long Island. It began as an important commercial port for traders that sailed to New York City and surrounding areas leveraging the Mill River’s deep channel. The port facilitated the farming, fishing and lumber industries that developed to supply commodities to cities along the mainland coast. Some homes in the Village date back more than 200 years. Eventually, the growing settlement, originally called Rockaway, then Near Rockaway, came to be known as East Rockaway. The Village of East Rockaway was incorporated in 1900.

Bay Park developed after World War I (1918), primarily with Cape Cod and bungalow style homes. Prior to development, most of the land was marshland, covered in part by tidewater, marsh grass and stands of white birch trees. As part of the development, bulkheads were built along the Grand Canal and portions of Higbie Creek providing access for navigation and recreation. In the 1950s and 60s, these bungalow and vacation homes, which were built in wetland areas, were converted to permanent residences.

**Land Use**

East Rockaway covers approximately 660 acres and has a variety of residential, commercial, institutional and recreational uses. Bay Park, covers 385 acres and is primarily comprised of single-family residential uses and two major Nassau County properties, Bay County Park and the Nassau County Bay Park Sewage Treatment Plant (Bay Park STP). Together, these facilities occupy 41% of Bay Park’s land area.



Bay Park and Village of East Rockaway

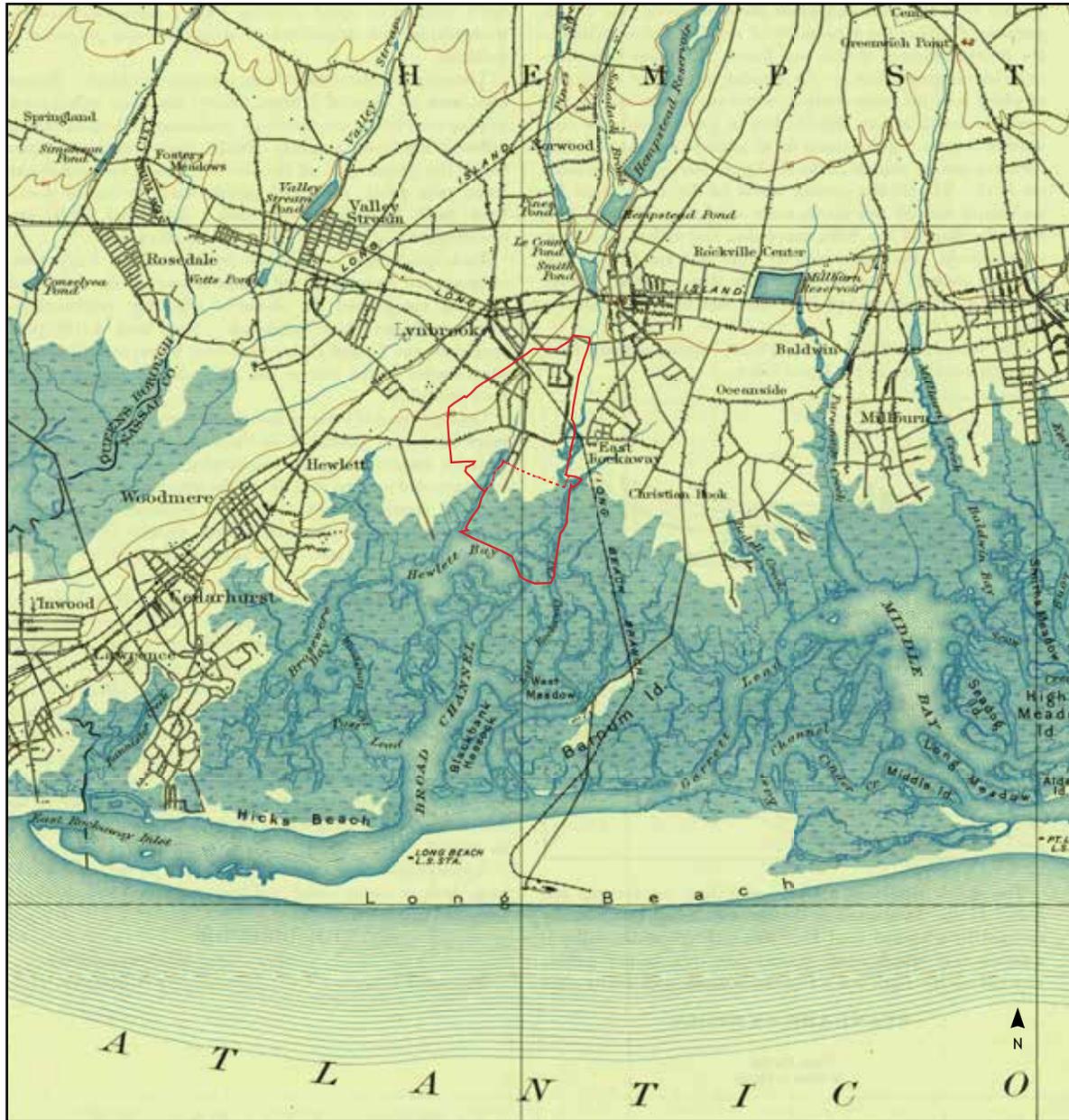


Figure 3: East Rockaway, 1903

Source: 1903, US Department of Interior

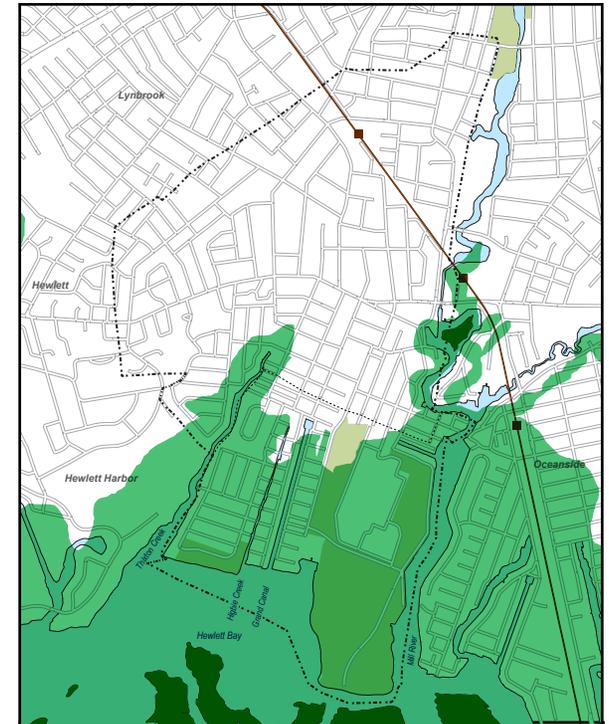


Figure 4: Historic Wetlands

- Historic wetlands
- Existing wetlands

Source: Nassau County

Commercial and civic uses in the Community are oriented along Main Street and Atlantic Avenue in East Rockaway; these areas comprise East Rockaway’s Central Business District (CBD). The CBD is relatively small compared to nearby commercial districts along the Sunrise Highway and Merrick Road to the north. The main node of activity in the CBD for both vehicular and pedestrian traffic is the Long Island Rail Road (LIRR) East Rockaway Station and the adjacent shopping center (Pathmark) at the eastern boundary of the Village. In addition to the East

## NY Rising Community Reconstruction Plan



East Rockaway Village Hall

Rockaway Station, the community is served by the LIRR Centre Avenue Station. Almost the entirety of the Village is located within a walkable distance (0.5 miles) of one of these stations on the Long Branch Line.

There are a variety of land uses along Mill River. The Talfor Boat Basin, located adjacent to the CBD and the River, has a number of commercial, industrial, and multi-family buildings. East Rockaway High School and Rolling River Day School are the two important civic uses located to the north. To the south, the shoreline is largely consists of single-family homes, many of which have private bulkheads and docks. The edges of Thixton Creek, Higbie Creek and Grand Canal have a residential character.



The Fishery Restaurant (Talfor Boat Basin, East Rockaway)

The Community's location along Hempstead's West Bay creates ubiquitous opportunities for active recreation. Most of these opportunities are associated with private properties along the bay. The Village owns land along the Mill River, but this is largely underutilized. The largest public recreational resource is Bay County Park, featuring a golf course, a boat launch ramp, athletic fields, playgrounds, and parking areas.



Retail shops along Atlantic Avenue

### Demographic Overview

According to the US Census, in 2010, there were 9,818 people, 3,825 households and 2,566 families in East Rockaway. Bay Park has 2,212 people, 867 households and 617 families. In total, there are 13,030 people in the Community. The median household income in East Rockaway is \$94,514, and the median income for a family is \$113,125. As determined by the Federal government, 5.1% of families and 6.1% of the

population are below the poverty line, including 8.9% of those under age 18 and 5.4% of those age 65 or older. The median household income in Bay Park is \$94,211, and the median income for a family is \$100,913. None of the Bay Park residents are below the poverty line.

Bay Park and East Rockaway are principally bedroom communities of New York City, with residents employed in New York City comprising 39.8% of the Planning Area's 5,358 person workforce. With frequent rush hour headways and a one-seat ride of approximately 45 minutes to Penn Station, most of these residents commute by train. This underscores the central role the LIRR plays in the livelihood of the both communities.

Local businesses correspondingly employ only a small part of the Community's workforce. As of 2011, there were 1,852 jobs in the Community. Of these, only one in every five was held by a local resident (14.6% from East Rockaway and 4.6% from Bay Park), the rest come in from surrounding areas including New York City. The leading employment sectors area health care and social services (16.6%), education (15.4%), retail (8.4%), and professional, scientific and technical services (8.0%).

## B. Description of Storm Damage

### Hurricane Irene

When Hurricane Irene made landfall in New York on August 28, 2011, it was downgraded to a tropical storm; however, it produced heavy damage in many areas of the state due to flooding, both from heavy rainfall, storm surge in coastal areas, and wind gusts in excess of hurricane force. The impacts from Hurricane Irene were largely a result of precipitation. Localized rainfall totals during Irene exceeded 10 inches in New York, with rainfall ranging from five to nine inches in Nassau County,<sup>13</sup> while storm tide levels reached 1.3 feet at the Battery.<sup>14</sup> According to FEMA, 470,000 residents were evacuated in Nassau and Suffolk Counties.<sup>15</sup> Power outages were widespread in Nassau County. Many homes in the Community experienced some flooding due to Irene; however, the damage did not approach the scale of destruction experienced during Superstorm Sandy.

### Superstorm Sandy

Superstorm Sandy approached the New York and New Jersey coastlines on Sunday, October 28, 2012, making landfall in Brigantine, NJ in the early morning hours of Monday, October 29. Even though the storm was not categorized as a hurricane when it made landfall, it was still large and dangerous. The extreme severity of Superstorm Sandy's impact came from an uncommon combination of factors. First, the timing of its landfall coincided with a "spring" tide, which is a high tide that occurs during a full moon. Second, it was very large, extending

approximately 1,000 miles in diameter, which contributed to an elevated storm surge.<sup>4</sup> Finally, Superstorm Sandy hit the region directly, instead of veering eastward into the Atlantic Ocean. The powerful northeastern quadrant of the storm pushed water from the Atlantic Ocean directly onto Long Island, the City of Long Beach, and neighboring communities located on the barrier island that protects the Hempstead Bays. Water flowed through the two inlets at Reynolds Channel and over the Long Beach barrier island into West Hempstead Bay and subsequently Hewlett Bay. Direct storm effects steadily increased overnight on October 28 and into October 29. Nassau County received approximately one inch of rain from the storm before it weakened and moved away from area October 30.<sup>5</sup>

The Village of East Rockaway Auxiliary Police, a unit of dedicated and civic-minded residents, were called in to action at noon on October 28 and evacuation announcements began at 3:00 p.m. Nassau County issued an Evacuation Order, effective at 2:00 p.m. on October 28, which required a Mandatory Evacuation of all residents living in a flood or storm surge zone, defined as south of Sunrise Highway, from the Queens County border to Rockville Centre and south of Merrick Road, from Rockville Centre to the Nassau-Suffolk County border.<sup>6</sup> The LIRR suspended service on its entire system at 7:00 p.m. on October 28. Limited service on the Long Beach Branch did not resume until November 14 and full service was not restored until November 25<sup>7</sup>.



*Volunteer efforts post Superstorm Sandy*

*Source: Melissa van Wickler*



*Superstorm Sandy inundation*

*Source: Melissa van Wickler*



*Superstorm Sandy inundation*

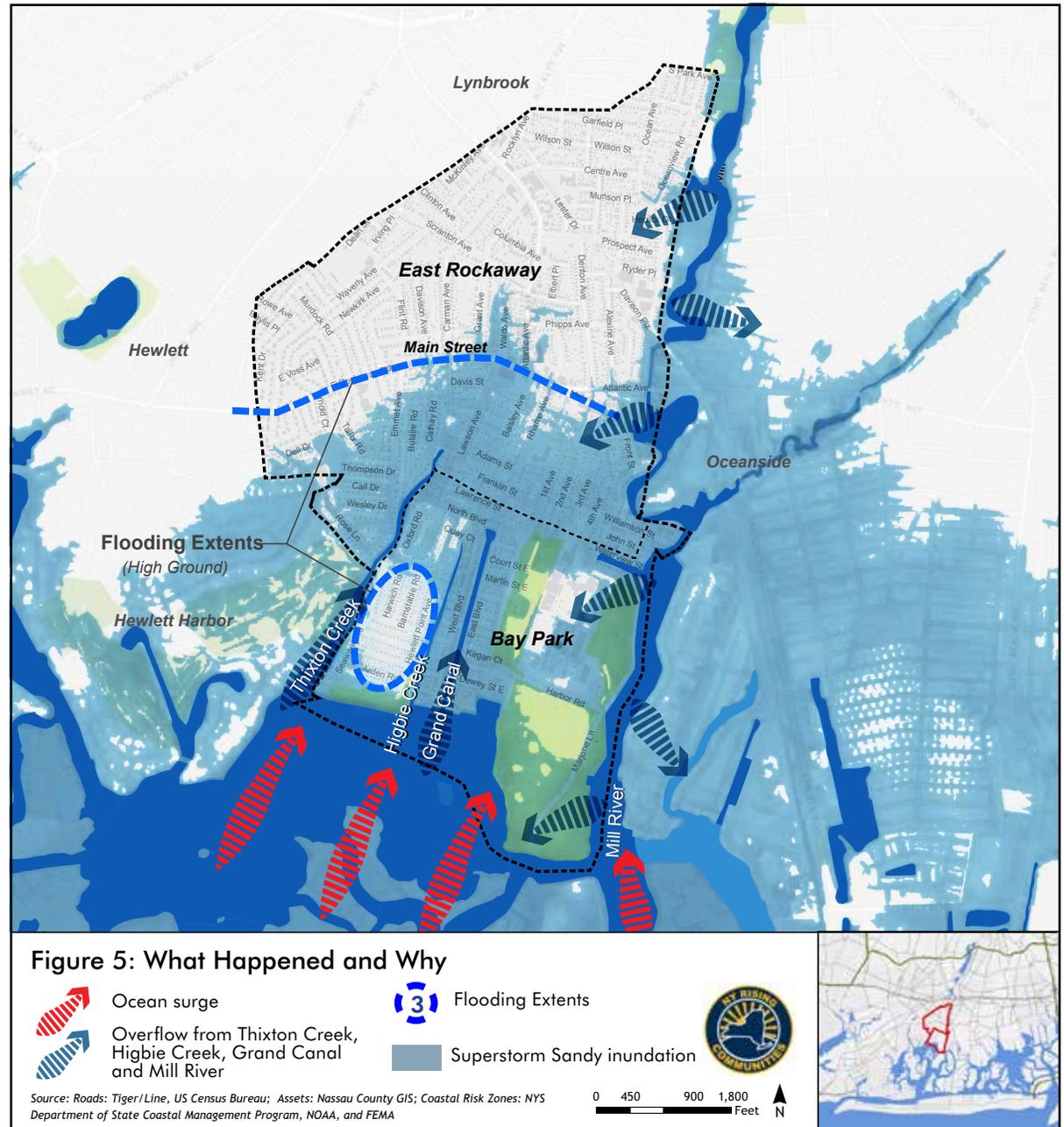
*Source: Melissa van Wickler*

According to the Federal Emergency Management Agency (FEMA) Individual Assistance data analyzed by the U.S. Department of Housing and Urban Development (HUD), Superstorm Sandy caused significant damage to the area’s residential assets. In East Rockaway 24%, (or 1,073) of the area’s total number of housing units sustained damage. Of these, 882 had damage of more than 50%. In total 1,056 housing units were flooded, 73 of which had more than four feet of water, 259 had one to four feet, and 116 had less than one foot. In Bay Park, 83% (or 665) of the Community’s total number of housing units sustained heavy damage. All 665 of these units suffered heavy or strong (i.e., 20% to 50%) damage. In total 660 housing units were flooded, with 80 units having greater than four feet of water and 439 with one to four feet of water. While some residents heeded evacuation orders, others in the Community did not evacuate. Consequently, some residents were trapped in their homes, due to both flooding of immediate housing units and roadways.

Figure 5 shows the flooding extent during Superstorm Sandy, which was a result of the tidal surge, overflow from the various water bodies and the stormwater drainage system.

### Tidal Flooding

According to the National Weather Service, the maximum storm surge in the Community was approximately eight feet at 9:00 p.m. on October 29, which coincided with the high tide. The total water level reached approximately 11 feet above mean sea level. The storm surge pushed seawater through Hewlett Bay into Mill River, Thixton Creek, Grand Canal, and Higbie Creek.

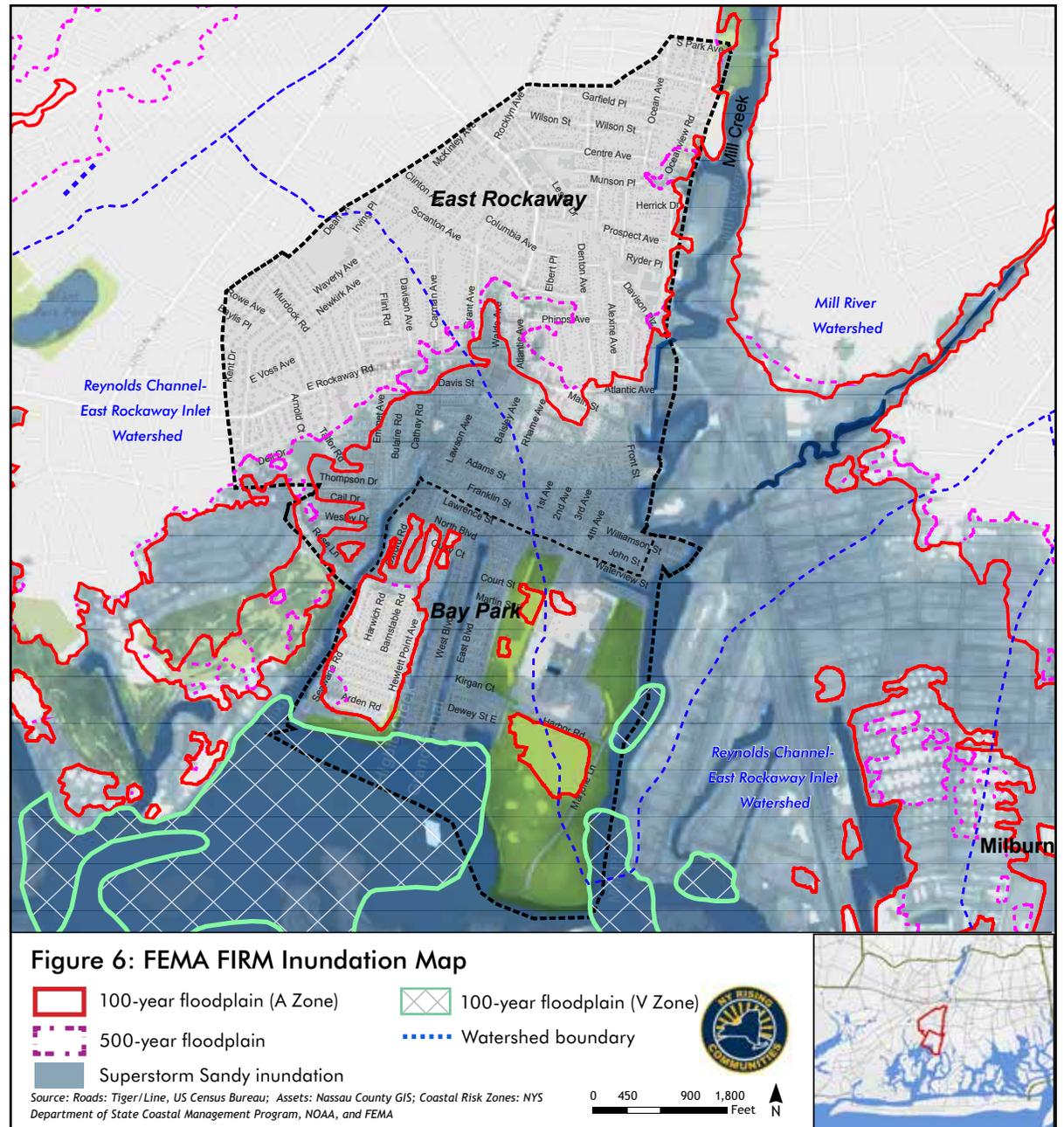


## Bay Park and Village of East Rockaway

Water overflowed shoreline banks, canals and bulkheads and flowed into the lowest points of land within the community.

The Federal Emergency Management Agency (FEMA) establishes Flood Insurance Rate Maps (FIRM) as a basis for National Flood Insurance Program (NFIP) regulations and flood insurance requirements. The insurance zone designations are used to determine flood insurance rates and premiums. The Base Flood Elevation (BFE) is the water surface elevation corresponding to a flood having a one percent probability of being equaled or exceeded in a given year (100-year floodplain).

Figure 6 shows the 100 and 500-year floodplains on the 2009 FIRM map, and areas that were flooded during Superstorm Sandy. The figure shows that flooding was generally aligned with the 500-year floodplain area. Storm surge water flowed up to Front Street and Main Street causing the most significant damage to the residential communities south of North Boulevard and west of Lawson Avenue closest to Higbie Creek and Grand Canal. The area south of Thixton Avenue was flooded; however, the area between Thixton Avenue and Arden Road is approximately 14 feet above sea level and was not flooded. Surge water generally receded off of roadways by Tuesday morning, October 30. Since Superstorm Sandy, areas that did not flood pre-Superstorm Sandy have flooded during full moon tides, high tides and other storm events. Areas subject to this nuisance flooding include Lawson Avenue, Adams Street and Williamson Street.



### Stormwater Flooding

The flooding that occurred during Superstorm Sandy came both from the storm surge as well as storm drains that overflowed with tidal water entering the system causing the rainwater to backup further up into the system. As can be seen in Figure 6, Bay Park and East Rockaway are at the southern portion of the Reynolds Channel - East Rockaway Inlet Watershed and the Mill River Watershed and receive stormwater runoff from the land areas to the north. Precipitation normally flows through the stormwater drainage system and out into the bays. During Superstorm Sandy the stormwater drainage system was impacted in several ways. Initially, high tide and surge waters entered the system through drainage outfalls, which were below the high tide surge elevation. Most of the outfalls are not equipped with operational backflow valves. Seawater filled much of the low-lying drainage system and prevented rainwater from draining. The total rainfall of one inch was not significant. An increased rainfall would have compounded flooding effects in areas of higher elevation and adjacent to the storm drainage system further north. Most of the flooding was from baywaters that either overtopped shoreline defenses or came up through the storm drainage system. Storm drainage flooding was noted as severe on Lawson Avenue from North Boulevard to Main Street.

Officials from the Village and the Town of Hempstead have indicated that some of the storm drain outfalls are equipped with backflow valves, but the interior condition of the stormwater drainage system was unknown before Superstorm Sandy. Superstorm Sandy caused large amounts



Bay Park Sewage Treatment Plant

Source: Bing Maps

of sediment and debris to flow into the system and a noticeable buildup of silt and debris has been identified. This buildup impedes the discharge of stormwater, further exacerbating flooding.

### Sewage Backup

A major impact of Superstorm Sandy was the failures at the Bay Park STP when as engines for the plant’s main pumping system were flooded by nine feet of water, which destroyed the plant’s electrical system and compromised



Backup power generators at Bay Park STP

## Bay Park and Village of East Rockaway

many other critical systems. The plant went offline at approximately 10:00 p.m. on October 29, 2012. The Plant was offline for approximately 58 hours. After the implementation of an emergency recovery effort, power was restored and influent/raw sewage pumping re-established at approximately 6:00 AM on November 1, 2012.

Loss of power to the influent pumps at the Bay Park STP caused a mixture of flood water and sanitary sewage to flood many homes in the sewer area, particularly those at lower elevations. Reportedly, roughly 69 million gallons of untreated sewage flowed into Hewlett Bay and over portions of Bay County Park during plant shutdown.<sup>8</sup> Approximately 55 hours after the Bay Park STP failed temporary power from portable generators and switchgear equipment restored pumping operations.<sup>9</sup>

Temporary power was restored on November 1, allowing primary treatment which consists of screening and disinfection to resume. Full primary and secondary sewage treatment resumed on December 14. During this time approximately 2.8 billion gallons of under-treated sewage flowed through the Bay Park STP into Rockaway Channel.<sup>10</sup> Full primary (mechanical removal of debris and large particles) and secondary treatment (biological digestion, clarification and sanitization) was reestablished by December 21, 2012. As of March 2014, the Bay Park STP is still running on backup diesel generators.

### Utility Systems

The Community lost electric power as the storm moved into the area on October 29. Disaster-related damages occurred when strong winds



*Superstorm Sandy inundation*  
Source: Melissa van Wickler

caused trees and broken limbs to fall into and across overhead electric distribution circuits damaging poles, transformers, power lines, insulators, fuses, and miscellaneous pole structure hardware. Long Island Power Authority's (LIPA) four divisions sustained damages to 877 overhead circuits linked to 149 substations, each of which are connected to and feed multiple overhead electric distribution circuits. LIPA had 475,000 customers in Nassau County and 600,000 customers in Suffolk County. Superstorm Sandy caused peak outages of 94% and 78% in Nassau and Suffolk Counties, respectively.

Many customers remained without electric power for up to two weeks<sup>11</sup>. As a result, communications networks were inoperable, including East Rockaway's emergency response network. Batteries were in short supply following the storm, hindering communications of first responders. Verizon supplied wi-fi on November 6, and generators were provided by Nassau County and borrowed from the New York City Office of Emergency Management. Further, residents reported that some home heating oil

tanks were damaged or even disconnected during the storm, causing oil to contaminate homes and surrounding properties.<sup>12</sup>

### Coastal Protections

Bulkheads protect against property erosion and provide some measure of protection from tidal flooding. Bulkheads along the Community's coast vary in height and structural integrity. This can be observed along the east side of the Grand Canal bulkhead, which was repaired and heightened to eight feet above BFE by the Town of Hempstead in August 2013. The Canal's west shoreline is privately owned and many bulkheads have not been repaired or raised. Bulkheads along Higbie Creek are generally in disrepair and property owners on the creek are concerned about their eroding property.

Historically, the Hewlett Bay and West Hempstead Bay tidal wetland ecosystem provided coastal protection in the form of floodwater absorption and wave velocity attenuation. These wetlands have been rapidly deteriorating for many years, a trend that was accelerated by Superstorm Sandy. The wetlands were overwhelmed by tidal flooding and the storm's wave energy weakened their future flood-reduction capabilities. In addition, bay waters continue to receive upland waters polluted with excessive nitrogen levels and increased sedimentation. Invasive plant species also impact the native vegetation and wildlife, such as *Phragmites australis* (common reed), which aggressively invades fills in wetlands, thereby reducing water flow and consequently floodwater retention exposing a community that is already highly vulnerable to coastal flooding.

## C. Critical Issues

A variety of critical issues were identified throughout the NYRCR planning process, which involved rigorous analysis, site visits, extensive meetings with the NYRCR Planning Committee and key stakeholders and government agencies, and Public Engagement Events. These issues are addressed in greater detail as part of the Needs Assessment in Section II of this NYRCR Plan. In brief, Superstorm Sandy exposed several issues within the Planning Area that the NYRCR Plan addresses.

Many homes suffered significant damage from the storm surge, some of which remain vacant. The exact number of vacant properties is not available due to confidentiality requirements. Most housing development pre-dates any flood insurance study or the establishment of flood zones (which began in 1968) and the roadways were established to accommodate low first floor elevations of the existing houses. These bungalow style homes, most of which were built before



Vacant home in Bay Park

buildings codes were established, are especially vulnerable to storm flooding because they typically have substandard structural reinforcement and unsecured home heating tanks.

The immediate displacement and the economic strain caused by Superstorm Sandy has been compounded by the imminent increase in flood insurance costs. Many residents cannot afford to invest in disaster mitigation measures to reduce the risk of future damage, even though these investments are cost effective and save lives in the long term. This disinvestment compounded with blight conditions from damaged and vacant properties have a negative impact on property values and neighborhood character. In the long term, middle-income housing may be lost to lot consolidation with high-end buildings that can bear the costs of construction.

Superstorm Sandy exposed downtown East Rockaway’s vulnerability to tidal and stormwater flooding. Protecting downtown East Rockaway from inundation from the Mill River presents a complex set of long-term challenges. The entire length of Main Street, the area surrounding Talfor Boat Basin along with some portions of Atlantic Avenue are at risk from future storms.

Though Superstorm Sandy was an unprecedented event, the sources and causes of flooding observed during Superstorm Sandy are regularly reflected on a smaller scale during high tide events, rainstorms, and nor’easters, not only in Bay Park and East Rockaway, but in other communities along the south shore as well. Nuisance flooding, which occurs approximately

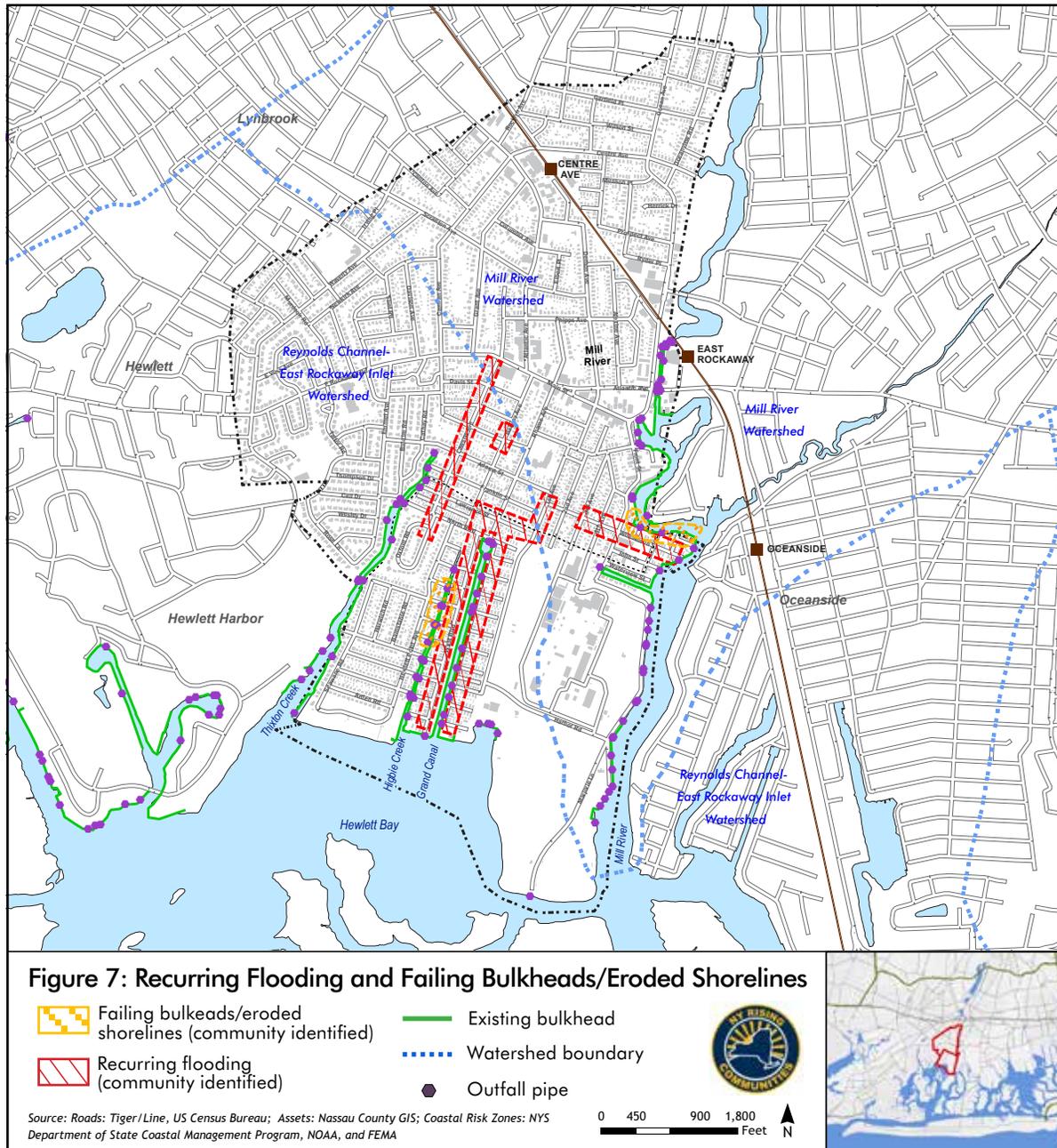


Raising of home in Bay Park

twice a month on spring tide and moon tides, is expected to increase as a result of anticipated increases in general sea level and frequency of extreme events such as high wind induced surges. The bay shoreline of the Town of Hempstead provides incomplete protection against tidal inundation above seven to eight feet.

Studies have shown that due to increasing temperatures and global warming, rising sea levels are likely. Therefore, coastal communities like Bay Park and East Rockaway can anticipate more frequent flooding and a shortened 100-year flood recurrence period. Table 1 shows model-based projections for mean annual sea level rise in Long Island between 2020 and the end of the century.

## Bay Park and Village of East Rockaway



**Table 1: Projected Sea Level Rise**

Decade	IPCC-Adapted Methodology	Rapid Ice-Melt Scenario
2020s	2 to 5 in	5 to 10 in
2050s	7 to 12 in	19 to 29 in
2080s	12 to 23 in	41 to 55 in

Source: Long Island 2035 Plan

Urbanization has contributed to the decline in stormwater retention capacity of the Community and its neighbors to the north that share a watershed. The construction of bulkheads, piers, and hardened shorelines have significantly altered tidal wetlands, natural shorelines, sub-surface water flow, aquatic habitats, and hydrology. Impervious surfaces do not have the capacity to absorb precipitation or water from spring tides. Some of the local streams such as Higbie Creek now suffer from failing bulkheads, erosion, debris in the waterway and widespread invasion of Phragmites.

Even when bulkheads and shore defenses are not overtopped, nuisance bay water flooding that overflows from the storm drain system occurs on some streets approximately twice a month, on spring and moon tides. This is expected to increase as a result of sea level rise and the frequency of extreme events such as high wind induced surges associated with climate change.

These events are a recurring burden to the municipality in terms of costs for repair/maintenance, emergency services by the necessary reaction to the events and the interruption of other services including but not limited to the disruption in sanitary curbside garbage collection, interruption of mail services, and school bus route changes. There is also

## NY Rising Community Reconstruction Plan



Example of recurring flooding at Lawson Avenue and Adams Street

Source: Brendon Perini

the threat of safety especially to the elderly and handicapped population of the area who may need access to doctors, hospitals and pharmacies. The tidal flooding in roadways also damages property including vehicles parked and/or driven through the salt water. Residents experience damage to their property including but not limited to their lawns and landscaping. The continual flooding has directly affected the quality of life throughout the community and property values have suffered. The median sales price for 2013 was \$315,000, down 13.1% from 2012. Many homeowners have put their properties on the market and anecdotal information from discussion with residents indicates that many owners who wish to sell are waiting until housing prices rebound in the area.

The interior condition of the stormwater sewer system was unknown before Superstorm Sandy,

but since the storm, which caused large amounts of sediment and debris to flow into the system, noticeable buildup of silt and debris within the stormwater conveyance system has been identified. It is unknown what structural damage was done to the integrity of the system from the amount of tidal surge waters draining through the system. The existing stormwater system, even if it were clear of obstructions, has insufficient capacity to convey current load. Additionally, the capacity of the current drainage system may not meet current regional development demands, which warrants further study.

As discussed in Section I, Superstorm Sandy's surge inundation of the Bay Park STP exposed major infrastructure and environmental vulnerabilities. In addition to the damage caused during the storm, noise, unpleasant odors and other issues are recurring nuisances for neighboring residents.

The State has announced that it has secured \$810 million in Federal funds to repair and fortify the Bay Park plant and collection system, and ensure the plant can withstand a 500-year storm event. The Bay Park STP outfall pipe, terminating in Reynolds Channel remains a critical issue for the environmental stability of the Hempstead Bays.

The Bay Park STP is currently running on backup generators, which has caused an increase in nose levels in the surrounding neighborhood on a daily basis. According to the Committee and area residents, another impact is the "worse-than-usual odors" emitting from the temporary digester tanks. Nassau County officials have stated that these issues will be addressed in the forthcoming repairs and upgrades to the Plant.

Nassau County is proposing to extend the outfall into the Atlantic Ocean, which would require additional funds beyond the \$810 million secured from the Federal Government. An Atlantic Ocean outfall would improve water quality in the bays, relieve stress on the bay's ecosystem and improve resident and visitor's quality of life. The ecologic health of the bays is important to the recreational and economic well-being of area residents.

Bay County Park, which served as an important regional recreational resource, was badly damaged from flooding and sewage overflow is in need of repairs. Since Superstorm Sandy, electric service has not been restored to the recreation facility at Bay Park County Park.

The issues identified above helped to guide the development of the NYRCR Bay Park/East Rockaway Plan and the identification of Proposed Projects for NYRCR Program funding. These issues are grouped into the six Recovery Support

## Bay Park and Village of East Rockaway

Functions (RSFs), established by President Barack Obama in 2011 through the National Disaster Recovery Framework (NDRF). The six RSFs are: Community Planning and Capacity Building; Economic Development; Health and Social Services, Housing; Infrastructure; and, Natural and Cultural Resources.

### **Community Planning & Capacity Building**

- There is a need for greater coordination amongst community-based organizations that provide critical resources in educating residents in preparation of disasters and helping people recover.
- The County, Town and Village could adopt resiliency recommendations put forth by various regional plans, identified in Section I-D: Relationship to Regional Plans, to protect against extreme weather and climate change.
- Better emergency response coordination is needed between Nassau County, the Town of Hempstead, the Village of East Rockaway, and local organizations.

### **Economic Development**

- Coastal and flood protection measures are needed to prevent damage caused by flooding to the East Rockaway CBD including Main Street and the Talfor Boat Basin.
- Need to diversify commercial base and reinvigorate the downtown area to promote economic resilience from future storm events.

### **Health and Social Services**

- The East Rockaway Junior-Senior High School, Rolling River Day School, Centre

Avenue and Rhame Avenue elementary schools were all damaged by Superstorm Sandy and remain at risk from future storm events.

- There are a number of facilities at risk include the U.S. Post Office, East Rockaway Fire Department Engine 1 and Truck 1, East Rockaway Department of Public Works (DPW) Facility, and the John Street Recreation Center which were all damaged during Superstorm Sandy.
- Flood protections are needed to protect municipal equipment at the Village DPW and additional equipment is needed (i.e., high water vehicle and a rescue boat to navigate flooded areas) to improve disaster response capability.
- Coordination amongst municipal first responders, and social services organizations to identify at risk areas, populations, and individuals, and ensure vulnerable populations are protected and able to recover from future disasters.

### **Housing**

- The aging single-family housing stock is vulnerable to flooding. Many homes have ground floors below BFE, have substandard structural reinforcement and unsecured home heating fuel tanks.
- A significant population of elderly residents live within the extreme and high risk areas.
- A significant number of homeowners within the extreme and high-risk areas may not have flood insurance as they do not have mortgages and are not required to purchase flood insurance.
- One third of East Rockaway households

and one quarter of Bay Park households were spending more than they could afford on housing<sup>16</sup>.

### **Infrastructure Systems**

- Strengthened and continuous coastal protections are needed on both public and private properties.
- Many of the local roads flood once or twice a month during high tides.
- Improved sewer networks, stormwater retention and detention are needed to prevent stormwater flooding.
- Damage to LIPA's power infrastructure showed electrical backup power is needed and there are systemic issues that needed to be addressed.
- Floodproofing and backup power is needed at key infrastructure assets to ensure electricity transmission and cellular service.
- Repairs/upgrades are needed at the Bay Park STP. Funds have been appropriated by FEMA and Nassau County.

### **Natural & Cultural Resources:**

- Increased coastal protections are needed along Mill River, Grand Canal and Higbie Creek. These may include, bulkheads, rip-rap and natural shorelines.
- The natural functions of Higbie Creek have been degraded by erosion, debris, and sedimentation.
- Bay County Park was damaged by Superstorm Sandy and still in need of repairs
- The Bay Park STP is negatively impacting the estuarine ecosystem.

## D. Community Vision

### Description of process for creating vision

The Committee created a Vision Statement to address regional and community recovery and

resilience for the Community. The objective of the vision statement is to address damage caused by Superstorm Sandy and Hurricane Irene, capitalize on social and economic assets to improve the

local economy, and rebuild a more resilient community to expand the economy and reduce future risk.

### Vision Statement

Bay Park and the Village of East Rockaway are two waterfront communities that are home to hard-working and family-oriented residents. They are bound together by their shared history, identity, civic, institutional and commercial networks, and their connection to the bay. Both communities were severely impacted by Superstorm Sandy and recognize their shared stake in rebuilding a more resilient future where people want to live, work and play.

The vision for the communities of Bay Park and East Rockaway as a whole is one that thrives in the face of future storm events where the small-town quality of life, walkable neighborhood character, and surrounding natural features are preserved and enhanced.

Bay Park and the Village of East Rockaway have a symbiotic relationship. Decisions in how to rebuild will have a profound impact on the future of both communities. The fundamental principle is to recognize the assets that have

always made people want to live in Bay Park and East Rockaway, and enhance these assets so they serve as a foundation for a new and better future. The Community vision is based on seven points:

- Re-establish a robust infrastructure system characterized by well-maintained and drained streets, a clean and reliable water supply, clean and reliable wastewater treatment, and a reliable utility distribution system;
- Improve facilities for essential public services and harden municipal infrastructure so that they are better able to secure the safety of the communities during future storm events.
- Secure neighborhoods from flooding and assist residents in their efforts to rebuild and protect their homes from future storm events;
- Strengthen the commercial and civic spine along Main Street and Atlantic Avenue

and build on landmarks and gathering places such as the Talfor Boat Basin and rail stations to help the community remain vibrant and economically sustainable;

- Build upon the strong network of existing civic and religious organizations to make the communities more resilient to future weather events;
- Encourage improvements that will protect and enhance the quality and natural beauty of West Hempstead Bay and the surrounding estuarine ecosystem. Recommendations will allow the communities to continue to enjoy and draw sustenance from the Bay, while respecting and addressing the potential of the Bay as a source of risk; and,
- Recognize and elevate the social and environmental burden imposed by the Bay Park Sewage Treatment Plant and leverage improvements to make it and the surrounding area a source of community pride.

## E. Relationship to Regional Plans

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Bay Park and East Rockaway are closely linked with other communities in southwestern Long Island, especially those located in the same watershed and/or located along West Bay. Other NYRCR communities that share the West Bay include “Five Towns” to the west, Barnum Island/Oceanside/Village of Island Park/Harbor Isle area to the east, and Long Beach to the south. Given the Community’s location between these other bayfront NYRCR communities, regional plans and projects in neighboring jurisdictions will have a strong impact on preparing Bay Park and East Rockaway for a more resilient future. As such, multiple regional projects that impact the West Bay and other waterways around the planning area were evaluated and assessed to ensure that the NYRCR Bay Park/East Rockaway Plan is not duplicating or conflicting with other efforts.

Nassau County’s plans to repair and upgrade the Bay Park STP is a regional project that will have a significant impact on the Community. As of March 2014, official plans have not been released, however, officials have revealed that plans to fortify and upgrade the plant would involve the following:<sup>17</sup>

- Building a large dike around the entire plant to provide protection against the 500-year storm and account for anticipated sea level rise;
- Elevating and hardening the Electrical Plant Distribution System and repairing existing generators to take the plant off of temporary power;

- Elevating and/or hardening as many as 57 pump stations that serve one million residents to protect from floods;
- Building a larger sewage collection line to accommodate increased flow levels during storm surges; and,
- Hardening and replacing the sludge dewatering equipment and building damaged during Sandy.

The construction phasing may involve a disruption of services at Bay County Park to the east while improvements are made. As part of the planning process, the Consultant Team has met with NYRCR representatives to discuss potential synergies where improvements could be leveraged to enhance the surrounding natural and cultural amenities as well as disaster resiliency through electrical backup systems. These improvements are discussed in Section III: Reconstruction and Resiliency Strategies.

In addition as part of the Rebuild By Design (RBD) program sponsored by the HUD, Nassau County is working the RBD team led by Interboro Partners to develop recommendations for infrastructure improvements around the Hempstead Bays. The final proposal will be released in April 2014 and is expected to recommend a series of soft and hard infrastructure improvements to protect residents and critical assets.

USACE is currently constructing a new dune system on the barrier island, including shoreline along the City of Long Beach and Town of Hempstead. Additionally, USACE is conducting the North Atlantic Coast Comprehensive Study,

a comprehensive coastal protection study of the East Coast that includes Reynolds Channel and the South Bay system. This study is scheduled to be completed in the beginning of 2015.

Further, many challenges and reconstruction strategies identified are beyond the jurisdictional control of Bay Park (Town of Hempstead) and Village of East Rockaway. Raising and repairing bulkheads on private property (to prevent flooding and reduce erosion) are the responsibility of private owners. In order to facilitate the permitting process, the New York State Department of Environmental Conservation (DEC) has issued a General Permit for bulkhead repair to expedite storm recovery efforts on the south shore of Nassau and Suffolk counties. The General Permit allows:

- The removal and replacement of existing bulkheads;
- The replacement of a bulkhead 18 inches higher in elevation than the existing bulkhead; and
- Limited maintenance dredging associated with the bulkhead replacement.

A critical component of the NYRCR Plan includes the identification of hurdles and opportunities for coordination, especially on projects that cross-jurisdictional boundaries. In order to facilitate buy-in on the Proposed Projects, the planning process has actively involved Federal, State, County, Town, and, community agencies that share jurisdictional control and responsibility.

**Existing Plans and Studies**

There are a significant number of plans, policies, procedures and resources that address the existing conditions, issues, regulatory frameworks, community goals, and resiliency opportunities in Community. These resources have been produced by public agencies at all levels (Federal, NY State, County, Town and Village), regional planning groups, non-profit organizations, academic institutions, community stakeholders, and private groups.

Reconstruction and resiliency programs and projects included in the NYRCR Plan recognize the planning work completed to date and are complementary to these other efforts. A summary of the regional plans and programs are provided below. *Section V-F: Summary of Existing Plans and Studies* includes a full list of relevant regulatory and advisory documents and brief summaries of each.

**Nassau County Hazard Mitigation Plan (2007, current update in progress)**

The Nassau County Hazard Mitigation Plan provides a description of various hazards, identification of assets in hazard areas, estimated damages in assessment areas (including assets exposed to storm surge), development trends in hazard areas, and capabilities and resources. Asset information and community specific recommendations are developed for some communities; however, this information is sparse for the Bay Park and East Rockaway. Implementation strategies and mitigation measures must be drawn from recommendations for neighboring communities.

Nassau County in the process of updating the 2014 Nassau County Multi-Jurisdictional Hazard Mitigation Plan (Hazard Mitigation Plan).

While the Hazard Mitigation Plan was originally implemented in 2007, the current update is meant to help prioritize mitigation projects, using the risks exposed by Superstorm Sandy as a way to learn more about potential damage from natural disasters in the future.<sup>18</sup> The Village of East Rockaway’s Emergency Manager has been actively participating in meetings for this plan update. In addition, both the Town and Village have played an integral role in providing data to the Nassau County Office of Emergency Management.

**Nassau County Stormwater Management Program Plan (2009)**

The Nassau County Stormwater Management Program (NCSWMP) includes a listing of Best Management Practices (BMPs) that have been implemented by the County and a coalition of local municipalities in order to achieve the regulatory standard of reducing pollutants in the County’s storm water to the maximum extent practicable. Initial measurable goals and an implementation schedule were developed for each of the BMPs in the NCSWMP.

East Rockaway’s current efforts consistent with the BMPs outlined in the plan include:

- Updating digital mapping of the stormwater system;
- Water quality education in the schools; and,
- \$10,000 annual investment in maintenance, to clean out basins and pipes with a vacuum truck twice every year.<sup>19</sup>

While the NCSWMP plan emphasizes practices to limit discharge of pollutants into Nassau County waterways, additional education and assistance

campaigns should also help homeowners, businesses, and municipalities improve stormwater control facilities to prevent flooding. In many locations within the Community, improved maintenance and controls of stormwater drainage equipment could prevent flooding during extreme events such as Superstorm Sandy and during more frequent heavy rain events. Additionally, improvement in stormwater retention in the watershed’s upstream areas to the north will reduce the burden on the stormwater drainage system in Bay Park.

**Long Island Regional Economic Development Council Strategic Plan (2011, update in 2013)**

The Long Island Regional Economic Development Council Strategic Plan (LIREDCSP) outlines a list of priority projects to advance key strategies for innovation, education, economic development, sustainability, and improve infrastructure.

Infrastructure strategies include: Revitalize downtowns and commercial centers; Repair and upgrade aging infrastructure; Create new housing opportunities; and, Promote new government policies to foster economic growth. Natural Asset Strategies include: Improve sustainable agriculture enterprises; Improve the Economic Potential and Employment Opportunities of Fisheries & Aquaculture; and, Enhance Ecotourism Activities and Infrastructure.

While none of the priority projects are located within Bay Park or East Rockaway, jurisdictions and businesses within the Community should advocate for future attention by the LIREDC, especially in order to gain additional support and funding for economic development projects

## Bay Park and Village of East Rockaway

recommended by this NYRCR Plan.

### **Cleaner Greener Long Island Regional Sustainability Plan (2013)**

Cleaner Greener Consortium of Long Island is a group of municipalities and non-governmental organizations organized to articulate a community based vision for a more sustainable future. The Cleaner Greener Long Island Regional Sustainability Plan (CGLI) is intended to serve as a common point of reference for local governments, non-governmental organizations, businesses and residents. It includes initiatives for implementation, objectives and performance targets, as well as a wealth of baseline information (in the appendices) that can be incorporated into comprehensive plans, management plans, zoning, and other planning and strategy initiatives.

Goals and strategies were developed for the following subject areas: Economic development and workforce housing; energy; transportation; land use and livable communities, waste management; and, water management as well as, governance and implementation.

### **Nassau Urban County Consortium 5-Year Consolidated Plan (Nassau County, 2010)**

This Plan presents a five-year strategy for addressing housing and community revitalization needs within the 34 member Urban County Consortium. It includes a One Year Action Plan for spending approximately \$21,524,865 in Community Development Block Grant (CDBG), HOME, Emergency Shelter Grant, and other program funds. Through these programs, funds will be spent on a wide range of housing and

community development activities including new construction and rehabilitation of housing; commercial and economic improvements; public services for senior, youths, and low income persons; architectural barrier removal in private homes and in public buildings; homeless shelter operations and renovation; acquisition, demolition and relocation activities of blighted properties in targeted redevelopment areas; infrastructure improvements in low income areas; and, other related activities.

The Town of Hempstead and East Rockaway are listed as revitalization areas where activities will be carried out. Specifically, the Village of East Rockaway was targeted for housing rehabilitation assistance for extremely low and moderate income households. While a particular focus of the Consolidated Plan is on housing needs in low-income areas, the plan also identifies revitalizations of commercial sections of East Rockaway, including streetscape improvements, as an additional point of emphasis. The Consolidated Plan recommends the use of CDBG funds for street improvements, parking, commercial rehabilitation, and business expansion, which will result in upgrading local business areas.

### **Village, Town, County Policy/Programs**

#### **Nassau County OEM**

Nassau County provides multilingual hurricane readiness materials to help educate residents on how to prepare for major storms. The County also operates an automated notification service to alert residents who have registered when emergency situations occur.

#### **Town of Hempstead OEM**

The Town of Hempstead also provides printed materials and an online guide for major storm preparation through the Town's Public Safety Department. The Town also operates a reverse 911 line, called Swift911, which uses phone directories and contact information provided through the Town's website to notify residents of emergency situations.

In addition to these programs operated by Nassau County and the Town of Hempstead, additional programs are needed to target vulnerable populations, especially independently living elderly residents.

*Picture to right: East Rockaway DPW Municipal Garage*

## Section II

# Assessment of Risk and Needs



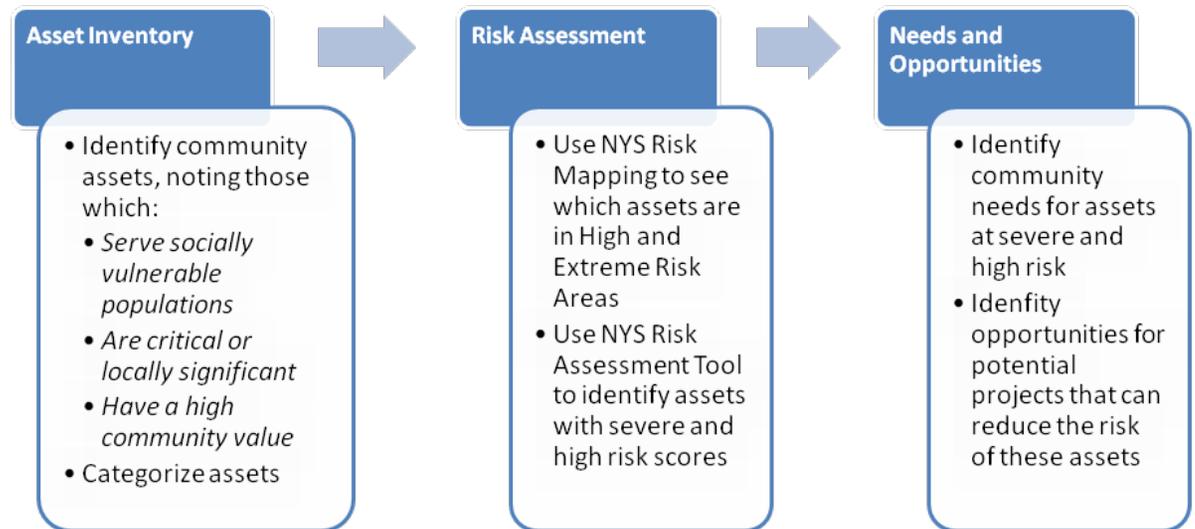
## Section II: Assessment of Risk and Need

### A. Description of Community Assets

Community assets were inventoried to understand the geographic areas and the functions of the NYRCR Bay Park/East Rockaway Community (Community) that are vulnerable. The assets identified are places or facilities where economic, environmental and social functions occur, or are critical infrastructure required to support those functions. These assets were identified by NYRCR Planning Committee (Committee) members and residents and include commercial areas, neighborhoods, schools, healthcare facilities, infrastructure, wildlife habitats, and cultural resources.

In addition to inventorying the assets, a risk assessment was conducted to understand which geographic areas and functions of the community are most at risk. The New York State Department of State (NYS DOS) has provided a risk assessment tool to quantify risk, which is explained in Section II-B. Understanding which assets are at highest risk also provided an understanding of the needs and opportunities within the Community, and helped the Committee identify the projects. The Asset Inventory and Risk Assessment process is illustrated in Figure 8.

As the goal of the risk assessment is to determine those assets at highest risk, the Asset Inventory and Risk Assessment was limited to all assets within extreme and high risk areas, as well as critical or locally significant assets within the entire Community. This risk assessment serves as a baseline for determining the risk-reduction benefits of potential NYRCR projects.



**Figure 8: Asset Inventory and Risk Assessment Process**

The Committee has identified several assets that were either impacted by Superstorm Sandy, are at risk of being impacted by future storms, or provide critical recovery functions for residents and businesses in the inundation zone. Assets are defined according to the following categories:

- Economic;
- Health & social services;
- Housing (neighborhoods);
- Natural & cultural resources;
- Infrastructure Systems; and,
- Socially vulnerable population.

Assets were identified through a series of exercises that involved community input, research, and analysis, including:

- Discussions at NYRCR Committee Meetings;
- Feedback at Public Engagement Events;
- Meetings in the local communities with Committee members, local officials, and community members;
- Site tours; and,
- Data analysis.

Flood and erosion defense works were not considered assets for the purpose of the asset inventory and risk assessment. Assets are items that provide community functions or services, such as education, healthcare or recreation. Bulkheads, seawalls, and riprap are not assets, but rather flood defenses that affect the exposure of an asset to storms or other hazards. Flood defenses are only considered assets to the extent they provide some community function (other than their flood design purpose). For further discussion on bulkheads and exposure, see Section III-B.

**Assessing Risk: New York State Risk Maps**

It is critical to understand the risk these assets could face in the event of future storms. To do this, NYSDOS developed a risk assessment area mapping tool that defines areas at risk from coastal hazards in relation to their topography, FEMA flood zones, previous storm surge inundation, sea level rise, National Weather Service (NWS) shallow coastal flooding advisory thresholds, and natural shoreline features.

The NYSDOS Risk Assessment Maps were utilized for the NYRCR Bay Park/East Rockaway Plan to show the corresponding risk (extreme, high, and moderate) for each of the asset categories.

**Extreme Risk Areas:** Areas currently at risk of frequent inundation, vulnerable to erosion in the next 40 years, or likely to be inundated in the future due to sea level rise.

**High Risk Areas:** Areas outside the Extreme Risk Area that are currently at infrequent risk of inundation or at future risk from sea level rise.

**Moderate Risk Areas:** Areas outside the Extreme and High Risk Areas but currently at moderate risk of inundation from infrequent events or at risk in the future from sea level rise.

A more detailed explanation for each of the risk areas can be found in *Section V-D: Community Asset Inventory and Risk Assessment*.



Scrap Yard on New Street

## Bay Park and Village of East Rockaway

### Economic Assets

Economic assets in the Community include employment hubs and downtown centers, ranging from large retail stores to industrial complexes, small businesses, service establishments and tourism destinations. Economic assets identified and confirmed by the Community are shown in Figure 9.

Most of the commercial properties (95.5% of all parcels and 95.6% of total assessed commercial value) are located in East Rockaway. Bay Park is primarily residential and it does not figure heavily in this section. The commercial core (East Rockaway CBD) for both communities is located in the Village along Main Street and Atlantic Avenue. Other pockets of retail can be found on Front Street and Ocean Avenue.

The strength of East Rockaway's commercial sector is the service industry. Several small businesses are located in residential homes. Marinas and yacht clubs along Mill River and the Talfor Boat Basin also suffered significant damage from Superstorm Sandy. Docks and boats were damaged and destroyed, and it was many months before the marinas, restaurants, boat dealerships, and workshops were able to reopen.

The primary commercial corridors in East Rockaway are along Atlantic Avenue, Main Street, and Ocean Avenue; each has its own distinct character. In addition, there is the Talfor Boat Basin (including Front Street), which has a variety of uses including public open space around White Cannon Point Park. The Atlantic Avenue corridor is diverse in its building types



*Main Street in downtown East Rockaway*

and uses which include stand-alone industrial and office buildings, single story strip malls, and several multi-family residences.

Main Street primarily consists of single story convenience retail and service strip malls. There are also two gas stations and several office buildings along the corridor. Many of the businesses were flooded during Superstorm Sandy flooding and some of the buildings took a year to re-open.

Ocean Avenue, stretching north from Main Street, supports a couple of waterside restaurant/bars as well as a shipping/customs broker.

A survey was distributed in December 2013 to businesses in the Community to help understand the impacts of Superstorm Sandy, the recovery process, and future economic development opportunities. Business owners expressed that the difficulty in recovery was compounded by the extent of the damage, both to individual businesses and to the community at large. Some

of the difficulties expressed include lack of power, difficulty to get to work, lack of supplies, and no gasoline to fuel delivery of inventory. In addition, many businesses owners suffered damage to both their business and home, making the recovery all the more difficult and overwhelming.

Initial repairs were paid for out-of-pocket with credit cards, family loans, and savings. Recovery for business owners without these resources was delayed as insurance payouts were slow in being distributed. Very few businesses received Federal, State or local assistance. Many of those who did qualify for government aid are still waiting for funds. According to data from the Small Business Administration (SBA), 85 East Rockaway businesses, representing 232 employees applied for Disaster Credit Management System (DCMS) assistance after Superstorm Sandy. These applications verified real property damage of \$6.6 million; machinery damage of \$1.3 million; inventory losses of \$322,938, and leaseholder improvements losses of \$1.5 million. Of the 85 applications, only 31 were approved for

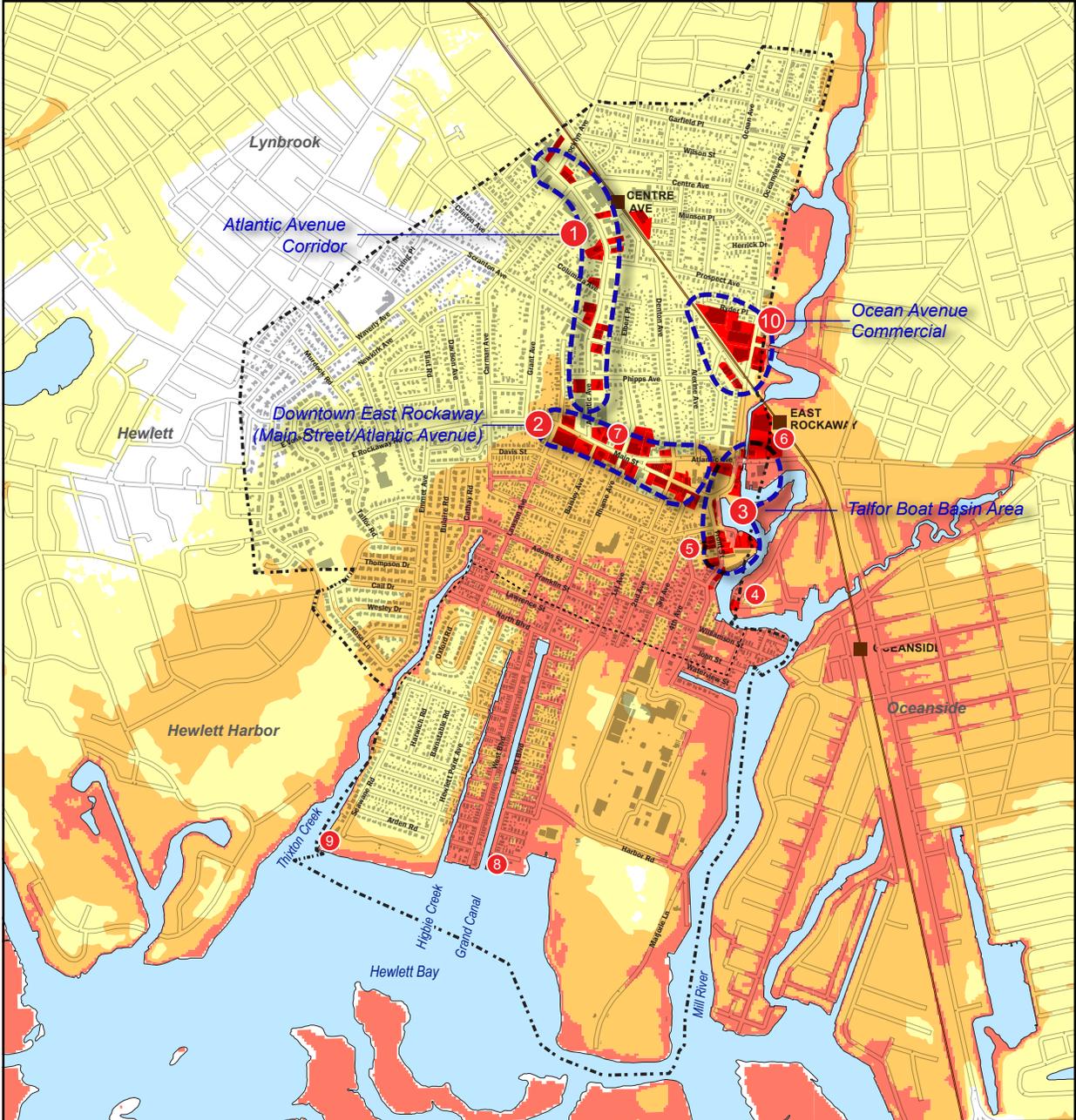
Figure 9: Economic Assets

1. Atlantic Ave Corridor
2. East Rockaway CBD (Main Street/ Atlantic Avenue)
3. Talfor Boat Basin
4. New Street Industrial
5. Front Street Economic Corridor
6. Pathmark
7. CVS
8. Woodmere Bay Yacht Club
9. Hewlett Point Yacht Club
10. Ocean Avenue Commercial

● Economic assets  
 DOS Risk Areas  
 Moderate High Extreme



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



## Bay Park and Village of East Rockaway

assistance, an amount totaling just under \$2.6 million—more than \$7 million less than the verified damage.

While most respondents reopened within three months, many are still suffering operating losses from continuing repairs, inventory replacement, and a loss of customers. The respondents feel that they would have been able to open sooner had they had quicker access to grant and insurance funds; lines of credit and fewer regulatory hurdles (e.g., Board of Health, Fire Marshall).

### **Economic Profile Summary**

A description of the economic profile of East Rockaway and Bay Park can be found in *Section V-E: Economic and Housing Profiles*. A summary of relevant details is listed below:

- East Rockaway and Bay Park are primarily bedroom communities. As of 2011, there were 1,852 jobs in the Community.
- Roughly one in every five jobs in the Community was held by a local resident (14.6 % from East Rockaway and 4.6% from Bay Park). The largest single share of workers (18.3%) travel to the Community from New York City.
- The number of employed residents has been on the decline since 2010, and is at the lowest level it has been in the last decade.
- Of the 5,358 employed residents, only 6.6% work in the Community. The largest share (39.8%) work in New York City.
- One in five (20.4%) Community residents make minimum wage.



*Retail along Main Street*



*Retail along Main Street*



*Retail along Atlantic Avenue*

**Health and Social Services Assets**

Health & Social Services assets provide critical services to residents and include schools, health care facilities, day care and elder care, government buildings, media and communications, and first responders such as police, fire, and rescue. Identified assets are shown in Figure 10.

East Rockaway Junior-Senior High School was heavily damaged and remained closed for six months after the Superstorm Sandy. Repair costs to the school were approximately \$10 million. Other public schools damaged included the Centre Avenue, Waverly Park, and Rhame Avenue Elementary Schools. The Rhame Avenue Elementary School re-opened in December 2012 with the exception of the gym that opened in March, 2013. The privately owned Rolling River Day School, located along the Mill River at Ocean Avenue was also damaged. There are no large medical facilities in the community, but some small medical offices were damaged and forced to relocate.

There are several health and social service assets in East Rockaway south of Main Street, which were severely inundated during Superstorm Sandy. This includes the U.S. Postal Service Office, East Rockaway Fire Department Engine 1 and Truck 1, East Rockaway Department of Public Works Facility, and the John Street Recreation Center, which provides after-school and weekend activities for young adults. According to the Committee, the area behind the Recreation Center was significantly damaged and debris remains on the property. There are ongoing mold



*East Rockaway Fire Department, Atlantic Avenue*



*East Rockaway DPW Municipal Garage*



*Rhame Avenue School, Bay Park*



*Rolling River Day Camp*

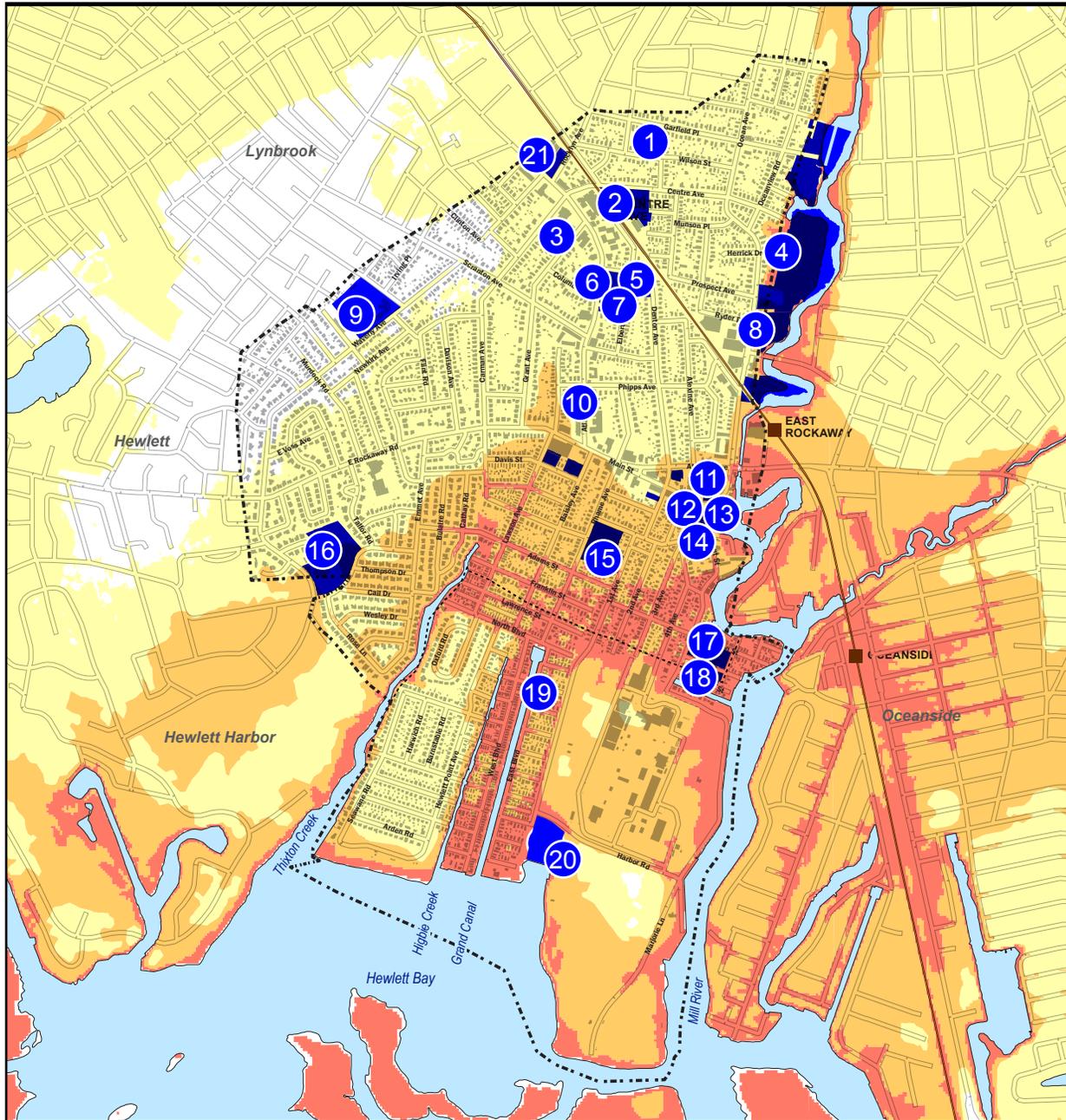
issues and mosquitoes have become a nuisance. The Jack and Jill Playland is out of business as a result of Superstorm Sandy and the property has been sold to the East Rockaway Fire Department.

The Village DPW Municipal Garage adjacent to the John Street Recreation Center was also inundated. Most of the vehicles and mobile equipment at the DPW was relocated to higher ground during Superstorm Sandy to avoid serious damage. The Town of Hempstead contracts with

the Village of East Rockaway for fire control services in Bay Park, and the Bay Park Fire District office building is only utilized for administrative purposes.

Other municipal assets located along Atlantic Avenue include East Rockaway Fire Department Houses 1 and 2, East Rockaway Village Hall, and the East Rockaway Senior Center.

Bay Park and Village of East Rockaway



**Figure 10: Health and Social Services Assets**

- |   |   |
|---|---|
| 1. East Rockaway FD Hose 2                | 11. US Post Office East Rockaway                  |
| 2. Centre Avenue Elementary School        | 12. East Rockaway FD Engine 1                     |
| 3. East Rockaway FD Hose 1                | 13. East Rockaway FD Truck 1                      |
| 4. East Rockaway High School              | 14. Former Jack & Jill Playland (now ERFD)        |
| 5. Haviland-Davison Grist Mill and Musuem | 15. Rhamé Avenue School                           |
| 6. East Rockaway Village Hall             | 16. Waverly Park School                           |
| 7. East Rockaway Senior Cit Center        | 17. East Rockaway DPW                             |
| 8. Rolling River Day School               | 18. John Street Rec. Center                       |
| 9. Marion Street School                   | 19. Bay Park Fire District                        |
| 10. Village of East Rockaway: Fire Dept.  | 20. Nassau County Police Department Marine Bureau |
|   | 21. East Rockaway Progressive Care                |

● Health and social services asset

DOS Risk Areas

Moderate
  High
  Extreme

0 450 900 1,800 Feet



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



## Housing Assets

According to the 2007-2011 American Community Survey (ACS) there were 4,514 housing units in the Community, 3,683 in East Rockaway and 831 in Bay Park. Of these units, only 225 were vacant. This yields an overall vacancy rate of 5%. The homeowner vacancy rate in East Rockaway was 1.2%, while the rental vacancy rate was 8.9%. In Bay Park, the homeowner vacancy rate was 4.9% and there were no vacant rental units. It is important to note that this data represents housing conditions prior to Superstorm Sandy. A discussion of Superstorm Sandy impacts related to housing can be found later in this section.

Sixty-one percent of housing units in the Community are traditional single-family detached, 21.7% are two-unit structures and 8.4% are large buildings with 20 units or more. Bay Park is the more traditional suburb in that it consists entirely of single-family homes. Many of the single-family homes in Bay Park are small Cape Cod style bungalows built following World War I (1918). Single-family housing types in both communities also includes ranch style and two-story homes. East Rockaway has a number of historic homes north of Main Street, some dating back more than 200 years.

Most of the multi-family residences are located along Atlantic Avenue. Some of these buildings were protected from the surge by the East Rockaway High School, others were flooded by Mill River and remain unoccupied. There is also a concentration of multi-family buildings (i.e., the Lindemere East and St. Regis Apartments) in the flood prone areas south of Main Street.



Single-family homes north of Main Street, East Rockaway



Multi-family building on Atlantic Avenue



Lindenmere Apartments, East Rockaway



Raising of single story home in Bay Park

## Housing Profile Summary

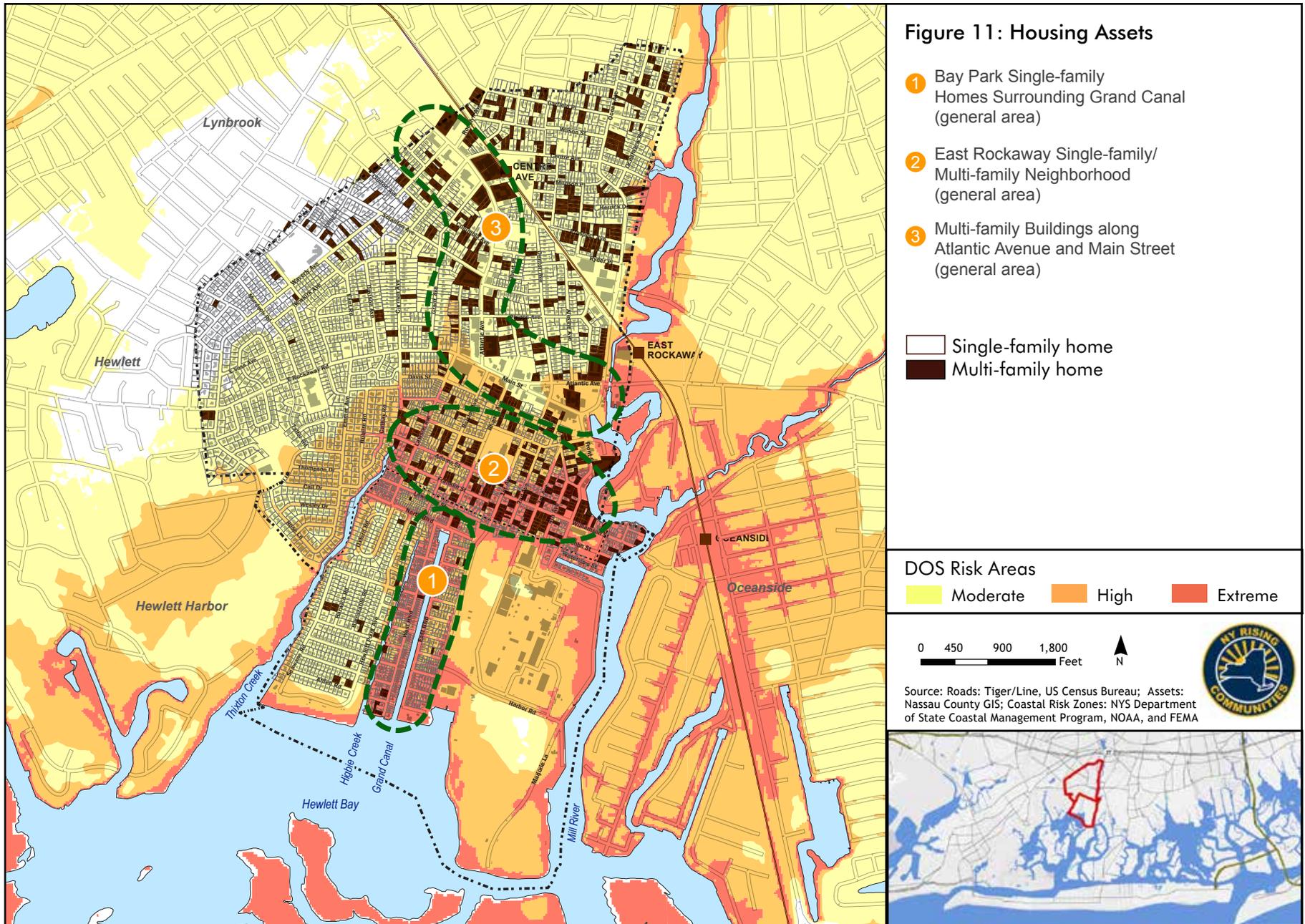
A detailed description of the economic profile of East Rockaway and Bay Park can be found in *Section V-E: Economic and Housing Profiles*. A summary of relevant is listed below<sup>20</sup>:

- The median housing value in East Rockaway was \$500,300, while the median value for housing in Bay Park was \$395,100(2011).
- The vast majority of the 4,289 occupied housing units are owner-occupied. The ownership rate in East Rockaway is 70.4%,

while the ownership rate in Bay Park is an even higher 80.2%.

- 95.9% of the housing stock was constructed before 1980. The majority of this housing, 82.4% for East Rockaway and 92.2% for Bay Park was constructed before 1960. The majority of rental units are in the northern tract of the East Rockaway--which includes the multi-unit structures surrounding the East Rockaway LIRR station as well as the Main Street and Atlantic Avenue corridors.

## Bay Park and Village of East Rockaway



- Of the 2,458 owner occupied units in East Rockaway, 68.5% had mortgages, while 65.8% of Bay Park’s 640 owner-occupied units had mortgages.
- As of 2011 one third of East Rockaway households (34.3%) and one quarter of Bay Park households (26.0%) were spending more than they could afford on housing.
- The number of foreclosures in 2012-2013 was 49 homes with a value of \$16.5 million.

**Table 2: Annual Foreclosure Filings and Values, Zip Code 11518**

	Filings	Values
2008-09	26	\$9,136,400
2009-10	41	\$13,915,546
2010-11	32	\$11,422,350
2011-12	28	\$15,856,232
2012-13	49	\$16,469,814

Source: Newsday

**Superstorm Sandy’s Impact on Housing**

The majority of housing in both communities (82.4% for East Rockaway and 92.2% for Bay Park) was constructed before 1960. Base Flood Elevations (BFE) were established in the 1970s and most building codes went into effect in the 1980s, leaving the vast majority housing not constructed to current standards. The aging single-family housing stock, especially the bungalow style homes are vulnerable as they have ground floors below BFE and have substandard structural reinforcement. Many of the home’s heating fuel tanks are unsecured.

The housing in the Village of East Rockaway on the Bay Park border as well as in Bay Park was the hardest hit by Superstorm Sandy. Walking through the West Boulevard area one year later (October, 2013), it’s obvious that foundations have been repaired so that the structures are habitable again, but very few have been, or are in the process of being raised in order to withstand future flooding events. Many homes are still vacant. While data is not available on the full number of homes damaged and destroyed, East Rockaway households received \$10.6 million in FEMA aid to households and \$2.2 million to renters. In addition, SBA provided \$20.8 million in home loans to small businesses; however, that is limited to replacement of pre-existing structures, not improvements related to resilience. Further government assistance for the raising of homes would have a beneficial impact in terms of resilience.

There has been almost no new construction or reconstruction. Data collected on the Village of East Rockaway by the US Census and NY State sources show that only two building permits have been issued for housing construction between November 2012 and October 2013. Both were single-family homes, with construction costs estimated from \$270,000 to \$300,000.

While relatively few for sale signs were visible, as of October, 2013, an extract from the Realtor.com multiple listing service, identified 86 homes for sale in the Community (see Figure 12). The listing price of these houses ranged from \$70,000 to \$1.1 million. The median price was \$383,000, a full 20% lower than the Census reported median price in 2011. The homes listed represent a reasonable 3.5% of the owner-occupied stock.



Multi-family building in East Rockaway

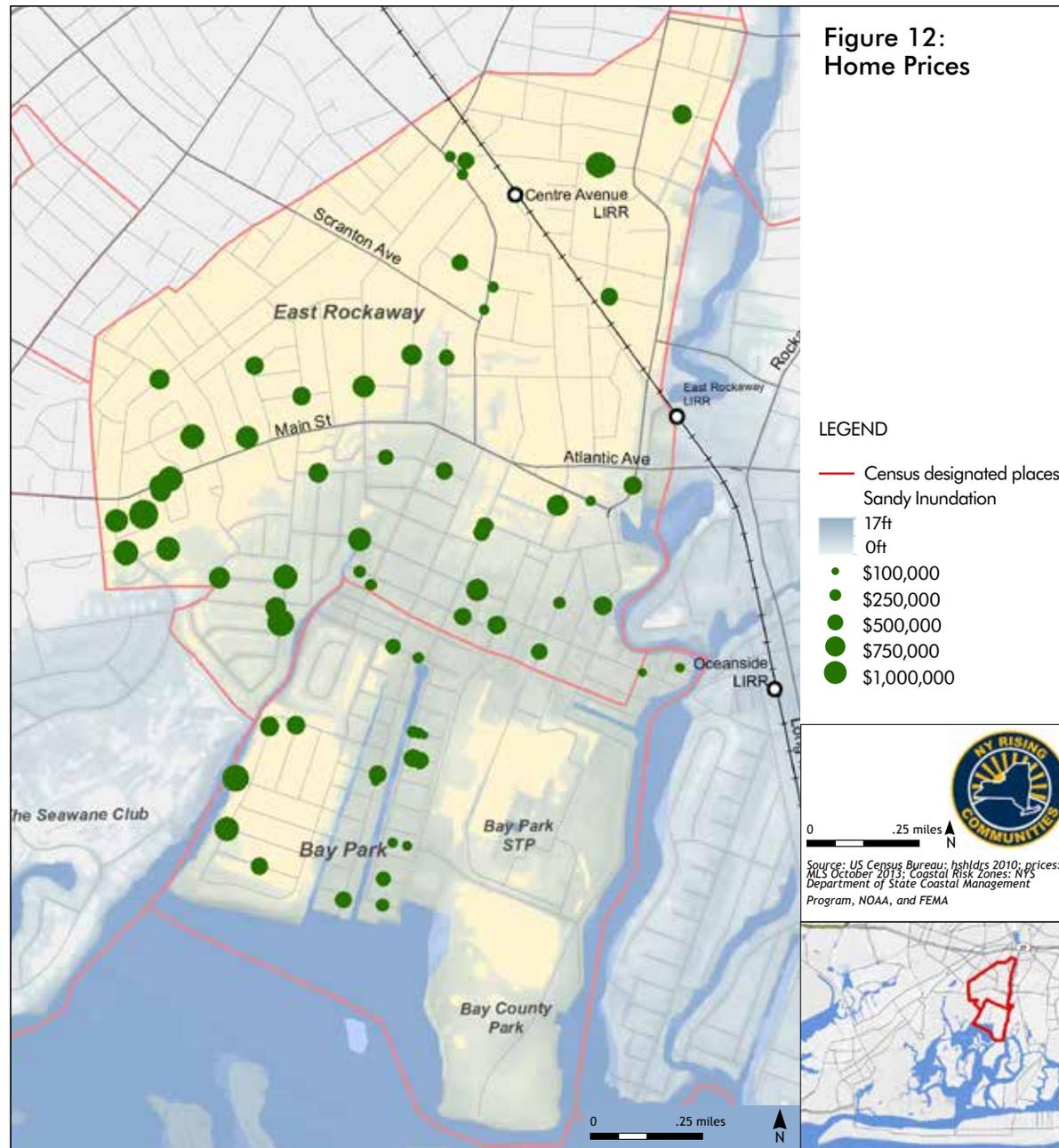


Single-family homes in Bay Park



Single-family homes in East Rockaway

## Bay Park and Village of East Rockaway



However, it should be noted that anecdotal information indicates that some owners who wish to sell are waiting until housing prices increase in the area.

To put current listings in context, data on the median sales price of single-family homes was collected from Long Island Newsday. The median sales price in East Rockaway rose from \$407,500 to \$427,288 (4.9%) between 2008 and 2010 when most Nassau County markets were in decline. However, after 2010, a slow decline began that was further exacerbated by Superstorm Sandy. The median sales price for October 2013 was \$315,000, down 13.1% from 2012, and \$70,000 lower than the October 2013 median list price.

There is no pre- post-storm data available on rental vacancies or lease rates, however anecdotal evidence from realtors is that there is very little rental vacancy and those are renting at higher rates due to demand from the displaced.

**Infrastructure Assets**

Infrastructure assets include transportation networks such as: roadways and transit; stormwater, wastewater and water supply distribution systems; gas stations; emergency and other communication systems; and, solid waste removal and recycling (Figure 13). The NYRCR Plan considers systems located within and outside of the Community to the extent that impairment of those assets due to flooding would affect community assets or functions.

The stormwater drainage system is a locally significant infrastructure asset, the condition of which is largely unknown. The stormwater system in some parts is more than 100 years old and records have been misplaced or never updated. Outfalls into waterways and canals can be blocked by tidal flow or become clogged with debris, which in combination with intermittent maintenance and the limited capacity of the system as a whole, causes the drainage system to backup. Lawson Avenue is subject to recurring flooding. Road raising has been noted by the Village Engineer to remediate the condition and is important to the Village. Since the storm, the sidewalk and bulkhead near 8th Avenue at Williamson Street are collapsing as they were likely undermined by tidal water.

The Nassau County Storm Water Management Program (NCSWMP) is a comprehensive program to reduce the levels of contaminants in Nassau County’s stormwater runoff and educate the public about their impacts on stormwater. The program depends on the participation of each municipality to manage the stormwater drainage system and reduce runoff. The Village of East Rockaway’s current efforts include:

- Updating digital mapping of the stormwater system;
- Water quality education in the schools; and,
- \$10,000 annual investment in maintenance, in which they use the prequalified contractor through Nassau County to clean out basins and pipes with a vacuum truck twice every year (once in the summer and once after the leaves fall). This maintenance focuses on problem areas such as Lawson Avenue as well as other areas throughout the Village that require cleaning/maintenance.

The Bay Park STP, built in the 1940s and upgraded in the 1980s, is the largest wastewater treatment facility in the County, treating 58 million gallons each day, and serves more than 550,000 residents which represent 40% of the population in Nassau County. Superstorm Sandy caused \$1.3 billion in damages. Bay County Park serves as a shore defense for the Bay Park STP during minor storm events; however, most of the community has minimal topography, landscape features, and defenses to buffer the Community from coastal storms.

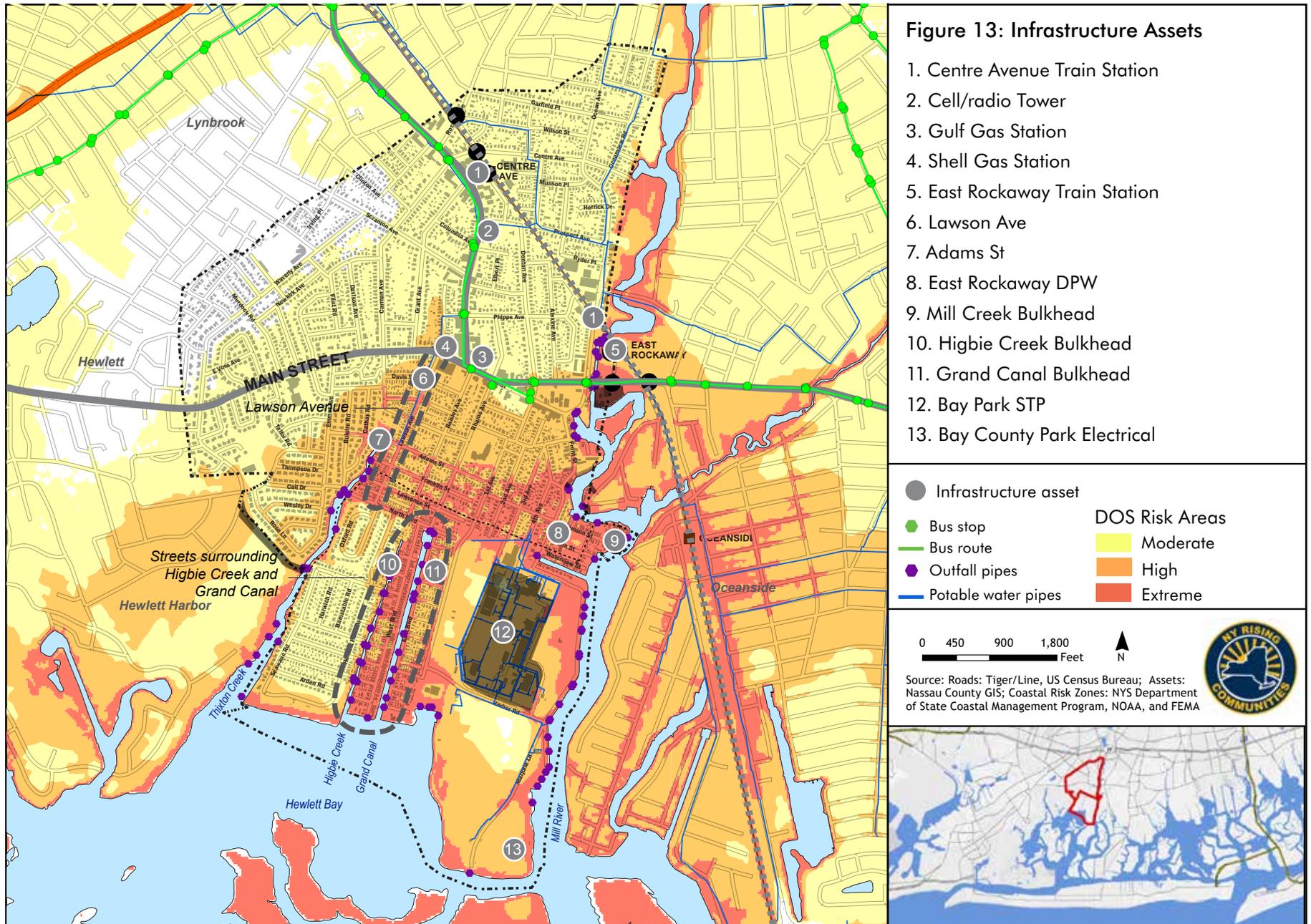
The Nassau Inter-County Express (NICE) #36 bus route runs through East Rockaway, providing service between Lynbrook and Freeport. Two LIRR stations, Centre Avenue and East Rockaway, are located within the Moderate Risk Area and did not suffer significant structural damage during Superstorm Sandy. Some local streets in Bay Park are in disrepair due to reoccurring nuisance flooding and the increased heavy

vehicle traffic from construction, refuse removal and additional service to the Bay Park STP (e.g., fuel delivery for diesel generators). Key roadways in the community include Atlantic Avenue, which provides access to Sunrise Highway to the north, and Main Street, which are also important retail corridors. Lawson Avenue is a key north-south corridor in East Rockaway, while East and West Boulevards are in Bay Park. North Boulevard is significant as it connects Lawson, East and West Boulevards. All four of these roadways were inundated during Superstorm Sandy, and Lawson Avenue experiences regular flooding during spring tides and precipitation events. Some local streets in Bay Park are in disrepair due to reoccurring flooding and the increased heavy vehicle traffic (e.g. construction and refuse removal vehicles).

Higbie Creek has intermittent bulkheads and is navigable up to Cook Street. The Creek’s natural functions have been impaired from failing bulkheads, erosion, sedimentation in the northern reach, debris in the waterway and widespread invasion of Phragmites in the canal. The eastern bulkhead of the Grand Canal was recently repaired and heightened by the Town of Hempstead. The western side of the Canal is privately owned and has not been upgraded since Superstorm Sandy.

It is important to note that flood and erosion defense works are not considered assets for the purpose of the asset inventory and risk assessment. For further discussion on bulkheads and exposure, see Section II-B.

## Bay Park and Village of East Rockaway



**Natural and Cultural Resources**

Natural and cultural resources include habitats, wetlands and marshes, parks, recreation facilities, open space, museums, libraries, historic landmarks, and religious establishments.

The surrounding embayment and tributaries are natural assets and include Mill River and Hewlett Bay, as well as the Higbie Creek and Grand Canal. Identified assets are shown in Figure 14. Natural and cultural resources assets contribute to environmental quality and public health. Street trees in the community help filter air pollutants, reducing illnesses such as asthma, and cool air temperatures, conserving energy. Trees, natural areas such as the community’s seven parks discussed below can reduce stormwater runoff and filter it before it reaches waterways, improving water quality. Further, these natural assets provide benefits such as increasing property values, neighborhood beautification, and traffic calming.

There are five parks in East Rockaway and two in Bay Park. East Rockaway’s parks include Memorial, Oxbow, McNulty, White Cannon Point, and Minore. White Cannon Point Park is located on the waterfront in an extreme risk zone at the Talfor Boat Basin. The boat basin was reconstructed and revitalized several years ago with partial funding from the NYS Environmental Protection Fund Local Waterfront Revitalization Program.

The two parks in Bay Park are Bay County Park and Hewlett Point Park. They are owned and operated by Nassau County and the Town of Hempstead, respectively. Bay Park features ball fields, a 9-hole golf course, picnic facilities and boating and fishing facilities. Since Superstorm Sandy, electric service and routine maintenance has not been restored



*Walkway along reconstructed Grand Canal Bulkhead, Bay Park*



*Talfor Boat Basin, East Rockaway*



*Bay County Park, Bay Park*



*Grand Canal, Bay Park*

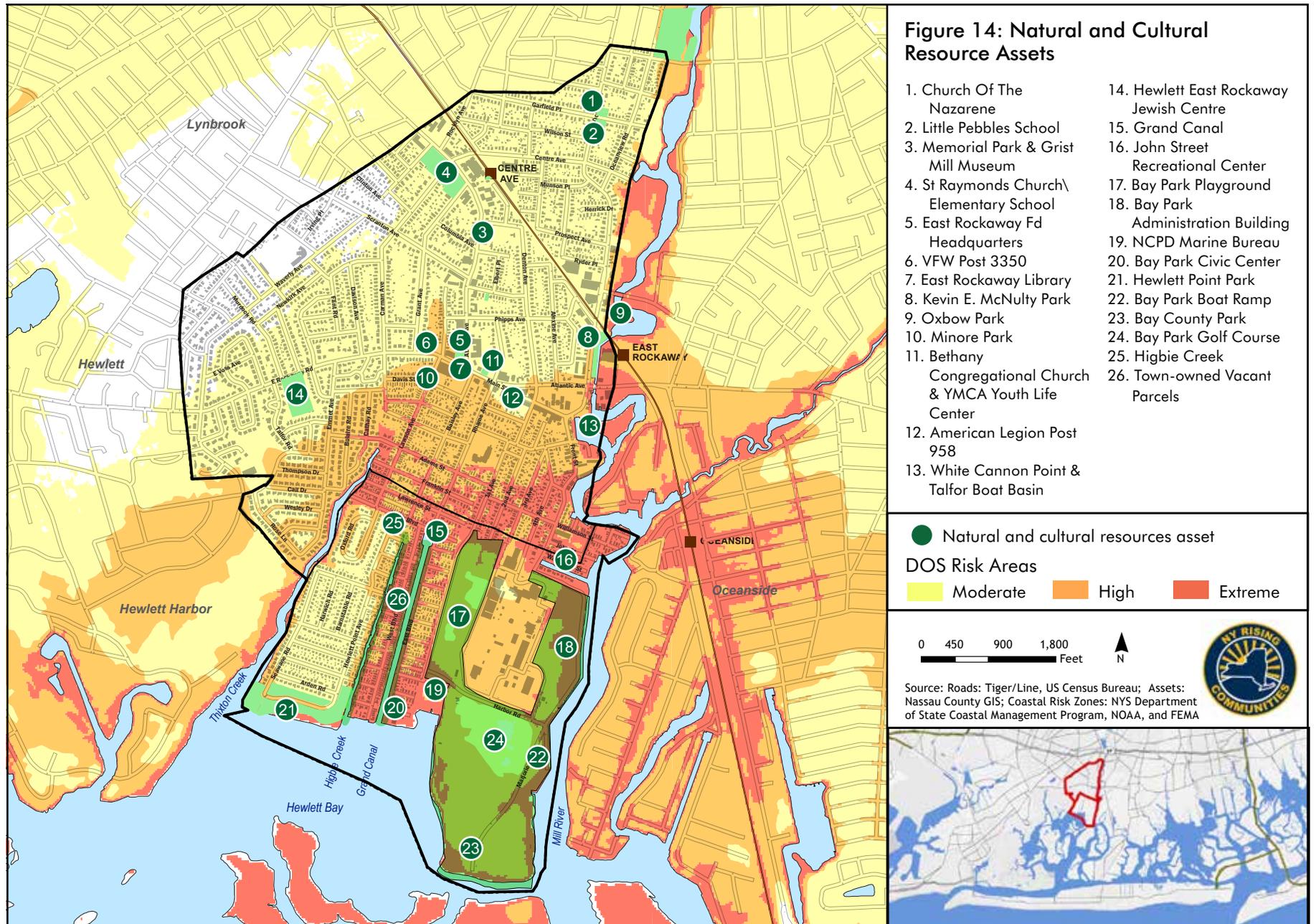
to the recreation facility or the lights at Bay Park County Park. Hewlett Point Park offers a pool, beach access and picnic facilities. The Town is working with USACE to dredge the bay and replenish the beach at Hewlett Point Park with sand. \$10 million will be supplied to help the Town as a whole for all beach replenishment. Town funds may be reimbursed by FEMA public assistance.

The majority of Bay County Park is located in the Moderate Risk Area given its higher elevation; however, most park facilities are located in the High Risk Area, including the playground, administration building, and boat launch ramp. Hewlett Point Park is located in a High Risk Area; however, during Superstorm Sandy the Town of Hempstead Department of Parks and Recreation successfully

floodproofed the pool house which served as a refuge and staging area after Superstorm Sandy.

Natural and cultural resources also include religious establishments such as Hewlett East Rockaway Jewish Centre, Bethany Congregational Church, St. Raymond of Penyafort Church, and the Church of Nazarene. Each of these faith-based establishments is located in the moderate risk area; however, their impacts varied during Superstorm Sandy. Bethany Church was inundated, while St. Raymond Church and the Church of Nazarene were not inundated and therefore were able to serve as Community Assistance Centers. The Havidland-Davidson Grist Mill in Memorial Park is a key historic asset.

# Bay Park and Village of East Rockaway



**Assets that Serve Socially Vulnerable Populations**

Assets that serve socially vulnerable populations include facilities that provide services for people with disabilities, low-income populations, the elderly, young children, and the homeless. Facilities providing services to elderly populations include the East Rockaway Senior Center and East Rockaway Progressive Care a nursing home facility (see Health and Social Services Asset Map). Both of these facilities are outside of the 100-year floodplain. Facilities that serve children include two day care centers and three elementary schools. The John Street Recreation Center also provides after school and weekend programming for young adults. The facilities identified above are described in further detail in the Health and Social Services and Natural and Cultural Resources sections. Figure 15 shows the percentage of socially vulnerable populations compared to the Town of Hempstead.

Bay Park/East Rockaway is considered to be a low to moderate income community. The NYRCR Plan uses a low income threshold of \$35,000 per household. According to the 2007-2011 ACS, 22% of households in East Rockaway make less than \$35,000<sup>21</sup>. The East Rockaway contains a greater share of low-income households than Bay Park. These populations are relatively dispersed. In East Rockaway, 6.1% of residents live below the poverty line, including 8.9% of those under age 18 and 5.4% of elderly residents (aged 65 years old or older). The Federal Government defines the poverty line as \$11,670 of income per year for an individual or \$23,850 per year for a family of four. No Bay Park residents are below the poverty line.

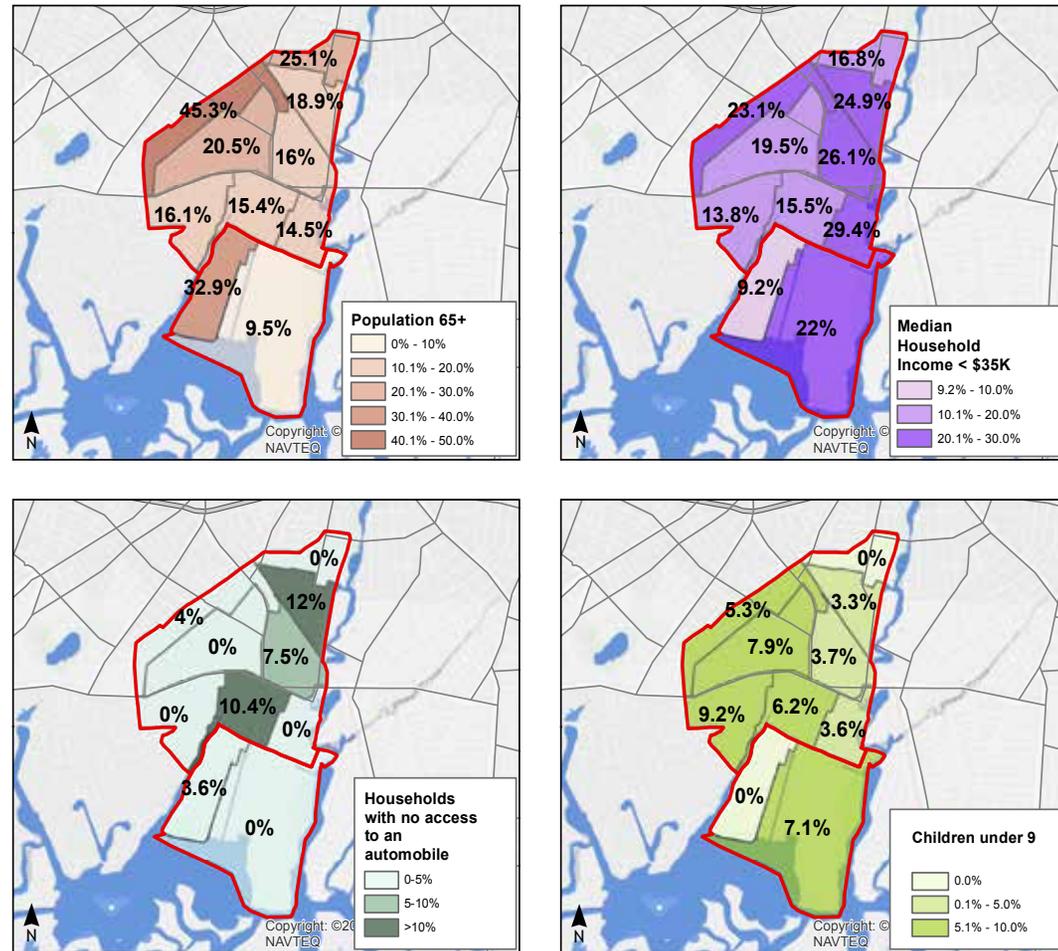


Figure 15: Socially Vulnerable Populations by CDP and Town

	Bay Park	East Rockaway	Town of Hempstead
Median Household Income	\$94,211	\$94,514	\$91,531
Median Household Income <\$35K	14.2%	22%	16.8%
Access to 0 Vehicles	1.6	7.5	8.1%
Population < 9 years old	6.9	12.1	12.1%
Population 65+	17.0%	14.6%	14%

Source: 2007-2011 American Community Survey (ACS)

## Bay Park and Village of East Rockaway

Figure 15 shows the concentration of elderly populations by Census Block Group (CDP). In East Rockaway, the highest concentration of elderly residents is in the north, which likely due to the availability of multi-family apartment buildings and the East Rockaway Progressive Care facility. Elderly populations in the remainder of the Village are somewhat evenly dispersed. In Bay Park, a third of the residents that live in the area between Higbie Creek and Thixton Creek are elderly. This area is vulnerable as it is located on a peninsula and all evacuation routes cross roads vulnerable to flooding. This presents a risk, even for those residents located above BFE. During Superstorm Sandy, all of the access roads leading out of this area were flooded leaving the area isolated and limiting emergency response capabilities. Many elderly residents who did not evacuate were trapped in their homes once the roads flooded and had to be rescued by firefighters.

Elderly residents (aged 65 and up) comprise 16% of the Community's population, which is slightly higher than the Town's percentage of elderly (14%). The bungalow style single-family homes, many of which are in Bay Park, tend to be relatively affordable and conducive to elderly homeowners. Many elderly residents have lived in the same house for decades. Of all households, 25.7% are headed by persons 65 or older. When looked at in terms of tenure, this is 28.1% of all owner-occupied households and 18.5% of all renter-occupied households. Broken down by CDP, this is 24.0% of Bay Park households, 26.1% of East Rockaway households.

The number of young children under the age of nine is relatively evenly distributed throughout the area and is generally low. In all portions of the planning area, less than 10% of the block group population is comprised of children under the age of nine. The area with the greatest share of young children (9%) is in western East Rockaway in the vicinity of Waverly Park School.

According to the 5-year ACS (2011), 100% of residents within the Community speak English well. Most residents in the Community have access to a vehicle, however, Figure 15 shows that in the area adjacent to the East Rockaway LIRR station, 10% of households do not have access to a vehicle. These homes are within walking distance of services and stores in the downtown area as well as the LIRR station, which provides access to regional employment and services, stores, civic organizations and religious institutions in the CBD.

### Critical and Locally Significant Assets

Special consideration was given to identifying critical or locally significant assets whose loss or impairment would compromise essential services. According to FEMA's Local Multi-Hazard Mitigation Guidance<sup>22</sup>, critical facilities are essential to the health and welfare of the whole population and are especially important following hazard events. Examples include emergency service facilities such as hospitals and other medical facilities, jails and juvenile detention centers, police and fire stations, emergency operations centers, public works facilities, generating plants and other principal point of utility lines, evacuation shelters, schools, and other uses that house special needs populations.

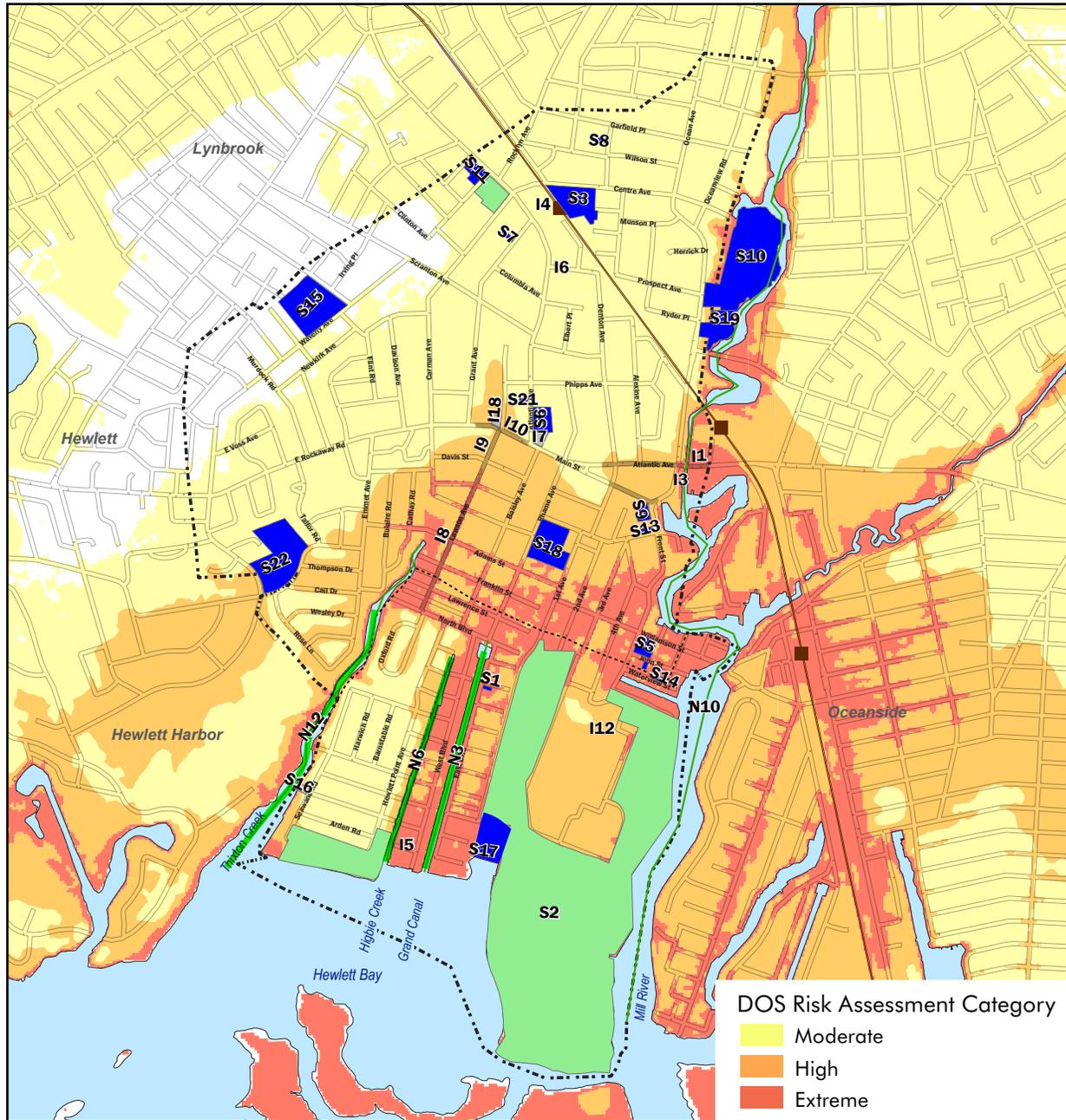
Critical facilities as defined by FEMA may not include the full range of assets considered critical by the Community. Therefore, the NYRCR Plan also identifies locally significant facilities that would be considered critical by other federal agencies, state and local officials, and the Committee. Together, these two 'tiers' of critical assets provide the Community with a more complete assessment of risk to important assets. Figure 16 illustrates the critical and locally significant facilities within Bay Park and East Rockaway.

### Assets with High Community Value

The preparation of the NYRCR Plan includes a participatory planning process to gain input from the Committee and the public. The Community value weighs highly in determining what assets the NYRCR Plan identifies for protection. Within the Risk Assessment Tool, 'community value' means the value of the asset to the community expressed as high, medium, or low. The following assets (shown in Figure 17) have a high community value:

- Assets noted as important to protect by the NYRCR Planning Committee and public;
- Critical facilities and locally significant facilities;
- Facilities that serve socially vulnerable populations;
- Key elements of infrastructure systems (e.g., gas stations and certain roadways);
- Emergency operations and response Facilities;
- Schools and community facilities; and,
- Significant economic assets.

# Bay Park and Village of East Rockaway



**Figure 16: Critical and Locally Significant Assets**

ID*	NAME	ID*	NAME
I1	Atlantic Ave (Extreme Risk area)	S5	East Rockaway DPW
I2	Atlantic Ave (High Risk area)	S6	East Rockaway FD Headquarters
I3	Atlantic Avenue Bridge	S7	East Rockaway FD House 1
I4	Centre Ave LIRR Station	S8	East Rockaway FD House 2
I5	Cook Street Pedestrian Bridge	S9	East Rockaway FD Truck 1 + Engine 1
I6	East Rockaway Village Hall Tower	S10	East Rockaway High School
I7	Gulf Gas Station	S11	East Rockaway Progressive Care (Nursing Home)
I8	Lawson Ave (Extreme Risk area)	S13	Former Jack & Jill Playland (ERFD)
I9	Lawson Ave (High Risk area)	S14	John Street Complex (Extreme Risk area)
I10	Main St	S15	Marion Street School
I12	Nassau County Bay Park STP	S16	N and R Fuel Oil Company Incorporated
I18	Shell Gas Station	S17	NCPD Marine Bureau
N03	Grand Canal	S18	Rhame Avenue School
N06	Higbie Canal	S19	Rolling River Day School
N10	Mill River	S21	Village of East Rockaway: Fire Dept.
N12	Thixton Creek	S22	Waverly Park School
S1	Bay Park Fire District		
S2	Bay Park Playground + Administration Building		
S3	Centre Avenue Elementary School		

\* The first letter of the asset ID designates the asset category (E = Economic, I = Infrastructure, H=Housing, S = Health and Social Services and V = Socially Vulnerable Populations)

**DOS Risk Areas**

Moderate
  High
  Extreme

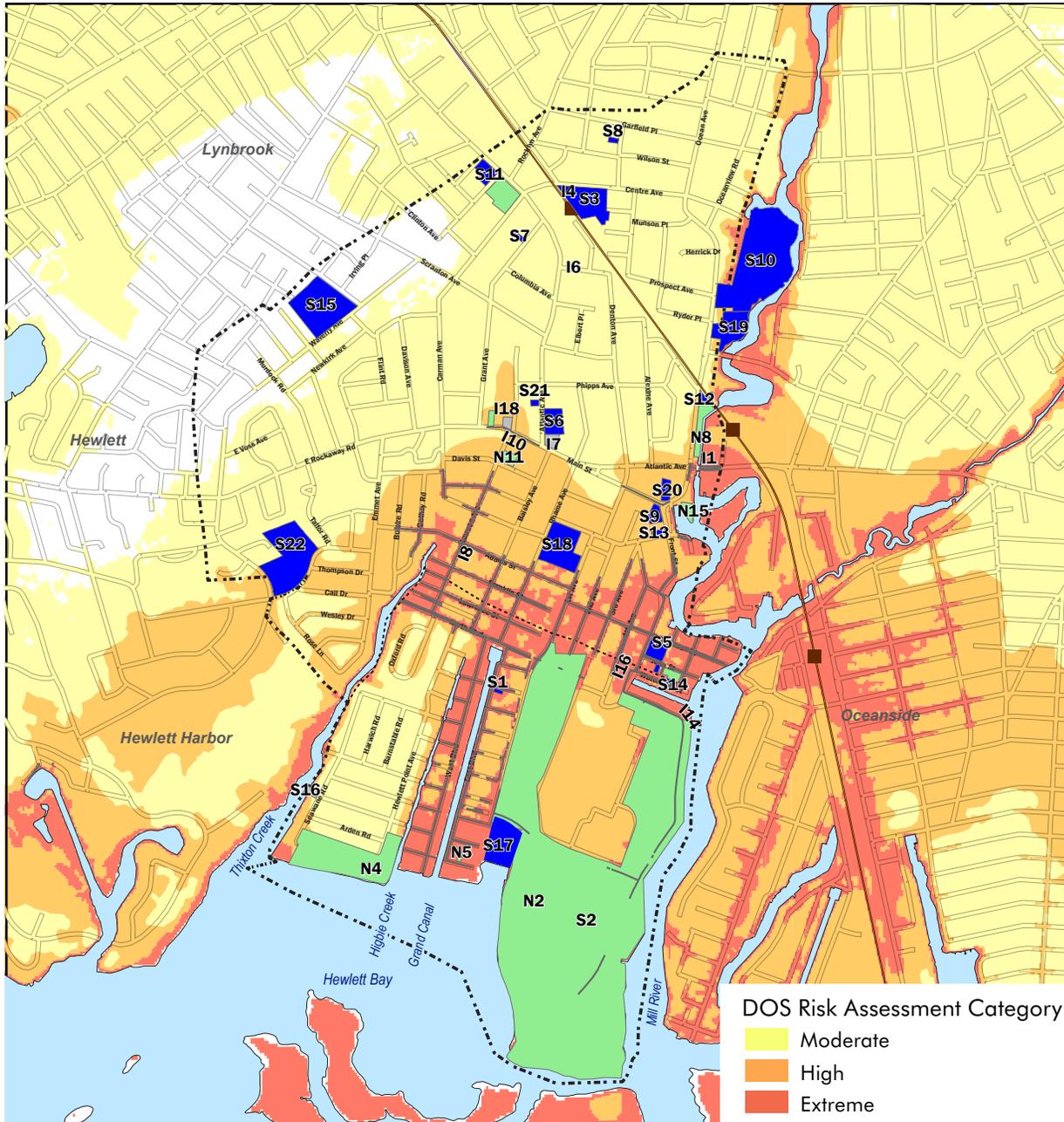
0 450 900 1,800 Feet

N



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



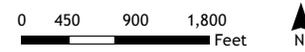


**Figure 17: Assets with High Community Value**

- |   |   |
|---|---|
| E08 Talfor Boat Basin                             | S03 Centre Avenue Elementary School               |
| I01 Atlantic Ave (Extreme)                        | S05 East Rockaway DPW                             |
| I04 Centre Ave LIRR Station                       | S06 East Rockaway FD Headquarters                 |
| I06 East Rockaway Village Hall Tower              | S07 East Rockaway FD House 1                      |
| I08 Lawson Ave (Extreme)                          | S08 East Rockaway FD House 2                      |
| I10 Main St                                       | S09 East Rockaway FD Truck 1 + Engine 1           |
| I14 Roadway Assets (Extreme)                      | S10 East Rockaway High School                     |
| I16 Sewer Pipe Assets (Extreme)                   | S11 East Rockaway Progressive Care (Nursing Home) |
| I18 Shell Gas Station                             | S12 East Rockaway Village Hall / Senior Center    |
| I70 Gulf Gas Station                              | S13 Former Jack & Jill Playland                   |
| N02 Bay Park Field #3/Bay Park Golf Course        | S14 John Street Complex_extreme                   |
| N04 Hewlett Point Park                            | S15 Marion Street School                          |
| N07 John Street Recreational Center (Extreme)     | S16 N and R Fuel Oil Company Incorporated         |
| N08 Kevin E. McNulty Park                         | S17 NCPD Marine Bureau                            |
| N1 Bay Park Boat Ramp                             | S18 Rhome Avenue School                           |
| N11 Minore Park                                   | S19 Rolling River Day School                      |
| N15 White Cannon Point Park                       | S20 U S Post Office East Rockaway                 |
| N5 Bay Park Civic Center                          | S21 Village of East Rockaway: Fire Dept.          |
| N9 VFW POST 3350/ Knights of Columbus             | S22 Waverly Park School                           |
| S01 Bay Park Fire District                        |   |
| S02 Bay Park Playground + Administration Building |   |

**DOS Risk Areas**

- Moderate
- High
- Extreme



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



**DOS Risk Assessment Category**

- Moderate
- High
- Extreme

## B. Assessment of Risk to Assets and Systems

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### **Quantifying Risks: Coastal Hazard and Risk Assessment Tool**

The risk to each asset has been quantified using the Coastal Hazard and Risk Assessment Tool developed by the NYSDOS. This risk assessment tool provides a baseline risk score for each asset group. Understanding the assets with the highest risk was used to identify projects and reconstruction strategies that can protect assets at risk. The reduction in risk score caused by implementing a potential project will be a key determinant of the risk-reduction benefit generated by that project. *Section V-D: Community Asset Inventory and Risk Assessment* provides a detailed explanation of Coastal Hazard and Risk Assessment Tool for the Community along with risk scores for each asset.

For the purposes of the Risk Assessment Tool, the *asset inventory and risk assessment was limited to critical or locally significant assets within the NYRCR Community*, and all assets within extreme and high risk areas, according to NYSDOS Risk Mapping.

Assets within the Tool are grouped by:

- Asset Category
- Systems, noting key elements of each system (e.g., "Roadway Network" and "Lawson Ave.")
- Location (i.e., municipality, close proximity)
- Similar Exposure and Risk Characteristics (e.g., NYS Risk Area)

Unless stated otherwise, 'assets' within subsequent text and figures refer to assets included in the Asset Inventory Tool, limited and grouped as described above.

Risk is an expression of *hazard*, the likelihood and magnitude of a future storm, *exposure*, or the moderating effect of topographic and shoreline features, and *vulnerability*, the ability of an asset to resist damage from a future storm event for each group of assets. These terms are explained below. The Risk Score for each group of assets is determined by multiplying its hazard, exposure and vulnerability values.

#### **Risk = Hazard x Exposure x Vulnerability**

The Coastal Hazard and Risk Assessment Tool automatically generates this risk score, which represents the relative risk of the community. Risk scores include some subjective analysis and should not be compared from one community to another. Risk scores can range from 1.5, the lowest score reflecting negligible or 'residual' risk, to 75, the highest score reflecting severe risk. These ranges are broken down as follows:

*Residual (Risk Score <6)*: Residual risk scores result from both low exposure and vulnerability, however if assets are critical or have a very high community value, actions may be warranted to reduce their risk.

*Moderate (Risk Score 6 - 23)*: A moderate risk score represents that the assets may suffer moderate to serious storm impacts, but that

adaptation may be of a lower priority because either exposure or vulnerability are low.

*High (Risk Score 24 - 53)*: Risk scores in the high range are indicative of conditions that could lead to significant negative impacts from a storm, and actions should be taken to reduce the assets' vulnerability and restore the assets' coastal protections.

*Severe (Risk Score >53)*: A severe risk score represents that the assets are in a dangerous situation and that both exposure and vulnerability should be reduced.

Risk scores help identify assets with increased potential for storm damage and serve as one of many factors that helped the Committee to determine the potential projects to include in the NYRCR Plan; see Section IV for further discussion on projects. In addition to the risk score, other contributing factors in determining which assets should be addressed and how immediately they should be addressed include:

- The assets' contribution to life safety;
- If the asset(s) are critical or locally significant;
- The assets' community value;
- Environmental services provided by the assets;
- Economic contribution of the assets;
- Availability or alternative assets or facilities; and,
- The capacity of the assets to adapt.

**Hazard**

Hazards are storms that are typical for the region, not an unlikely or unpredictable event. In general, Bay Park-East Rockaway face three types of hazards:

- Frequent, low intensity events that are typical storms for the region, such as flooding within the 100-year floodplain. Due to poor stormwater drainage, average rainfall events have resulted in ponding on some roadways and localized flooding;
- Infrequent, high intensity events such as a hurricanes and flooding from tidal storm surge; and,
- Long-term flooding risks from coastal erosion, land subsidence and sea level rise.

As the magnitude of storm events increases as the likelihood decreases (i.e., 100 year storms have higher magnitude than 10 year storms), the corresponding hazard score increases as the likelihood decreases. The hazard scores are defined in the table to the right.

The NYRCR Program selected a 100-year storm (1% annual chance of occurring) as the sample event for calculating risk scores. Other events could also be selected, which would yield a different range of scores. This could be useful for future planning initiatives. According to the NYRCR Program Guidance, the hazard score for a 100-year event is three (3), which is therefore the hazard score noted for all assets in the risk assessment.

Very likely or expected to occur. Low intensity event.	>90% probability of occurring
Likely to occur. Moderate intensity event.	66-90%
About as likely as not (possible). High intensity event	33-66%
Unlikely to occur. Very high intensity event	10-33%
Highly unlikely, but conceivable. Extreme intensity event.	1-10%

**Exposure**

Bay Park-East Rockaway location along Hewlett Bay and Mill River is highly exposed to coastal and riverine flooding. As demonstrated by Superstorm Sandy’s inundation, low-lying areas south of Sunrise Highway are exposed. Exceptions to this are areas between Hewlett Point Avenue and Seawane Road, as well as the high point in Bay County Park and the northern portion of the Bay Park STP property.

Exposure is an expression of the local topographic and shoreline conditions that tend to increase or decrease the effects of coastal hazards on assets. Exposure is determined by evaluating landscape attributes, which are features of the landscape that lie between an asset and the source of floodwaters, which may reduce the exposure of the assets to flooding.

The following landscape attributes were evaluated for each group of assets:

**Shoreline Erosion Rate:** Assets located where the long-term average erosion rate is one foot or more per year, or unknown. Erosion is defined by

FEMA as collapse, undermining, or subsidence of land along the shore of a lake or other body of water, and is in this case limited to coastal erosion for the purposes of the Coastal Hazard and Risk Assessment Tool. Storm impacts may increase on shorelines with high erosion rates, as development on an eroding beach can heighten risk from wave impacts and storm surge. As Bay Park and the East Rockaway are not identified as a Structural Hazard Areas on the Coastal Erosion Hazard Area (CEHA) maps (or located on the Long Island Sound) erosion rate for all assets (100% of asset inventory) is assumed to be less than one foot per year according to the New York State guidance (Source: Nassau County Hazard Mitigation Plan 2007; New York State DEC Coastal Erosion Hazard Area maps, 1988).

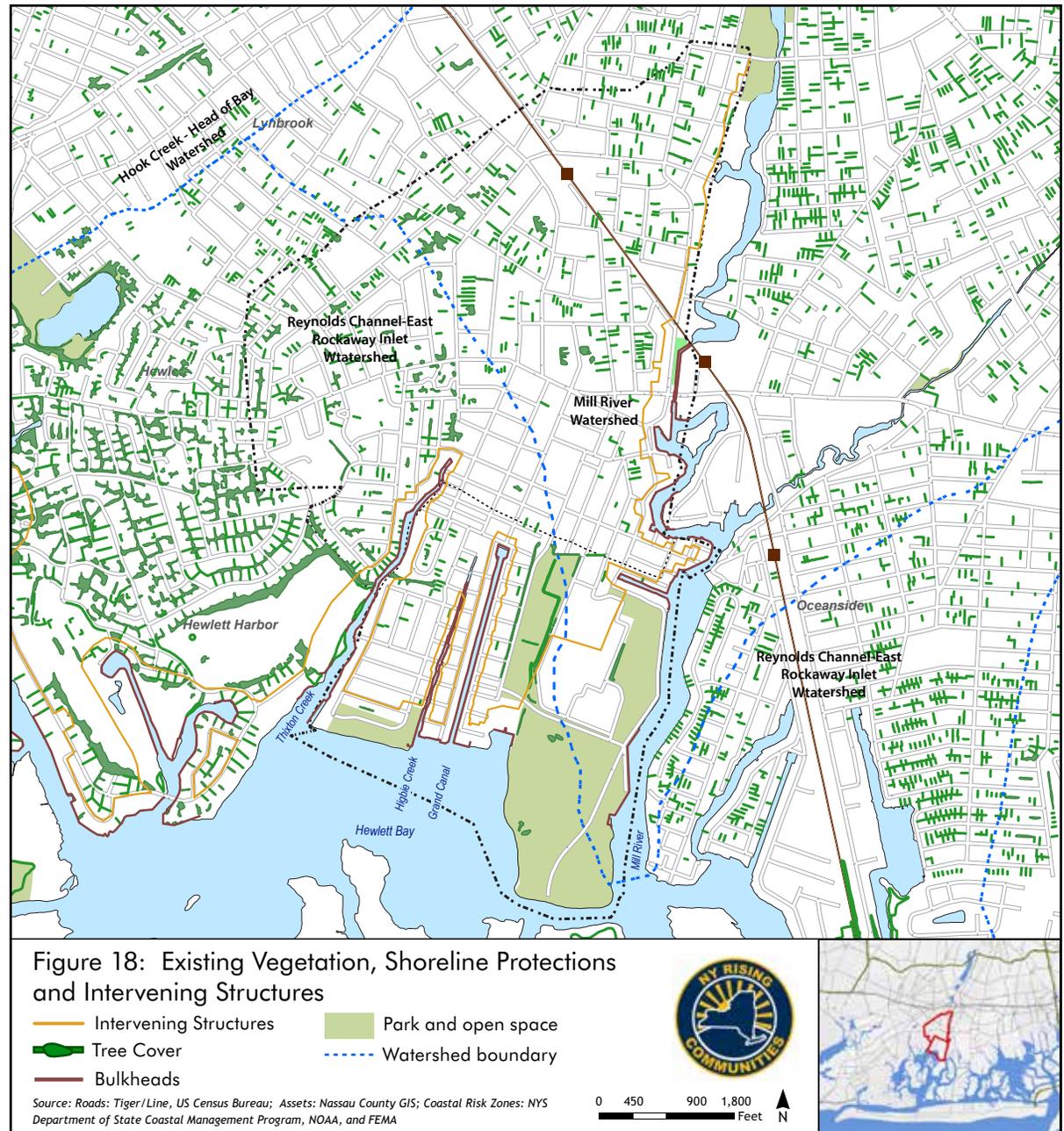
**Beach Width:** Assets located where the water line is frequently in contact with shore defense structures (e.g., bulkheads) or upland vegetation. Wide beaches and shallow water can lessen waves and surge. The water line is in frequent contact with shore defense structures for assets in all of East Rockaway and the majority of assets in Bay Park (95% of asset inventory). Two beaches in Bay Park, Hewlett Point Park and the Woodmere Bay Yacht Club, protect assets (5% of asset inventory) along Hewlett Point Avenue and Cook Street, respectively (Source: Aerial Photography, Google Earth 2013).

**Shore Defenses:** Assets that are not protected by shore defenses, or where shore defenses are deteriorating or not constructed to anticipated storm or sea level rise conditions. Shore defenses such as bulkheads, seawalls, breakwaters and revetments may reduce the effects of incoming surge and wave energy on an asset, barring

## Bay Park and Village of East Rockaway

that the asset is above base flood elevation. Shore defenses in Bay Park and East Rockaway are limited to bulkheads, which are often lower than the adjacent land that they are intended to protect, such as along the Higbie Creek. Further, bulkheads are deteriorating or not present in most areas, and existing shore defenses are not constructed to anticipated storm events. Therefore, according to NYRCR Program Guidance, shore defenses are assumed to be absent for the all assets (100% of asset inventory). Adequate bulkheads, those which are not deteriorating and are constructed to anticipate future storm conditions, exist only along the eastern side of the Grand Canal, which was rebuilt by the Town following Superstorm Sandy. However, given that only one side of Grand Canal has adequate bulkheads, rather than contiguous bulkheads along the entire canal, the risk reduction benefits of these bulkheads are assumed to be negligible for the purposes of the Coastal Hazard and Risk Assessment Tool. Figure 18 illustrates existing shoreline protections.

**Vegetation:** Locations where protective vegetation (i.e., dense shrubbery or forested land cover at least 300 feet in depth from the flood source), wetlands, or intervening structures between asset and flood sources are absent. Vegetation can reduce flood and erosion impacts, especially dense vegetation which can influence wind speeds and water flow velocity. Conversely, assets built on filled wetlands may experience increased flooding and erosion. Assets located along the coastline in Bay Park and along Mill River in the Village of East Rockaway (51% of asset inventory) do not have substantial vegetation, wetlands or intervening structures protecting them from a flood source, while those inland have protection



## Assets and Risks

### Economic Asset Risk Assessment

Assets and risk assessment data were spatially overlaid with the FEMA Extreme, High and Moderate Risk Areas to determine the vulnerability of existing commercial parcels in East Rockaway. The vast majority of commercial parcels (98%) and commercial assessed property value (99.2%) for tax purposes are in the three risk areas – Extreme, High and Moderate. More than 20% of all commercial parcels are located in Extreme Risk Areas and account for 12.9% of total commercial assessed value. More than 23% of parcels are in High Risk Areas and account for 26.0% of total assessed value. More than half (54.5%) of the properties are in the Moderate Risk Areas, which accounts for 60.3% of total, assessed value. As witnessed with Superstorm Sandy, this means that in an event with a similar impact, the vast majority of commercial properties are likely to sustain some damage and could be destroyed, as evidenced by fact that 40% of the vacant parcels in the Community are in the Extreme Risk Zone (Nassau County Land Use and assessment data, 2012-13 and FEMA Risk Maps). Figure 19 illustrates the risk of each group of Economic Assets included in the Asset Inventory and Risk Assessment.

Economic assets at severe risk include the Ocean Avenue and Front and Main Street retailers, as well as the New Street industrial area, located along Mill River north and south of the Davison Plaza and Ocean Ave intersection, are in the Extreme Risk Area, given their proximity to the River. The majority of the Talfor Boat Basin and

from intervening structures<sup>23</sup>. Figure 18 illustrates existing vegetation and intervening structures.

**Dunes or Bluffs:** Assets that are not protected by dunes or bluffs because either dunes are absent, below base flood elevation, eroding, discontinuous, or have little vegetation, and bluff slopes are unstable, partially vegetated. Dunes can absorb wave energy, with continuous vegetated dunes elevated above the base flood elevation having the greatest benefit, No dunes or bluffs are present in Bay Park and East Rockaway, therefore all assets (100% of asset inventory) are not protected.<sup>24</sup>

**Soils:** Assets that are located on a coastal barrier island or filled wetland. The majority of assets within Bay Park are located on a filled wetland (54% of asset inventory), according, while nearly half of assets within East Rockaway are located on a filled wetland. Source: USGS maps, 1903; NOAA maps, 1929; Aerial Photography, Google Earth, 2013).

The resulting exposure score for each group of assets considers the risk area in which the asset is located and the landscape attributes that influence the assets’ potential for storm impacts, as described above. Assets that are closer and more exposed to hazards are at greater risk than those that are less exposed.

### Vulnerability

Vulnerability is an expression of an assets’ ability to return to service after a storm. Vulnerability relates to both the assets’ material strength relative to the coastal hazard and its regenerative capacity. Based on feedback from the Committee

and the public, a vulnerability score was defined for each group of assets as follows:

- *Insignificant:* Limited Interruption;
- *Minor:* Service loss of less than 1 week;
- *Moderate:* Service loss 1-4 weeks;
- *Significant:* Service loss greater than 1 month; and
- *Major:* Permanent loss.

Vulnerability scores were subsequently confirmed by the Committee.

The community of Bay Park and East Rockaway is extremely vulnerable, as most assets south of Main Street or adjacent to the Mill River are not elevated above Base flood Elevation (BFE), which is the elevation associated with the 100-year flood (1% chance of occurrence in any given year). These areas may be subject to direct wave action and storm surge. Most assets south of Sunrise Highway are vulnerable to storm drainage flooding that occurs when runoff is prevented from exiting the system when high tide waters enter the system. Further, the community remains vulnerable to sewer backups in the event of another failure at the Bay Park STP.

The aging housing stock is vulnerable as ground floors were built too low (below the BFE), foundations are inadequately anchored, and home heating fuel tanks are often unsecured. Most of these homes were built before the BFE was established. Roadways are also vulnerable to flooding, which impedes emergency access and evacuation routes along key north-south corridors.

# Bay Park and Village of East Rockaway

Figure 19: Risk to Economic Assets

Asset ID <sup>30</sup>	Asset	Risk Score
E7	New St Economic Corridor_Extreme	Severe risk (>54)
E9	Woodmere Bay Yacht Club	Severe risk (>54)
E1	Atlantic Ave/Ocean Ave Economic Corridor_Extreme	High risk (24-53)
E5	Hewlett Point Yacht Club	High risk (24-53)
E4	Front St Economic Corridor_High	High risk (24-53)
E3	Front St Economic Corridor_Extreme	High risk (24-53)
E2	Atlantic Ave/Ocean Ave Economic Corridor_High	High risk (24-53)
E8	Talfor Boat Basin	High risk (24-53)
E6	Main St Economic Corridor_High	Moderate risk (6-23)

### Risk Assessment Score

■ Severe risk (>54)    
 ■ High risk (24-53)    
 ■ Moderate risk (6-23)



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



**Table 4: Assessed Land Value by Risk Zone**

		Share of Parcels	Share of Land Value	Share of Total Assessed Value
<b>Extreme</b>	Total Commercial	20.1%	14.5%	12.9%
	Office	0.0%	0.0%	0.0%
	Retail	16.4%	9.6%	11.9%
	Mixed Use	17.8%	12.8%	10.3%
	Industrial	25.0%	26.0%	20.4%
	Vacant Commercial/Industrial	58.3%	67.3%	67.8%
<b>High</b>	Total Commercial	23.4%	26.6%	26.0%
	Office	20.0%	30.8%	21.2%
	Retail	25.4%	32.6%	29.4%
	Mixed Use	24.4%	26.3%	32.5%
	Industrial	25.0%	14.2%	14.4%
	Vacant Commercial/Industrial	8.3%	1.0%	1.0%
<b>Moderate</b>	Total Commercial	54.5%	57.7%	60.3%
	Office	80.0%	69.2%	78.8%
	Retail	58.2%	57.9%	58.7%
	Mixed Use	57.8%	60.9%	57.2%
	Industrial	50.0%	59.8%	65.3%
	Vacant Commercial/Industrial	8.3%	0.5%	0.5%

Source: Nassau County Land Use and 2012-13 Assessment data and FEMA Risk Maps

the vulnerability of existing commercial parcels in East Rockaway (see Table 4). The vast majority of commercial parcels (93.2%) and value (94.3%) are in Extreme or High Risk areas. Just more than 20% of all commercial parcels and 12.9% of total commercial assessed value are located in Extreme Risk areas. 23.4% of parcels and 26.0% of total assessed value are in High Risk areas; while more than half (54.5% of parcels and 60.3% of all value) are in Moderate Risk areas.

The data in Table 4 shows that in an event with the impact of Superstorm Sandy, the vast majority of commercial properties are likely to sustain at least some damage, or potentially destroyed. This is evidenced by the share of vacant parcels in the Extreme Risk area. Vacant parcels do provide potential opportunities to diversify the commercial base. This is especially true in the Talfor Harbor area, which is a prime location for a destination mixed use development near the Fisheries Restaurant as well as the New Street site, assuming the area could be developed in such a way as to minimize susceptibility to flood waters.

the east side of Front Street are located partially in Extreme and High Risk Areas, while the west side is in a Moderate Risk Area. The Cook Street Economic Corridor and nearby Hewlett Point Yacht Club are located in an Extreme Risk Area.

south side of the roadway classified at high risk, while those on the northern side of the roadway are at moderate risk. The LIRR stations are also at high risk as an economic asset critical to the local economy as well as an infrastructure asset.

Atlantic Avenue extending west of Main Street toward Mill River is in the High Risk Area. The entire length of Main Street is considered at risk for future storm events, with businesses along the

**Risk Areas and Development Potential**

Using ArcGIS, the land use and assessment data were spatially joined to the FEMA Extreme, High and Moderate Risk Area overlays to determine

## Bay Park and Village of East Rockaway

### Health and Social Services Risk Assessment

Figure 20 illustrates the risk of Health and Social Services assets included in the Asset Inventory and Risk Assessment. The Bay Park Fire District building, located on Court Street, is at severe risk for future inundation. This building is only utilized for administrative purposes as Bay Park contracts East Rockaway for fire control services.

The majority (82%) of the health and social services assets are categorized as high risk (Figure 20). Emergency operations & response facilities that receive high risk scores include East Rockaway's Fire Department / Headquarters located on Atlantic Avenue, the Fire House on Clark Street, and Truck 1 / Engine 1 on Front Street. The East Rockaway High School, Rolling River Day School, and Rhame Avenue Elementary School are educational facilities with high risk scores. The East Rockaway DPW facility, Bay Park Playground Administration Building and the John Street Recreational Complex are other municipal facilities at high risk. The DPW facility is considered critical under FEMA standards and has a high community value; therefore, hardening the DPW is important to the Committee.

There are some public facilities at a lower risk level, located in the northern portion of the Village. These assets include the East Rockaway Fire Houses on Grant Street, East Rockaway Village Hall, East Rockaway Senior Center, and East Rockaway Progressive Care Nursing Home, which are all classified at moderate risk for future storm events.

### Housing Risk Assessment

Of the 4,452 occupied housing units that existed in the in Community In 2011, 12.2% were located in Extreme Risk Areas, 26.0% were in High Risk Areas, and 61.8% were in Moderate Risk Areas. When looked at in terms of risk area distribution by tenure, there is a disproportionate share of renters in the Extreme Risk Area (16.7 % of all renters, compared to 12.2% of all units). As renters generally have lower incomes than home owners, this is indicative of a relatively vulnerable population being more at risk than most residents. Looking at the same information in a slightly different manner, 74.3% of all units were owner-occupied in the area as a whole. The Extreme Risk Area had the lowest rate of ownership at 64.9%, compared to 73.9% in the High Risk Area and 76.4% in the Moderate Risk Area. Roughly two thirds of the total properties (66.3%) had mortgages. The higher the risk category, the more likely owners were to have mortgages. Mortgage rates were 70.0% in the Extreme risk zone, 69.4% in the High Risk Area and 64.4% in the Moderate Risk Area.

Parcel data received from Nassau County demonstrates that three categories of four residential land uses (high density residential (5+family structures), medium residential (2-4 family structures), and vacant residential (clear parcels zoned for residential use) are at greater risk than single family residential areas. A disproportionate concentration of high residential parcels (72% of all parcels) lie in the Moderate Risk Area. Medium residential property is concentrated in the extreme (15.2% of all parcels) and High Risk Areas (30.1% of all parcels). Vacant residential parcels are concentrated in

the Extreme Risk Areas, perhaps because of the potential risk of flooding.

Median housing value was obtained for the Census tracts for 2011, the most recent data available. These values were then distributed by majority area to each risk zone. Housing values in the Moderate Risk zone were \$493,300, or 7.9% higher than the median value in the High Risk Area. A review of a recent (October 9, 2013) extract from the Realtor.com multiple listing service identified there were 86 homes for sale. Of these, the median price was \$383,000, 20% lower than the Census reported median price (2011).

When considering future housing demand under the circumstances, it is necessary to determine the level of risk for new and existing households. It is also necessary to look at where housing is located in terms of its value on the municipal tax rolls. Looking at the parcel data received from Nassau County, the share of all residential parcels and value by density are shown in Table 5.

Of the occupied units in East Rockaway and Bay Park in 2010, 12.2% were located in Extreme Risk Areas, while 26.0% were in High risk areas and 61.8% were in Moderate risk areas. When looked at in terms of risk area distribution by Tenure, it is easy to see that there is a disproportionate share of renters in the Extreme risk area (16.7 % of all renters, compared to 12.2 % of all units).

Looking at the same information in a slightly different manner, 74.3% of all units were owner-occupied in the Community as a whole. The Extreme risk area had the lowest rate of ownership at 64.9%, compared to 73.9% in

Figure 20: Risk to Health and Social Services Assets

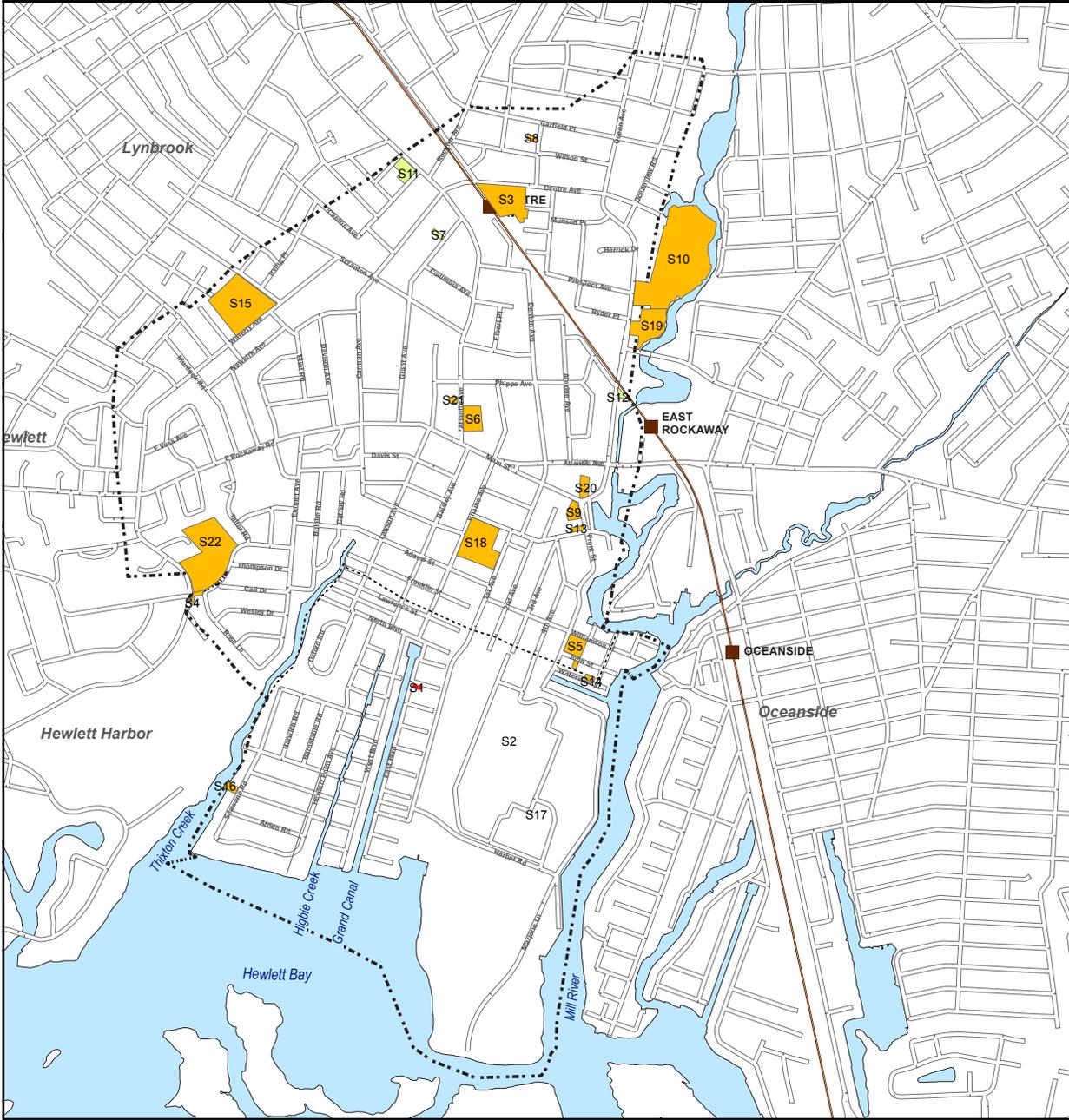
Asset ID	Asset	Risk Score
S1	Bay Park Fire District	Severe risk (>54)
S2	Bay Park Playground + Administration Building	High risk (24-53)
S10	East Rockaway High School	High risk (24-53)
S14	John Street Rec Center	High risk (24-53)
S19	Rolling River Day School	High risk (24-53)
S13	Former Jack & Jill Playland (now ERFD)	High risk (24-53)
S16	N and R Fuel Oil Company Incorporated	High risk (24-53)
S17	Nassau County Police Department Marine Bureau	High risk (24-53)
S20	U S Post Office East Rockaway	Moderate risk (6-23)
S5	East Rockaway DPW	Moderate risk (6-23)
S9	East Rockaway Fd Truck 1 + Engine 1	Moderate risk (6-23)
S18	Rhame Avenue School	Moderate risk (6-23)
S4	East Rockaway Bldg Dept	Moderate risk (6-23)
S15	Marion Street School	Moderate risk (6-23)
S21	Village of East Rockaway: Fire Dept.	Moderate risk (6-23)
S22	Waverly Park School	Moderate risk (6-23)
S3	Centre Avenue Elementary School	Moderate risk (6-23)
S6	East Rockaway FD Headquarters	Moderate risk (6-23)
S8	East Rockaway FD House 2	Moderate risk (6-23)
S12	East Rockaway Village Hall / Senior Center	Moderate risk (6-23)
S7	East Rockaway FD House 1	Moderate risk (6-23)
S11	East Rockaway Progressive Care (Nursing Home)	Moderate risk (6-23)

**Risk Assessment Score**

Severe risk (>54)      High risk (24-53)      Moderate risk (6-23)



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



## Bay Park and Village of East Rockaway

High risk area and 76.4% in the Moderate risk area. Therefore, the higher the flood risk category, the more likely owners were to have mortgages. Mortgage rates were 70.0% in the Extreme risk zone, 69.4% in the High risk zone and 64.4% in the Moderate risk zone.

Figure 21 illustrates the Risk Score of Housing Assets included in the Asset Inventory and Risk Assessment, grouped by location, NYS Risk Area and similar exposure characteristics. While several groups of housing assets are located in

the Extreme Risk Area, only the neighborhood in western Bay Park along Thixton Creek north beyond North Boulevard to Adams Street received a severe risk score. All other groups of inventoried housing assets in Bay Park and East Rockaway are at high risk. The residential area between Hewlett Point Avenue and Seawane Road was not inundated during Superstorm Sandy due to its higher elevation, despite the proximity to Higbie and Thixton Creek. This area is classified as a Moderate Risk Area, and as such was not included in the Risk Assessment analysis.

## Infrastructure Systems Risk Assessment

Each infrastructure system (e.g., roadway assets) was analyzed as a group within the Asset Inventory and Risk Assessment Tool, and key segments of these systems that were identified as locally significant by the NYRCR Planning Committee (e.g., Lawson Avenue) were analyzed separately. Figure 22 illustrates the risk scores of Infrastructure Systems Assets included in the Asset Inventory and Risk Assessment.

Risk levels are compounded by flooded roadways, which impede emergency access and evacuation routes along key north-south corridors. The Atlantic Avenue Bridge crossing the Mill River is not within a NYS categorized Risk Area, but was included as it is locally significant to the transportation networks and emergency evacuations. While the bridges have a residual risk of zero according to the Risk Assessment tool; they serve local assets with severe risk, and are thus considered to be at severe risk. It is likely that they do not fall within risk areas as they are over water, not because they are actually not at risk. Storm drainage outfalls were identified as locally significant assets and received a high risk score in the Risk Assessment tool.

The Nassau County Police Department Telecommunications Tower located adjacent to Hewlett Bay and Bay County Park has a high risk score and is a critical facility under FEMA standards. The Bay Park Sewage STP is also a critical facility under FEMA standards and key regional asset located in the Extreme and High Risk Areas and it is important to Nassau County. The sewer pipes leading to the plant lie within

**Table 5: Residential Parcels by Type, Value and Risk Zone**

Residential Parcel Type	Risk Zone	Share of All Parcels	Share of Land Value	Share of Total Assessed Value
All	Total Extreme	11.2%	14.0%	14.5%
	Total High	23.3%	26.2%	24.6%
	Total Moderate	58.4%	52.7%	54.1%
High Res	Total Extreme	9.0%	7.7%	10.4%
	Total High	19.0%	30.8%	21.3%
	Total Moderate	72.0%	61.5%	68.3%
Med Res	Total Extreme	15.2%	15.7%	15.9%
	Total High	30.1%	28.8%	28.3%
	Total Moderate	50.4%	51.6%	51.2%
Low Res	Total Extreme	10.7%	12.9%	14.4%
	Total High	22.9%	25.5%	24.4%
	Total Moderate	57.5%	53.8%	53.6%
Vacant Res	Total Extreme	39.7%	25.9%	40.9%
	Total High	23.1%	29.3%	23.0%
	Total Moderate	32.8%	37.4%	31.8%

Source: Nassau County Land Use and 2012-13 Assessment data and FEMA Risk Maps

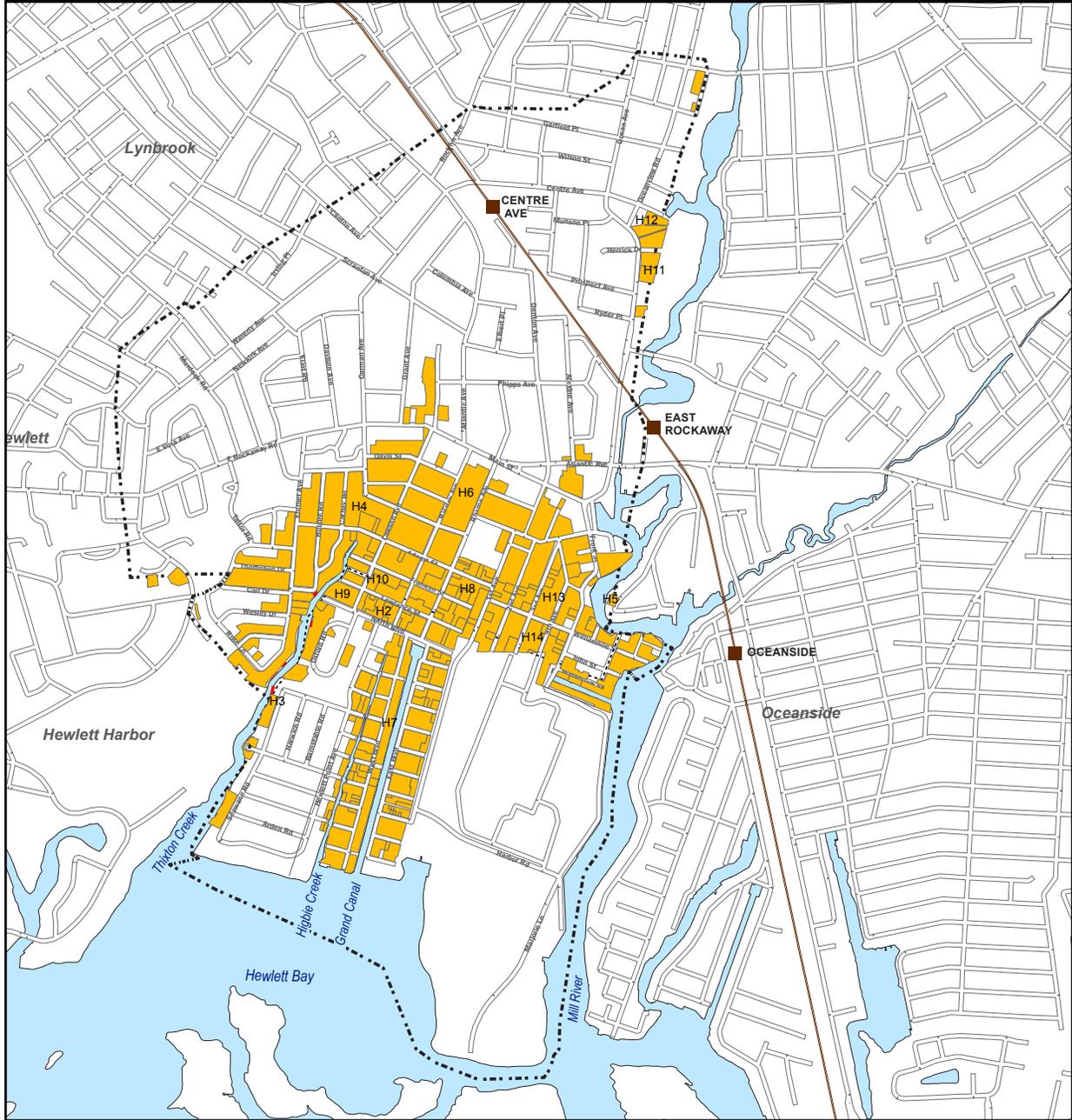
Figure 21: Risk to Housing Assets

Asset ID <sup>30</sup>	Asset	Risk Score
H3	Bay Park West Housing Assets_Extreme	Severe risk (>54)
H11	North East Rockaway Housing Assets_Extreme	High risk (24-53)
H13	Williamson St Housing Assets_Extreme	High risk (24-53)
H7	East/West Blvd Housing Assets_Extreme	High risk (24-53)
H4	Bay Park West Housing Assets_High	High risk (24-53)
H1	Bay Park East Housing Assets_Extreme	High risk (24-53)
H5	Central East Rockaway Housing Assets_Extreme	High risk (24-53)
H2	Bay Park East Housing Assets_High	High risk (24-53)
H12	North East Rockaway Housing Assets_High	High risk (24-53)
H8	East/West Blvd Housing Assets_High	High risk (24-53)
H9	Lawson Ave Housing Assets_Extreme	High risk (24-53)
H10	Lawson Ave Housing Assets_High	High risk (24-53)
H14	Williamson St Housing Assets_High	High risk (24-53)
H6	Central East Rockaway Housing Assets_High	High risk (24-53)

**Risk Assessment Score**  
 Severe risk (>54)    High risk (24-53)    Moderate risk (6-23)



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



# Bay Park and Village of East Rockaway

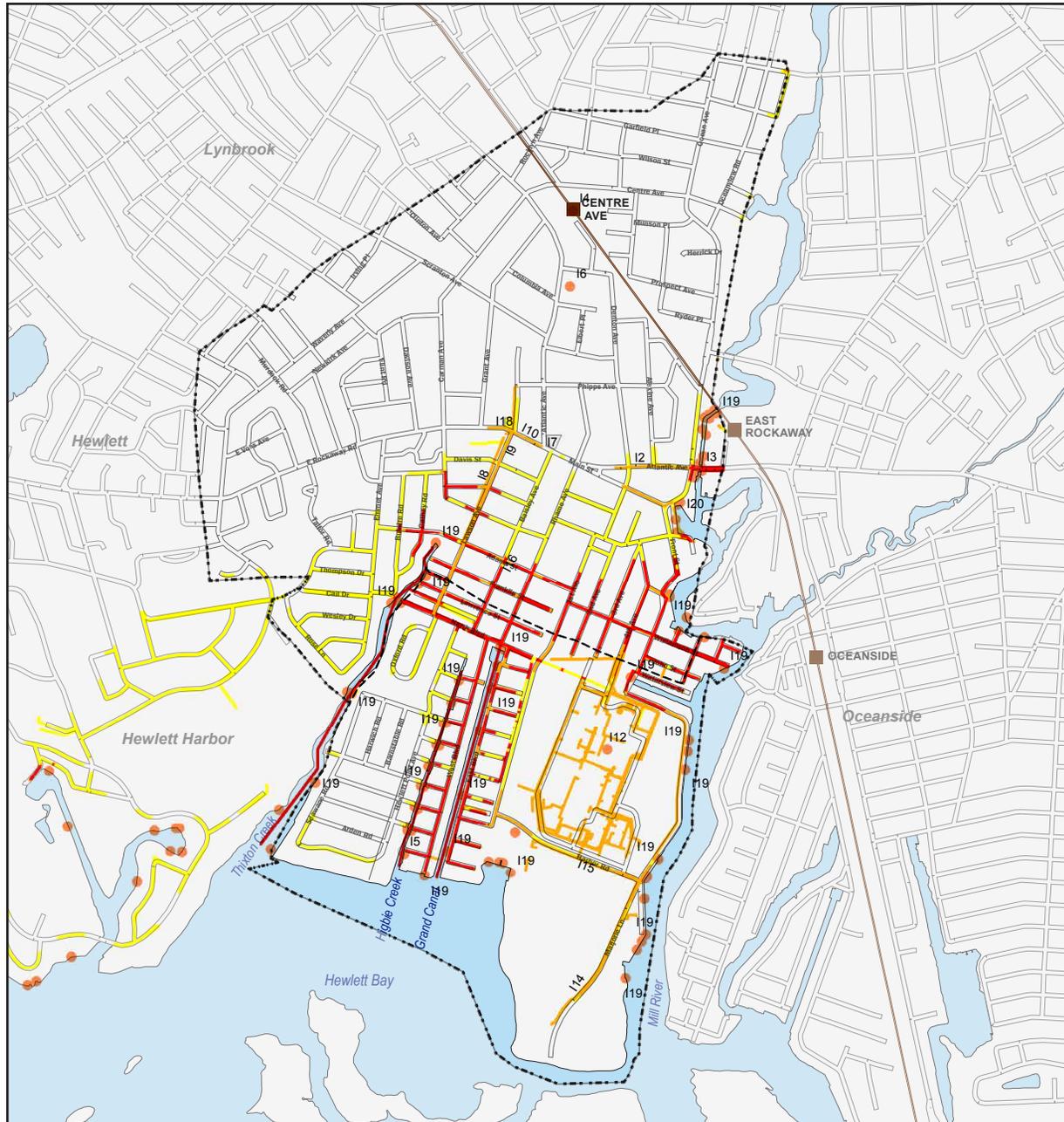


Figure 22: Risk to Infrastructure Assets

Asset ID <sup>30</sup>	Asset	Risk Score
I1	Atlantic Ave_Extreme	Severe risk (>54)
I16	Sewer Pipe Assets_Extreme	Severe risk (>54)
I13	Nassau County Police Department Telecommunications Tower	High risk (24-53)
I19	Stormwater Outfall_Extreme	High risk (24-53)
I8	Lawson Ave_Extreme	High risk (24-53)
I12	Nassau County Bay Park Sewage Treatment Plant	High risk (24-53)
I21	Water Systems_Extreme	High risk (24-53)
I14	Roadway Assets_Extreme	High risk (24-53)
I11	Minute Man Cleaners Remediation Site	High risk (24-53)
I2	Atlantic Ave_High	High risk (24-53)
I20	Stormwater Outfall_High	High risk (24-53)
I10	Main St	High risk (24-53)
I4	Centre Ave LIRR Station	Moderate risk (6-23)
I9	Lawson Ave_High	Moderate risk (6-23)
I22	Water Systems_High	Moderate risk (6-23)
I15	Roadway Assets_High	Moderate risk (6-23)
I18	Shell Gas Station	Moderate risk (6-23)
I7	Gulf Gas Station	Moderate risk (6-23)
I17	Sewer Pipe Assets_High	Moderate risk (6-23)
I6	East Rockaway Village Hall Telecommunications Tower	Moderate risk (6-23)
I3	Atlantic Avenue Bridge	Residual risk (0-6)

**Risk Assessment Score**  
■ Severe risk (>54)    ■ High risk (24-53)    ■ Moderate risk (6-23)    ■ Residual risk (0-6)



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



various risk areas, and some of the pipes received a severe risk score.

Both LIRR tracks and stations received a high risk score. These stations did not suffer significant structural damage during Superstorm Sandy; however, passenger service was interrupted. Infrastructure systems assets at moderate risk include the telecommunications tower at East Rockaway Village Hall and the Shell Gas Station on Main Street as well as some roadway system and sanitary sewer pipe assets and the stormwater infrastructure system. Although these assets are classified as moderate risk, they are noted as locally significant due to their importance to the overall telecommunication, automobile fuel supply, and roadway and sewer infrastructure systems, respectively.

**Natural and Cultural Resources Risk Assessment**

Figure 23 illustrates the risk scores of Natural and Cultural Resources Assets included in the Asset Inventory and Risk Assessment. The natural and cultural resources near water bodies within and adjacent to the NYRCR Area are at most severe risk in future storms. These assets include Grand Canal, Higbie Creek, Mill River and Thixton Creek as well as two vacant parcels adjacent to Grand Canal at Court Street West and West Evans Street. These two parcels are owned by the Town of Hempstead and have been identified by the Committee as potential locations for future pocket parks. The Bay Park Civic Association building is also at severe risk.

Of the parks in East Rockaway, White Cannon Point, Minore Park and the John Street Recreation Center received high risk scores. The two parks in Bay Park, the Bay County Park and Hewlett Point Park also received high risk scores.

**Socially Vulnerable Populations Risk Assessment**

Single-family homes in the Community tend to be modest, relatively affordable and conducive to elderly homeowners. Many elderly residents have lived in the same homes for decades and

some have been passed down within families for generations. As shown in Table 6 below, the elderly population is equally represented in the three Risk Areas.

Most assets serving these populations are classified under the Health and Social Services or Natural and Cultural Resources asset categories. The majority of assets (80%) that serve socially vulnerable populations received a high risk scores ranging between 24 and 48. No assets in this category received a severe risk score. Both the East Rockaway Progressive Care building and the East Rockaway Senior Center, located adjacent to the Village Hall received moderate risk scores.

**Table 6: Bay Park – East Rockaway Residents in Risk Areas**

Risk Area	Under 18		Over 65		Total	
	#	%	#	%	#	%
Extreme	207	8%	160	16%	979	8%
High	490	18%	321	14%	2311	19%
Moderate	1665	63%	1066	15%	7165	60%
Total	2659	100%	1929	16%	12030	100%

Source: 2007-2011 American Community Survey (ACS)

## Bay Park and Village of East Rockaway

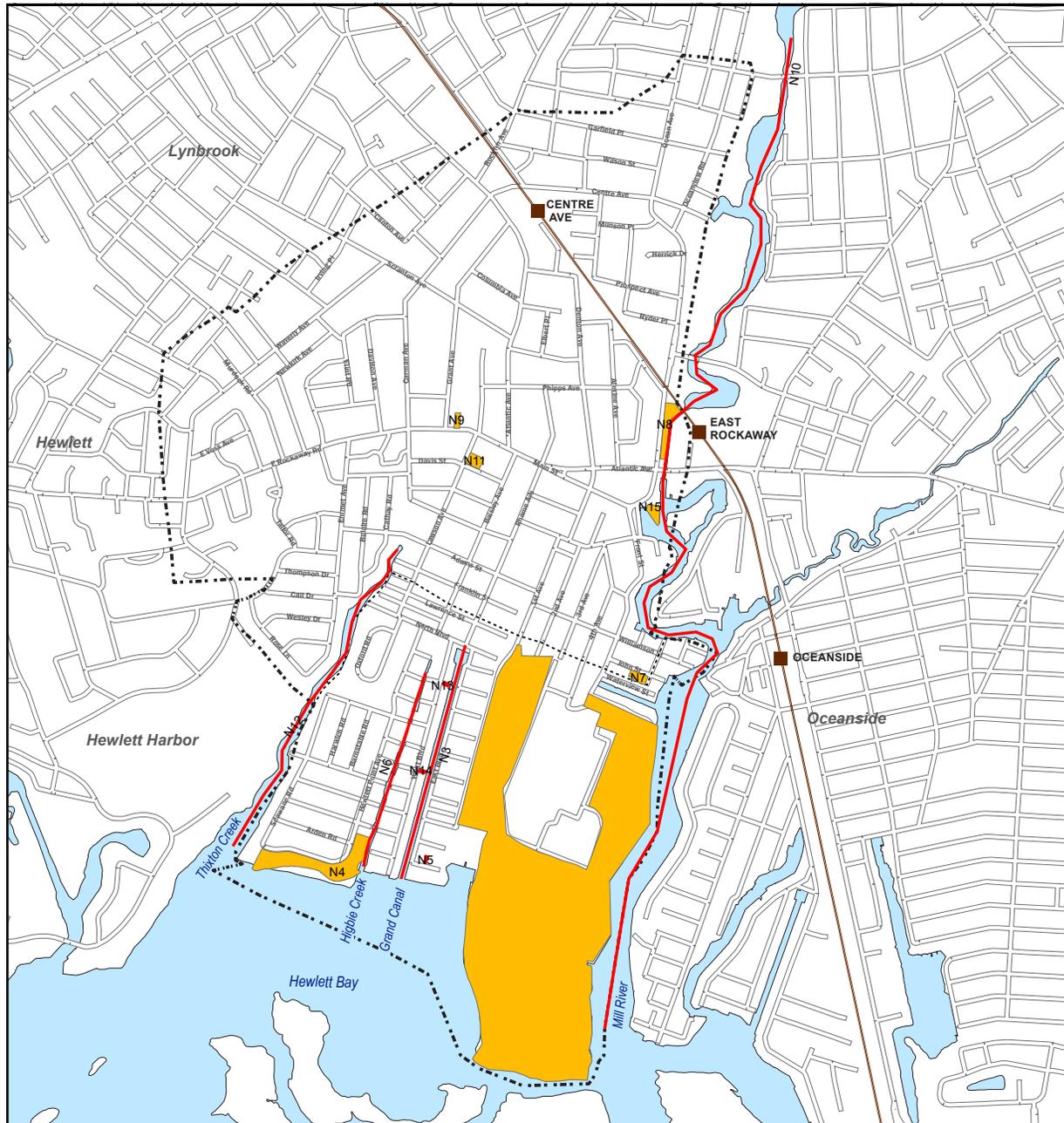


Figure 23: Risk to Natural and Cultural Assets

Asset ID <sup>30</sup>	Asset	Risk Score
N10	Mill River	Severe risk (>54)
N12	Thixton Creek	Severe risk (>54)
N13	Town of Hempstead Property - Potential Pocket Park at Court St. W.	Severe risk (>54)
N14	Town of Hempstead Property - Potential Pocket Park at W. Evans St.	Severe risk (>54)
N3	Grand Canal	Severe risk (>54)
N5h	Hewlett Point Park Center	Severe risk (>54)
N6	Higbie Canal	High risk (24-53)
N7	John Street Recreational Center_Extreme	High risk (24-53)
N15	White Cannon Point Park	High risk (24-53)
N1	Bay Park Boat Ramp	High risk (24-53)
N2	Bay Park Field #3/Bay Park Golf Course	High risk (24-53)
N4	Hewlett Point Park	High risk (24-53)
N8	Kevin E. McNulty Park	High risk (24-53)
N11	Minore Park	High risk (24-53)
N9	Knights of Columbus	High risk (24-53)

### Risk Assessment Score

■ Severe risk (>54)
 ■ High risk (24-53)
 ■ Moderate risk (6-23)

0 450 900 1,800 Feet



Source: Roads: Tiger/Line, US Census Bureau; Assets: Nassau County GIS; Coastal Risk Zones: NYS Department of State Coastal Management Program, NOAA, and FEMA



## C. Assessment of Needs and Opportunities

The objective of the Needs Assessment is to evaluate potential for increased resilience in the short, medium, and long term in Bay Park/East Rockaway. The following section builds upon the initial evaluation of the needs and opportunities within the Planning Area which was presented in the NYRCR Conceptual Plan. This more detailed Needs Assessment has been refined through additional detailed analysis of the assets and risks within the Planning Area, analysis of demographic and economic data, and through input from the Planning Committee and the public.

Though Superstorm Sandy was an unprecedented event, the sources and causes of flooding observed on the greater scale during Superstorm Sandy are regularly reflected on a smaller scale during high tides, rain storms, and nor'easters. Superstorm Sandy has effectively exposed the greater system-wide inadequacy of the Community's flood mitigation and storm drainage system.

For each of the six recovery functions, the Needs Assessment identifies areas in which Community could improve its resilience to major storms and other disasters. This analysis supplements input that the Committee has received at NYRCR Planning Committee meetings and Public Engagement Events (*Section V-C*) and has helped to guide the Committee in identifying strategies to guide the process and projects that will contribute to the Community and the region's resilience.

### **Community Planning & Capacity Building Needs & Opportunities**

The Needs Assessment for Community Planning & Capacity Building examines existing public education initiatives, recommendations from previous plans, policies, and programs related to resilience and emergency preparedness at the County, Town, and Village levels.

Both East Rockaway and Bay Park have large elderly populations, with 16% of residents above the age of 65. 25.7% of all households are headed by persons 65 years or older. Broken down by CDP, the elderly account for 24.0% of Bay Park households and 26.1% of East Rockaway households. As shown in the Socially Vulnerable Population risk assessment (page 63), 481 residents live in High and Extreme Risk Areas.

Many elderly residents are living on fixed incomes and are ill prepared to recover from the damage caused by Superstorm Sandy. These residents are also less likely to invest in measures to protect their homes from future storm events. It is important for the community to identify financial measures so everyone, even those with fixed incomes, can rebuild and make their homes more resilient. Additionally, it is important for the community to identify opportunity sites where more resilient, durable and higher quality housing can be developed for all segments of the community.

Directly after Superstorm Sandy, many residents went to Island Park or Oceanside for FEMA recovery services. Residents have expressed the

need for a more central recovery center. Local and non-local nonprofit and community based organizations provided a significant amount of assistance in the aftermath of Superstorm Sandy. Local civic organizations involved in the rebuilding effort include the Knights of Columbus, Bay Park Civic Association, Village Foundation, American Legion, VFW, Project Hope, Pay it Forward, and the Fire Department. In addition, a number of community-supported websites and online forums have helped strengthen social networks and have been a useful resource for residents to share resiliency information. Some of these sites include The11518.org, East Rockaway Hurricane Superstorm Sandy Relief, Paying It Forward to East Rockaway, East Rockaway & Bay Park Relief, and East Rockaway/Bay Park Hazard Mitigation Group. Coordination and communication amongst these organizations was critical to aid residents in obtaining necessary recovery service and resources.

### ***Guidelines Outlined in Existing Plans***

As described in the Relationship to Regional Plans (*Section 1:E*), several previous planning documents call attention to Critical Issues that needs to be addressed in order to make the Community more resilient to climate related events. Regional plans at the County level and that include all of Long Island focus on stormwater management, hazard mitigation, economic development, sustainability, and housing affordability. All of these issues impact resilience in the Community and were considered by the NYRCR Committee.

## Bay Park and Village of East Rockaway

In particular, Nassau County and regional plans that could impact the Community include:

- Nassau County Stormwater Management Program Plan (2009);
- Nassau County Hazard Mitigation Plan (2007, current update in progress);
- Long Island Regional Economic Development (LIREDC) Council Strategic Plan (2011, update in 2012, 2013);
- Cleaner Greener Long Island Regional Sustainability Plan (2013); and,
- Nassau Urban County Consortium 5 Year Consolidated Plan (Nassau County, 2010).

In order to assure that these regional plans provide sufficient benefit to residents and businesses, there is a need within the Community for the Village and the Town of Hempstead to advocate for the implementation of regional best practices at the local level. In some cases, these regional plans identify strategies that could apply within the Community, such as the Nassau County Stormwater Management Program Plan.

### **Community Planning & Capacity Building - Opportunities**

There are opportunities for greater coordination between the County, Town and local community-based organizations to better educate residents and improve future disaster preparedness and recovery efforts. There is an existing network of community-based organizations that are already connected through various means including social media platforms like Facebook. This social network can be tapped to help coordinate municipal first responders and social

services organizations to better identify risk areas and ensure vulnerable populations are protected and able to recover from disasters. Improved communication, information sharing with existing community-based organizations will help to facilitate emergency response by connecting external resources to those in need. These community organizations could utilize the mass communication services (email or SMS text messaging) provided by the County and Town. Nassau County has a number of programs help residents remain prepared for extreme weather and other disasters. For example, the E-News program sends information and emergency notification updates to email addresses and cellphone numbers. The Town of Hempstead provides a similar emergency notification system, Swift911.

The updated Hazard Mitigation Plan presents an opportunity for Bay Park and East Rockaway to formalize plans to protect the community from future storm events and other disasters. In addition, the Town of Hempstead could consider preparing a comprehensive plan that focuses on community resilience to address the following issues:

- Hazard mitigation;
- Economic development;
- Preservation / restoration of open space areas, and parklands that can serve as storm surge buffer areas and storm water retention areas;
- Rebuild coastal infrastructure and roadways in a more resilient manner;
- Zoning / development codes that align

with recovery planning;

- Enhance the delivery of human services to elderly and disabled populations can improve future resiliency; and,
- Identify community resources and areas of common concern such as waterfront revitalization and bulkheading.

The Town of Hempstead and the Village have limited fiscal capability to deal with future post-disaster recovery planning and/or implementation. This includes a lack of staff for administrative, planning, and inspecting activities; additional emergency management training; financing, enforcing building codes; and, addressing tax revenues. There are many available grants from corporations, foundations, and government agencies that will aid with resiliency planning that the Village and Town could pursue such as those in the New York Hurricane Superstorm Sandy Grants Information: Funders, Resources and Grant Writing Tool<sup>25</sup>. If the municipal agencies are not capable of researching and applying for these grants, they could collaborate with non-profits and local civic groups to take on these tasks.

### **Health & Social Services Needs and Opportunities**

Health & Social Services assets include schools, health care facilities, day care, elder care, government buildings, media and communications, and first responders including police, fire, and rescue. The East Rockaway High School and the adjacent Rolling River Day School are located in an Extreme Risk Area, while other schools are located in High Risk Areas, such as the

**Health & Social Services - Needs**

East Rockaway has a number of municipal facilities located in the High and Extreme Risk Areas, which need to be taken to floodproofed where feasible and include:

- DPW Municipal Garage;
- John Street Rec Center;
- US Post Office – East Rockaway;
- East Rockaway FD Truck 1;
- East Rockaway DPW; and,
- East Rockaway FD Engine 1.

In addition, the bulkheading along Mill River adjacent to the East Rockaway Junior-Senior High School is discontinuous, and approximately 750 linear feet of bulkheading needs to be constructed to mitigate erosion and provide continuous shoreline protection along this locally significant asset.

**Health & Social Services – Opportunities**

Some of East Rockaway’s facilities such as the DPW facility are located in the Extreme Risk Areas are vulnerable to flooding. The Village could protect the DPW facility and the John Street Recreation Center through dry floodproofing and flood barriers. The Recreation Center is within walking distance of residential communities in both East Rockaway and Bay Park, and could serve as a staging facility / warming station during storm events if properly hardened.

Since Superstorm Sandy recurring stormwater and tidal flooding has become a significant nuisance issue for the areas south of Main Street. Roads



DPW Municipal Garage and John Street Recreation Center, East Rockaway. Source: Bing Maps

Centre Avenue and Rhame Avenue elementary schools. The Waverly Park School is located in a Moderate Risk Area, and the Marion Street School is the only school in the community that is not located in a risk area. There are no large dedicated medical facilities in the community.

Several of these assets are clustered in Extreme to High Risk Areas, including the US Postal Service Office, East Rockaway Fire Department (ERFD) Engine 1 and Truck 1, and the former Jack & Jill Playland (now owned by ERFD). The East Rockaway DPW Facility and the adjacent John Street Recreation Center are also at extreme risk. The DPW is subject to recurrent flooding.

There are many public facilities in the moderate risk level or no risk level, located in the northern

portion of the Village. These assets are classified at moderate risk for future storm events and include: East Rockaway Fire Department Houses 1 and 2; the East Rockaway Village Hall; and, East Rockaway Senior Center.

After Superstorm Sandy, a number of religious establishments and cultural institutions that were not inundated were able to serve as shelters and locations for community support. This includes the Hewlett East Rockaway Jewish Centre, St. Raymond of Penyafort Church and the Church of Nazarene. The Hewlett Point Park Pool House was successfully floodproofed and was able to serve as a refuge and staging area after Superstorm Sandy.

## Bay Park and Village of East Rockaway



Bay Park homes

become impassable during high tide events and the Fire Department has rescued people from vehicles stranded in flooded streets. The Village Fire Department can acquire low-profile rescue boats and a high water vehicle to improve response capabilities in flooded areas.

During Superstorm Sandy, electric service and natural gas was lost for an extended period of time. It is important to ensure that critical facilities, including Community Assistance Centers, are equipped with generators capable of providing power during and after major storm events. The Village can acquire portable generators that can be readily deployed throughout the community. They can also establish a micro-grid network with key nodes at Village Hall, the Village of East Rockaway DPW, and John Street Recreation Center connected to and the Bay Park Sewage Treatment Plant as a backup power supply provider during storm events. Radio towers that provide communication for first responders and are required for operation of the emergency alert system should be floodproofed and provided with a backup generators. East Rockaway and the Town of Hempstead could work with local

cellular service providers and regulatory agencies to ensure that utilities are hardened from flooding and have emergency backup power. Cellular phones are a critical mode of communication during emergencies and current requirements for backup power are not sufficient to maintain service through a disaster or storm event.

### **Housing Needs & Opportunities**

A variety of sources were utilized to identify housing needs and opportunities including Census data, recommendations from regional plans, as well as data gathered from the County, Town, Village, and Committee liaisons. A detailed analysis of the housing profile can be found in *Section V-E: Economic and Housing Profiles*. It is important to note that the 2007-2011 ACS data represents housing conditions prior to Superstorm Sandy.

### ***Housing Needs***

The Nassau County Consolidated Plan 2010-2014 identified shortages in housing availability for seniors and young families due to high housing costs, which include taxes and utilities. These issues have been further exacerbated by the impacts of Superstorm Sandy as previously discussed and summarized:

- Pre-Superstorm Sandy, 34.3% of East Rockaway households and 26.0% of Bay Park households were spending more than they could afford on housing, which is especially true of elderly and young households;<sup>26</sup>

- Large shares of elderly headed households are in extreme risk/inundation areas; and,
- The need for repairs and slow distribution of individual household homeowners and flood insurance and grants have exacerbated the situation; 30% of homeowners in the Extreme Risk and High Risk Areas (those that likely suffered the most damage from inundation) do not have mortgages and thus were not required to have flood insurance. An unknown share of these 350 homes are at risk for abandonment if FEMA, SBA or NY Rising Housing Recovery grants are not received.

The need for transit supported housing has been expressed as a need for Nassau County in a number of planning documents including the Long Island Regional Economic Development Council Strategic Plan (Cleaner Greener Long Island, 2013), Places to Grow (The Long Island Index, 2010), Long Island Infrastructure Priorities to Recover from Hurricane Superstorm Sandy (Long Island Association, 2012), Nassau County Infill Redevelopment Feasibility Study, and Long Island 2035 Comprehensive Sustainability Plan (Nassau County, 2010). Transit supported housing is well suited for workforce housing, senior housing, or a hotel because they typically have excellent access to transit and are walkable to downtown areas. Encouraging transit supported development provides additional choice for residents who wish

to move from their homes in flood prone areas but remain in the community.

### **Housing Opportunities**

While the situation is difficult, opportunities do exist.

- East Rockaway already has successful examples of owner-occupied higher density housing in areas outside of the risk zone;
- Single-family homes with elderly heads may become available for young families, as the owners downsize to smaller accommodations; and,
- Areas around the LIRR stations have potential for mixed use development. Opportunities for Transit Supported Development (TSD) are encouraged in Nassau County Infill Redevelopment Study.

### **Economic Needs and Opportunities**

The Economic Development assessment provides an overview of the ability of the Community’s economy to bounce back from extreme weather events and other disasters. Economic resilience is important because the ability of residents to acquire goods and services and return to work are all critical to storm recovery. An analysis of the existing socioeconomic profile of the community is discussed in *Section V-E: Economic and Housing Profiles*.

### **Economic Development Needs**

Socioeconomic data shows that job growth is a significant need for Bay Park – East Rockaway as well as Long Island as a whole. Local employment has been declining for at least the past decade and more than one third of local jobs pay only minimum wage. Specific Needs are listed below.

- Strengthen the Main Street and Atlantic Avenue corridor to attain a more resilient community, where businesses can bounce back more quickly and continue to deliver goods and services after severe events. This need was corroborated by information gathered from the business survey that was distributed to the business community to assess the impact of Superstorm Sandy on East Rockaway’s businesses by quantifying damage suffered and identifying obstacles to recovery. Respondents felt that several things were required to make East Rockaway’s business/commercial districts stronger including increasing the number of stores, improved parking, and improving the overall appearance of the commercial districts to create a sense of place.
- Increase flood resiliency. When asked about resiliency, some business owners acknowledged that they have chosen to live and work close to water and they need to accept and prepare for the disadvantages entailed. Respondents indicated that it was important to harden the Bay Park STP. Additionally, they felt

business and officials need to work together to come up with a business development plan for East Rockaway.

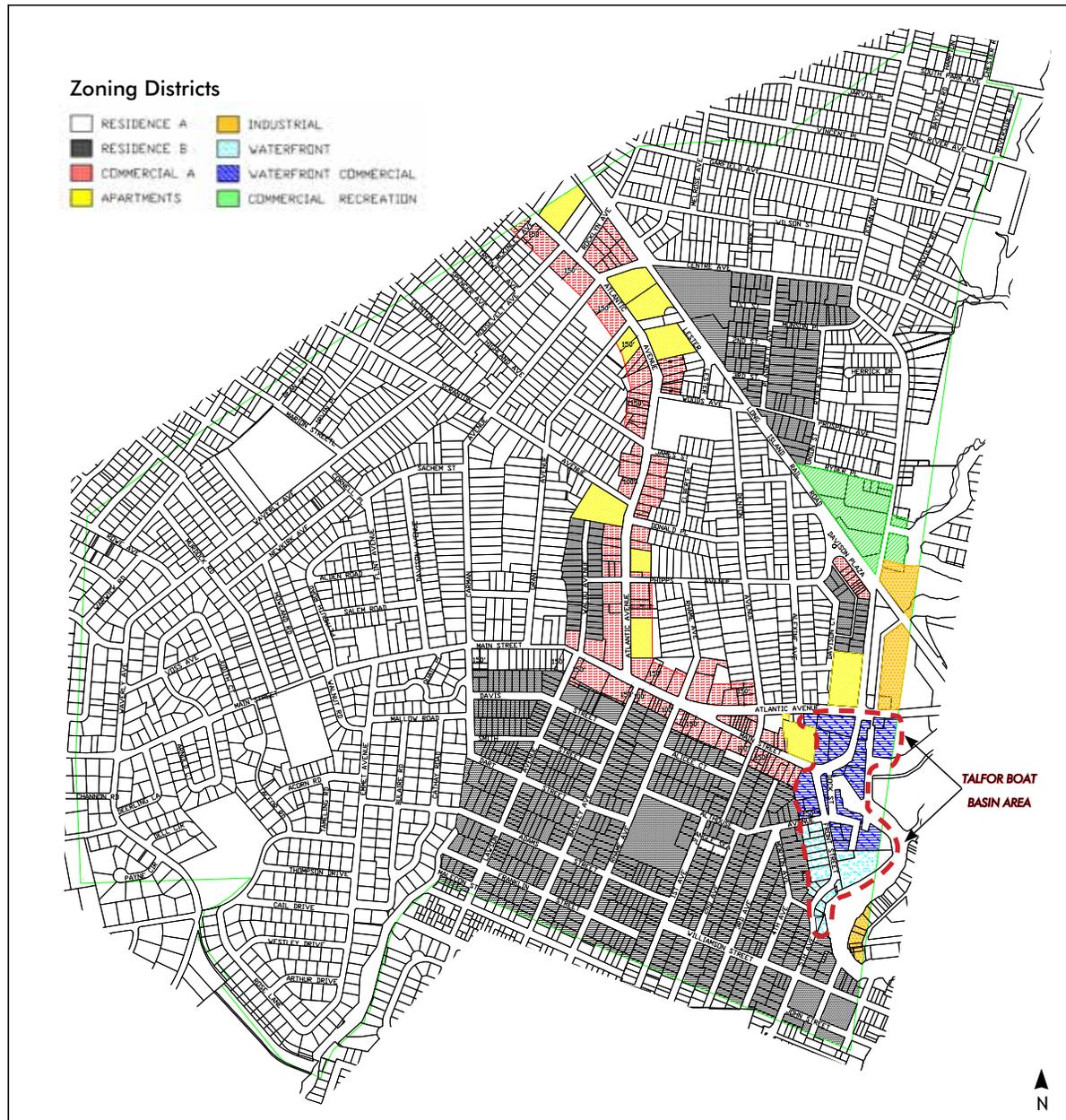
### **Economic Development Opportunities**

Enhancing the existing commercial areas is key to the future success of East Rockaway’s business districts. In addition, expanding the commercial tax base within the Village will provide tax revenues that could be used to support additional infrastructure projects that are not listed as Proposed Projects in this NYRCR Plan or are ineligible for CDBG-DR funds.

With its proximity to the waterfront and water-based recreation/retail services, there are a number of parcels the vicinity of downtown East Rockaway and the Talfor Boat Basin that present an opportunity for redevelopment to meet gaps in local consumer expenditures and retail sales (see *Section V-E*). Some of these opportunities include:

- Davison’s Marina: This property located on the border of East Rockaway and Oceanside (Town of Hempstead) has been identified as a potential site for redevelopment. A developer has secured approval from the Town for a zoning change to allow condos and townhouses. The developer’s application for zoning changes in the Village of East Rockaway is pending;
- Front Street between Althouse Ave and Morton Drive: This area currently has a mix of single-family homes and small commercial buildings. The existing Waterfront Zoning District (Figure 24) allows for the consolidation of lots and mixed-use development; and,

## Bay Park and Village of East Rockaway



*Davison's Boat Yard, East Rockaway*

- Transit Supported Development:**  
 The industrial area north of the LIRR station has a number of soft sites where redevelopment could reasonably occur. This area has recently been rezoned to Commercial Recreation, which promotes adaptive re-use of vacant industrial buildings and allows new types of private recreation and entertainment facilities, such as fitness centers, learning centers, indoor sports facilities and indoor amusement centers. The intent of the district is also to improve public access to the waterfront and increase public activity in the waterfront area. Residential uses are not allowed in the Commercial-Recreation District.

**Figure 24: East Rockaway Zoning Map**

Source: Village of East Rockaway



**Case Study: Freeport’s “Nautical Mile”**

Woodcleft Avenue was transformed as Freeport’s “Nautical Mile” following a major reconstruction and revitalization program initiated by the Village of Freeport in 2000-2001. This effort included:

- Raising the road level above the 100 year floodplain.
- Placing utilities underground
- Widening and rebuilding sidewalks.
- Providing new street furniture including lighting, benches and signage.
- Construction pedestrian plaza, a small fishing pier and gazebo.

Funding was provided by the Village of Freeport, the NYS Department of State, the NYS Department of Environmental Conservation, and from the Community Development Block Grant Program.

It is important to recognize that the properties discussed above are all located in the Extreme and High Risk Areas. Although there are opportunities to provide mixed-use development and diversify the commercial base, this is assuming the area could be developed in such a way as to minimize susceptibility to flood waters.

Although there are a number of economic development opportunities within the Community, there is no clearly defined plan for downtown East Rockaway and the Talfor Boat Basin. East Rockaway would benefit from a comprehensive strategy with goals and objectives that would yield a coordinated economic plan to promote East Rockaway as a business location to new businesses as well as shoppers. The plan could include a commercial market development study, urban design standards, coordinated parking and resiliency strategies, and designate an entity responsibility for implementation. Funding sources could also be explored for façade improvements. This could come from several sources including Chase Mission Main Streets and the NYSHCR Main Street Grant Program.

**Infrastructure Needs and Opportunities**

The Infrastructure assessment provides an overview of the ability of the Community’s infrastructure systems to bounce back from extreme weather events and other disasters and function properly during those events.

**Infrastructure Needs**

Improving infrastructure was identified as a primary need in the Community. Upgrades

could strengthen coastal protections, improve storm drainage water capacity, expand storm drain networks and build a more reliable power grid and transportation network system. These infrastructure improvements will benefit the local Community, and will add to the resiliency of neighboring communities as well.

**Critical Infrastructure**

Transportation infrastructure for East Rockaway - Bay Park presents risks for residents in the event of a storm, in part because of assets that are within the risk zone, but also because of difficulties in accessing transportation routes for destinations that are outside of the risk zone due to damage to roads, persistent flooding, and congestion. Risk levels are compounded by flooded roadways, which impede emergency access and evacuation routes along key north-south corridors. Assets that are particularly at risk include parts of Lawson Avenue from North Boulevard to Davis Street (Extreme Risk), East Boulevard, West Boulevard and Williamson Street (all Extreme Risk), which were subject to Superstorm Sandy inundation, and are critical for evacuating Extreme Risk residential areas within the community. Lawson Avenue is subject to recurring flooding and lies in both the extreme and high risk areas. Improvements to this street were noted by the Village Engineer as being important to the Village. Since Superstorm Sandy, the sidewalk and bulkhead near 8th Avenue at Williamson Street have been caving in.

The Centre Avenue LIRR Station is located in a Moderate Risk zone, and the East Rockaway LIRR Station sits astride all three risk zones – Extreme, High and Moderate. The East Rockaway LIRR Station was inundated during Superstorm Sandy as shown on the Flood inundation map in Figure 6.

## Bay Park and Village of East Rockaway

Bulkheads along the coast vary in their height and their structural maintenance. For example, the east side of the Grand Canal bulkhead was repaired and heightened by the Town of Hempstead. The west side of the canal is privately owned and bulkheads have not been raised. Bulkheads along Higbie Creek are intermittent and many that were built are in disrepair. Bulkheads are failing along various parts of Mill River. Marshlands and wetlands within Hewlett Bay and West Hempstead Bay provide coastal protections, but have deteriorated over the years due to water pollution, high nitrogen levels, increased sediment, and invasive plant species, resulting in a community that is highly vulnerable to coastal flooding.

### Utility Infrastructure

Bay Park STP is a key regional asset located in the High Risk area, with some portions in the Extreme Risk zone. Hardening the plant is an important need expressed by Nassau County. Owned by Nassau County and built in the 1940s and last upgraded in the 1980s, Bay Park Sewage Treatment Plant treats sewage for 550,000 residents, approximately 40% of Nassau County. The treatment plant sustained \$1.3 billion in Superstorm Sandy-related damage. Its outfall at Reynolds Channel releases 55 million gallons per day of treated sewage into West Bay, which has impacted marshlands, fishing and tourism. Bay County Parks serves as a shore defense for the plant during minor storm events; however, most of the community has minimal topography, landscape features and shore defenses to buffer the community from coastal storms. During Superstorm Sandy, approximately 69 million gallons (MG) of untreated sewage overflowed into Hewlett Bay during plant shutdown.

Approximately 2.8 billion gallons of under-treated sewage flowed through the plant into Rockaway Channel between Nov. 1 and Dec. 21. Primary treatment was immediately resumed, which consisted of screening and disinfection. Full primary and secondary treatment was reestablished by December 14, 2013.

### Stormwater Drainage System Network

The storm drainage system is also a critical infrastructure asset, the condition of which is largely unknown. Outfalls into waterways and canals can be blocked by tidal flow or become clogged with debris, which in combination with intermittent maintenance and the limited capacity of the system as a whole, causes stormwater drainage system backup.

It is unknown if system outfalls are equipped with backflow preventers. Water from spring tides and tidal surges may be entering the sewer system and creating further water backup in the system. The amount of water entering the system cannot exit the system at the same rate and results in flooding. The groundwater table in the Community is very high, limiting the amount of infiltration in the area and increasing the need for other types of runoff water storage facilities.

Areas of East Rockaway and Bay Park that did not flood, and several that did flood, experienced sewage backup. The electrical system at Bay Park STP was flooded and inoperable. Loss of power to the influent pumps also caused a mixture of floodwater and sewage to back-flow and flood many homes in the Bay Park and East Rockaway area, particularly those at lower elevations.

## Infrastructure Opportunities

There are a number of opportunities to upgrade infrastructure assets to increase resiliency within the Community including the improvement of stormwater retention and detention capacity, the expansion of drainage networks and the development of a more reliable transportation grid and transportation network.

The following specific infrastructure opportunities have been identified:

### Coastal Protections

- Study the potential benefits of movable tidal surge barriers to intercept tidal flows at the termini of Higbie Creek, Grand Canal, Thixton Creek and Mill River;
- Collectively organize property owners through administrative support and/or financial incentives to provide bulkhead repairs and maintenance, or living shoreline restoration, as appropriate to protect property from flooding. Noted locations for bulkhead repairs include Grand Canal and Higbie Creek, where banks are eroding and bulkheads are missing or deteriorating, as well as at East Rockaway High School, along Williamson Street and along the west side of Higbie Creek north to Court Street; and,
- Align with USACE to evaluate potential movable tidal surge barriers at two locations on Reynolds Channel, near Silver Point County Park/Atlantic Beach Bridge and Long Beach Boulevard, to intercept tidal flows into Hempstead Bay.



Source: NYC.gov

**Case Study: Newtown Creek Wastewater Treatment Plant, Greenpoint, NY**

Redesign of outdated and environmentally unsound facility included a state-of-the-art Waste Water Treatment Plant as well as thoughtful development of the quarter-mile Newtown Creek Waterfront Nature Walk. Nature walk features unique architectural features, plantings and environmental sculpture, as well as stunning views of New York City and the nearby industrial landscape.

**Stormwater Drainage and Sewer Network**

- Conduct a watershed wide analysis of storm water flows – a Hydrologic and Hydraulic study - to determine where the run-off is coming from, how much, where is it going and are the current systems adequate to handle 2014 conditions and future conditions;
- Introduce regularly scheduled maintenance of backflow preventers at sewer outfalls;
- Incentivize homeowners to secure or move residential petroleum tanks and other infrastructure that is subject to dislodging and transport by storm waters or storm surge and install backflow preventers to prevent the potential of sewage from backing up into homes. This threat will be reduced once Bay Park STP is hardened from flooding;
- Develop homeowner education campaign to encourage green infrastructure improvements (e.g., driveways constructed with pervious surfaces, rain gardens) on private property. Promote the capture of rainwater draining from the roofs. Enact zoning changes to incentivize green infrastructure for redevelopment. Consider the re-establishment of the Town of Hempstead’s rain barrel program or similar program at the local level;
- Address the recurring stormwater flooding on Lawson Avenue through road raising and green infrastructure measures; and.
- Promote installation of green infrastructure on to capture storm water runoff before it travels downstream.

**Transportation Network**

- Create a more resilient transportation network by elevating roads, preventing flooding of LIRR stations and implementing education campaigns that guide residents to high ground.

**Utility Infrastructure**

- Create microgrids that generate power in low-risk locations such as the Bay Park STP, and form networks of critical facilities that can provide important relief and recovery services after a major storm.

**Natural and Cultural Resources Needs and Opportunities**

Natural and cultural resources vary from natural and ecological habitats, wetlands and marshes, parks, recreation and open space, to museums, libraries, historic landmarks and religious establishments. In general, the Community’s close proximity in relation to several water bodies provides a source of active recreation including docking for private boats, natural habitat, and aesthetic surroundings for the community; however, it is also a source of risk during both tidal storm surge and significant rain events.

***Natural and Cultural Resource Needs***

Typically, the surrounding water bodies remain calm with minor erosion along the edges of the bay and creeks. Improvements to the shorelines at Higbie Creek, Thixton Creek, Grand Canal and Mill River are needed to enhance resiliency to flooding and reduce erosion and sedimentation.

## Bay Park and Village of East Rockaway

Needs to be addressed include:

- Restoring the Creek’s natural function;
- Removal of debris that may be clogging outfall pipes along the Creek and prevention of future debris accumulation;
- Coordination of repairs/raising of bulkheads located on private properties;
- Bulkheads are decaying along both private and public properties. A survey of the bulkhead network is needed;
- Restoring natural resources, including Bay County Park and wetlands, to increase their capacity in absorbing flood and rainwater; and,
- Residents have stated that there is a lack of recreational resources (e.g. ball fields, track, basketball court). The use of portions of Bay County Park have been limited since Superstorm Sandy.

### **Natural and Cultural Resource Opportunities**

Opportunities exist within the East Rockaway and Bay Park planning area to provide greater protections from flooding for residential neighborhoods and commercial districts. Though Superstorm Sandy was an unprecedented event, the sources and causes of flooding observed on the greater scale during

Superstorm Sandy are regularly reflected on a smaller scale during high tides, rainstorms, and nor’easters. Superstorm Sandy has effectively exposed the greater system-wide inadequacy of flood mitigation and protection systems in the Community as well as the need for more robust comprehensive planning. The objective

of the needs and opportunities assessment is to evaluate potential for increased resilience within East Rockaway and Bay Park. Resiliency can be achieved by:

- Restoring natural resources, including parks and wetlands, to increase their capacity in absorbing flood and rainwater (increasing Green Infrastructure). An opportunity exists at two Town-owned parcels along the Grand Canal to implement green infrastructure improvements;
- Restoring degraded marshes. Wetlands are vital to the health of waterways and communities that are downstream. One opportunity would be to replace the rip rap on the west side of Bay County Park with a living shoreline. This could be a wetland mitigation for work done on Higbie Creek; and,
- Reducing impervious surfaces to reduce runoff. Parking lots at the Bay Park Boat Ramp and Bay Park Playground can be replaced with gravel or some other pervious treatment. Parking lots on public property (e.g. school parking lots) can be converted from pervious pavements to impervious pavements.

Residents of both communities have stated that there is a lack of recreational resources (e.g., ball fields, track, basketball court) for youth. The County can leverage improvements to the Bay Park STP to enhance coastal protection, natural resources and recreational assets in Bay County Park. Funds have been allocated by the County to repair and harden the plant. There is also an



*Bulkheads along Higbie Creek*

opportunity to reduce the impact the plant has on the Hempstead Bay ecosystem. The County is considering extending the plant’s outfall pipe from Reynolds Channel to the Atlantic Ocean, similar to the Cedar Creek plant in Seaford. An opportunity to improve to improve Bay County Park also exists as part of the soft and hard infrastructure recommendations put forth in the Rebuild by Design (RBD) program (discussed in Section I-C: Critical Issues).

*Picture to right: Home being raised in Bay Park*

## Section III

# Reconstruction and Resiliency Strategies



## Reconstruction and resiliency strategies

Based on input from the NYRCR Planning Committee (Committee), feedback from Public Engagement Events, and background research, six key strategies were developed to guide development and evaluation of Proposed Projects. Proposed Projects were developed around these six strategies and the six recovery support functions (Figure 25).

These projects have been evaluated using qualitative analysis and the Coastal Hazard and Risk Assessment Scenario tool for their cost-benefit, evaluated by the Planning Committee and at Public Engagement Events to garner the public’s support, and reviewed for their ability to protect critical assets. The projects were then identified by their capacity to reduce immediate exposure to risk, serve multiple recovery functions, and support the larger recovery strategy. Projects are discussed further in Section IV.

The section below presents the six reconstruction and resiliency strategies along with a general list of Proposed Projects and Featured identified for each strategy. These strategies and projects are also shown in Figure 25.

### **Strategy A: Protect the coastline from flooding**

Though Superstorm Sandy was an unprecedented event, the sources and causes of flooding observed on the greater scale during Superstorm Sandy are regularly reflected on a smaller scale during high tide events, rainstorms, and nor’easters. The bay shoreline of the Town of Hempstead provides incomplete protection against certain levels of tidal inundation, essentially bay water elevations of approximately seven feet and above.

Strategy A addresses the recovery support functions of Infrastructure and Natural and Coastal Resources. Mitigating frequent flooding due to extreme high tides and stormwater backups will serve everyday benefits while also limiting the risk posed by severe flooding due to inadequate coastal defenses and stormwater infrastructure.

Upgrades to the stormwater infrastructure (addressed in Strategy B) and coastal protections are critical needs to make the NYRCR Bay Park/ East Rockaway Community (Community) more resilient. Strategy A addresses coastal protections

such as bulkhead repairs and living shorelines can be implemented in the medium-term and provide protections against flooding up to seven (7) feet above MHHW, or approximately a 10-year storm. Part of the success of this strategy will be to ensure that shoreline improvements are continuous and comprehensive. These measures will extensive interagency coordination. The NYRCR Bay Park/East Rockaway Plan includes studies to assist local jurisdictions and New York State in identifying strategies that will make the Community resilient in the face of future extreme storms.

In the long term, coastal protections such as flood gates can be implemented to provide protections against catastrophic flooding. A study to determine the feasibility and location of flood gates (i.e., near Silver Point County Park/Atlantic Beach Bridge to intercept tidal flows into West Hempstead Bay) is addressed in Section V-A: *Additional Resiliency Measures*.

### Strategy A: Proposed and Featured Projects

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
A-1	South Shore Shoreline Improvement Program Study	<i>Comprehensive program to facilitate coordinated bulkhead repairs and living shoreline improvements on private property.</i>	\$100,000	Proposed	Y

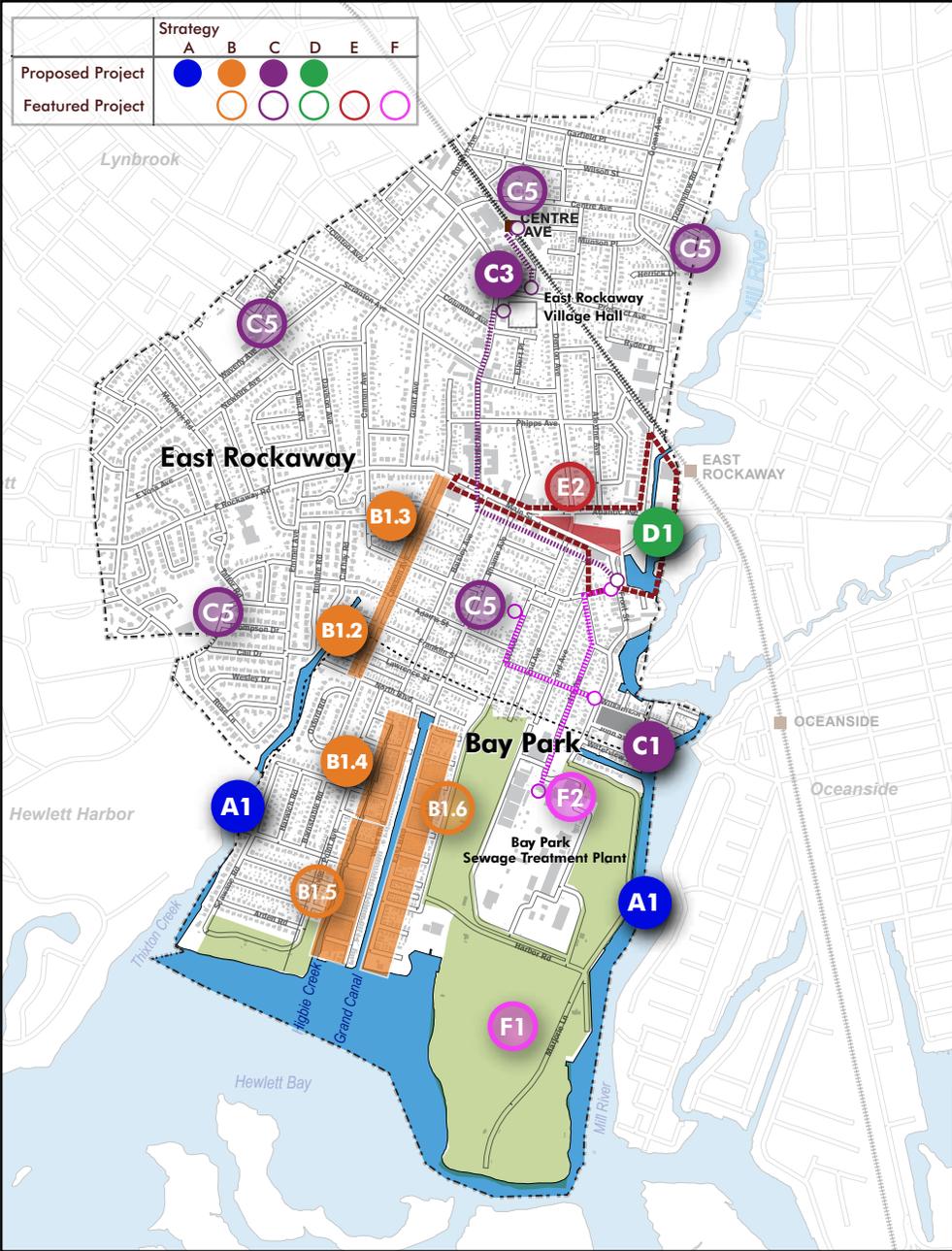


Figure 25: Proposed and Featured Projects

**Strategy A: Protect the Shoreline**

A-1	South Shore Shoreline Improvement Program Study	\$100,000	Proposed
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**Strategy B: Address recurring stormwater drainage issues**

B-1	East Rockaway – Bay Park Drainage Improvements		
B-1.1	Sub-project 1: East Rockaway – Bay Park Drainage Hydrology and Hydraulic Study	\$250,000	Proposed
B-1.2	Sub-project 2: Lawson Ave (part 1)	\$120,000	Proposed
B-1.3	Sub-project 3: Lawson Ave (part 2)	\$2,670,000	Proposed
B-1.4	Sub-project 4: West Blvd (part 1)	\$4,200,000	Proposed
B-1.5	Sub-project 5: West Blvd (part 2)	\$5,200,000	Featured
B-1.6	Sub-project 6: Road Raising of East Boulevard and connecting streets	\$4,800,000	Featured
B-2	Green Infrastructure Implementation Program	\$5,200,000	Featured

**Strategy C: Harden municipal infrastructure and improve capability to respond to storm events**

C-1	Harden East Rockaway DPW Garage and John Street Recreation Center	\$460,000	Proposed
C-2	Local Disaster Recovery Manager (LDRM)	\$200,000	Proposed
C-3	Microgrid network for backup power supply	\$1,000,000	Proposed
C-4	Expand Mobile Disaster Response Capacity in East Rockaway	\$325,000	Featured
C-5	Install Solar Panels at Schools	\$250,000	Featured

**Strategy D: Improve the overall quality of life**

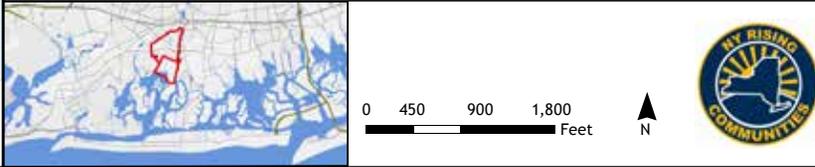
D-1/ E-1	Downtown Resiliency and Redevelopment Strategic Plan	\$195,000	Proposed
D-2	Neighborhood Home Improvement Assistance Program	\$3,000,000	Featured

**Strategy E: Strengthen and protect the local economy**

E-2	Program for Floodproofing of Downtown Businesses	\$150,000	Featured
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**Strategy F: Leverage improvements to Bay Park STP**

F-1	Repairs to Bay County Park	\$8,600,000	Featured
F-2	Microgrid network for backup power supply at Bay Park STP	\$800,000	Featured



## Bay Park and Village of East Rockaway

### **Strategy B: Address recurring stormwater drainage issues**

Many roads in East Rockaway and Bay Park experience recurring flooding as the stormwater drainage system is not operating properly at lower elevations. This nuisance flooding from bay waters, occurs approximately twice a month on

spring tide and moon tides is expected to increase as a result of climate change (which increases both the general sea level and the frequency of extreme events such as high wind induced surges). The drainage system capacity is not sufficient to handle 2013 conditions and siltation of the pipes and recurring tidal flows have reduced the ability of the system to function at its intended capacity.

Strategy B addresses risk by identifying and resolving a critical source of flooding that occurred during Superstorm Sandy but also occurs to a lesser extent on a frequent basis. Mitigating frequent flooding due to extreme high tides and stormwater backups will serve everyday benefits while also limiting the risk posed by severe flooding due to inadequate coastal defenses and stormwater infrastructure.

### **Strategy B: Proposed and Featured Projects**

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
B-1	East Rockaway – Bay Park Drainage Improvements	<i>Drainage Improvements are broken into 6 distinct sub-projects. Su-project 1 (H&amp;H Study) will identify specific needs and plans for Sub-projects 2-6.</i>			
B-1.1	Sub-project 1: East Rockaway – Bay Park Drainage Hydrology and Hydraulic Study	<i>Hydrologic and hydraulic study on the existing stormwater system.</i>	\$250,000	Proposed	N
B-1.2	Sub-project 2: Lawson Ave Drainage Improvements (part 1)	<i>Resolve stormwater issues at Lawson Ave with installation of check valves, wet weather pumps and water storage tank where feasible.</i>	\$120,000	Proposed	N
B-1.3	Sub-project 3: Lawson Ave Drainage Improvements (part 2)	<i>Road raising of Lawson Avenue to 8' and site restoration to address drainage issues.</i>	\$2,670,000	Proposed	N
B-1.4	Sub-project 4: West Blvd/Higbie Creek Drainage Improvements (part 1)	<i>Road raising of north half of West Blvd with site restoration. Includes installation of outfalls, dredging, wetland creation and site restoration at Higbie Creek.</i>	\$4,200,000	Proposed	N
B-1.5	Sub-project 5: West Blvd Drainage Improvements (part 2)	<i>Road raising of south half of West Blvd. Includes installation of outfalls, dredging, wetland creation and site restoration at Higbie Creek.</i>	\$5,200,000	Featured	N
B-1.6	Sub-project 6: East Boulevard/ connecting streets Drainage Improvements	<i>Road raising and site restoration of East Boulevard and connecting streets.</i>	\$4,800,000	Featured	N
B-2	Green Infrastructure Implementation Program	<i>Green infrastructure measures to increase stormwater retention and detention including constructed wetlands, vegetated swales, stormwater street trees, rain gardens and permeable pavements.</i>	\$5,200,000	Featured	N

Data and documentation of existing stormwater infrastructure is largely incomplete for both the Village of East Rockaway and Bay Park. In many cases, stormwater pipes are only partially mapped. The location of stormwater outfalls is known, however information on the existence and condition of check valves is incomplete. A hydraulic and hydrologic study of the NYRCR area will serve as an initial step towards determining the specific needs for stormwater infrastructure

upgrades. A regional watershed-level stormwater management study is also needed to assess how drainage from upland areas are affecting Bay Park/East Rockaway and to determine what improvements are need to handle future conditions. Some of the projects identified will reduce the strain on the stormwater system by reducing runoff. This may include implementing green infrastructure solutions such as impervious pavements, bioswales and raingardens.

**Strategy C: Harden municipal infrastructure and improve capability to respond to storm events**

Strategy C seeks to improve the capacity, communication ability, and coordination amongst emergency response groups and non-profit organizations who were active in helping Bay Park/East Rockaway recovery from Superstorm Sandy. A significant component of this strategy is to preserve and enhance these critical facilities

**Strategy C: Proposed and Featured Projects**

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
C-1	Harden East Rockaway DPW Garage and John Street Recreation Center	Dry floodproofing and installation of flood barriers to protect the DPW site and the John Street Rec Center.	\$460,000	Proposed	N
C-2	Local Disaster Recovery Manager (LDRM)	Fund a local LDRM to coordinate long-term recovery and redevelopment. LDRM will coordinate and manage the overall long-term recovery, provide grant writing services, administration and leveraging of multiple federally-funded projects and programs.	\$200,000 (2 years)	Proposed	N
C-3	Microgrid network for backup power supply	Establish a micgro-grid network to provide backup power for key facilities. A microgrid hub could be located at the (1) Bay Park STP or (2) East Rockaway Village Hall.	\$1,000,000	Proposed	N
C-4	Expand Mobile Disaster Response Capacity in East Rockaway	Purchase of low profile boat and high water vehicle, expansion of storage and floodproofing of radio tower.	\$325,000	Featured	N
C-5	Install Solar Panels at Schools	Install solar panels on roofs of four schools within East Rockaway Union Free School District.	\$250,000	Featured	N

## Bay Park and Village of East Rockaway

so that emergency supplies, evacuation centers, power supplies, and emergency management structures can act effectively in a storm. The strategy also identifies measures to plan, mobilize, communicate and respond to future weather events.

Many of these improvements can be accomplished in the short term. Strategy C addresses the recovery support functions of Community Planning & Capacity Building, Health & Social Services, and Infrastructure. This strategy has co-benefits in that it addresses risks to health and social Service functions as well as vulnerable populations by improving the capacity to evacuate more quickly, locate those who need assistance during the immediate aftermath, and provide resources to return the community back to normal soon after a disaster.

### **Strategy D: Improve the overall quality of life to maintain housing values and give people a reason to stay and invest in the community**

That the economic strain, blight and displacement caused by Superstorm Sandy have the potential to substantially impact the existing neighborhood character. In the short term, Superstorm Sandy has caused the reduction of home values and the weakening of the economic base. In the long-term, there is the risk of loss of middle-income housing to lot consolidation and high-end buildings.

Strategy D serves to help stabilize the Neighborhood’s residential character while also making it better prepared to bounce back from future disasters. Strategy D addresses the Economic and Housing recover support functions. Housing and residential neighborhoods are supported by

projects that will provide residents with resources to help to rebuild more resilient homes that meet FEMA requirements, reduce blight, support the economic base, improve public amenities and restore the surrounding ecosystem.

### **Strategy E: Strengthen and protect the local economy**

Superstorm Sandy revealed that the economic base of downtown East Rockaway is vulnerable to tidal and stormwater flooding. There is a need to strengthen the commercial spine to become a more resilient community where businesses can bounce back more quickly and continue to deliver goods and services after severe events. The area surrounding the Talfor Boat Basin is a unique waterside location that was identified by the community as an opportunity to diversify and strengthen the commercial base and provide new housing opportunities.

## Strategy D: Proposed and Featured Projects

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
D-1/E-1	Downtown Resiliency and Redevelopment Strategic Plan	<i>Plan that identifies housing and economic development opportunities, zoning changes, streetscape improvements and shoreline improvements that improve the resiliency of the downtown commercial district.</i>	\$195,000	Proposed	N
D-2	Neighborhood Home Improvement Assistance Program	<i>Program to facilitate and incentivize home raising and other permanent floodproofing measures.</i>	\$3,000,000	Featured	N
D-3	Pocket parks on West Boulevard, Bay Park	<i>Creation of recreational space with green infrastructure at vacant parcels adjacent to Grand Canal.</i>	\$1,000,000	Featured	N

Strategy D serves to help stabilize the Community’s CBD area, with measures to encourage growth while also making it better prepared to bounce back from future disasters. Identified projects will help to foster economic growth by building on Downtown East Rockaway’s advantages of being

located along the water. This strategy recognizes the need to develop a plan for Downtown East Rockaway that addresses zoning and resilient building design guidelines, land use, streetscape character, and transportation for all modes (i.e., vehicular, transit, pedestrian, bicyclists). Planning

efforts should also address new opportunities for resilient housing such as mixed-use and transit oriented redevelopment in the downtown area. Strategy E addresses the Economic, Housing, and Community Planning & Capacity Building recover support functions.

**Strategy E: Proposed and Featured Projects**

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
E-2	Program for Floodproofing of Downtown Businesses	<i>Program to facilitate and incentivize permanent flood-proofing measures for businesses.</i>	\$150,000	Featured	N

**Strategy F: Leverage improvements to Bay Park STP to provide needed local amenities**

Nassau County is in the process of repairing, upgrading and hardening the Bay Park STP. The burdens placed on the local community by the presence of the Bay Park STP were recognized by not only the Committee, but the larger Community as well. As such, the Committee identified the opportunity to leverage the \$810 million investment planned for the Bay Park

STP to increase the overall resiliency of the host community.

This strategy includes repairs at Bay County Park as a featured project. This project would advocate for Nassau County to provide further improvements to the southern and western areas of Bay County Park in Bay Park. This would entail the relocation of ball fields to the south side of the park, which will allow the construction staging for Bay Park Sewage Treatment Plant to continue while improvements are made concurrently to the

Park. Such phasing will allow for the redesign of the existing ball fields as passive recreational space, and provide residents with access to the canal for fishing. Establishing a microgrid hub project identified that leverages improvements at the sewer treatment plant. The microgrid would provide a backup power supply during storm events to the plant and nearby critical facilities in the Community. Strategy F addresses the recovery support functions of Infrastructure, Health and Social Services, and, Natural and Cultural Resources.

**Strategy F: Proposed and Featured Projects**

ID	Project Name	Project Description	Estimated Cost	Proposed or Featured	Regional Project (Y/N)
F-1	Repairs to Bay County Park	<i>Improvements to Bay County Park including ball fields, passive recreation space and access to water for fishing and boating.</i>	N/A (advocacy)	Featured	Y
F-2	Microgrid network for backup power supply at Bay Park STP	<i>Establish a microgrid network with hub at BP STP and above ground conduits to transformer at 5th &amp; Williamson, DPW, and Rhame Avenue School</i>	\$800,000	Featured	N

## Bay Park and Village of East Rockaway

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*Picture to right: Bay County Park*

A landscape photograph of a golf course. In the foreground, several large, mature pine trees with dense green needles are scattered across the frame. The middle ground is a vast, well-maintained green lawn, likely a fairway or green. In the far distance, a large industrial building with two tall, thin smokestacks is visible against a hazy, overcast sky. The overall scene is a mix of natural beauty and industrial presence.

## Section IV

### Implementation - Project Profiles

## Section IV: Implementation - Project Profiles

### A. Project Screening and Selection

The NYRCR Program has allocated to the Community up to \$6.65 million (Bay Park: \$3.65 million; Village of East Rockaway: \$3 million). The funding is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program. While developing projects and actions for inclusion in the NYRCR Plan, Planning Committees took into account a number of factors (Figure 26) including 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. The projects and actions set forth in the NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in the NYRCR Plan does not necessarily indicate the Community’s identification of these projects and actions.

Proposed Projects are projects proposed for funding through the 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.

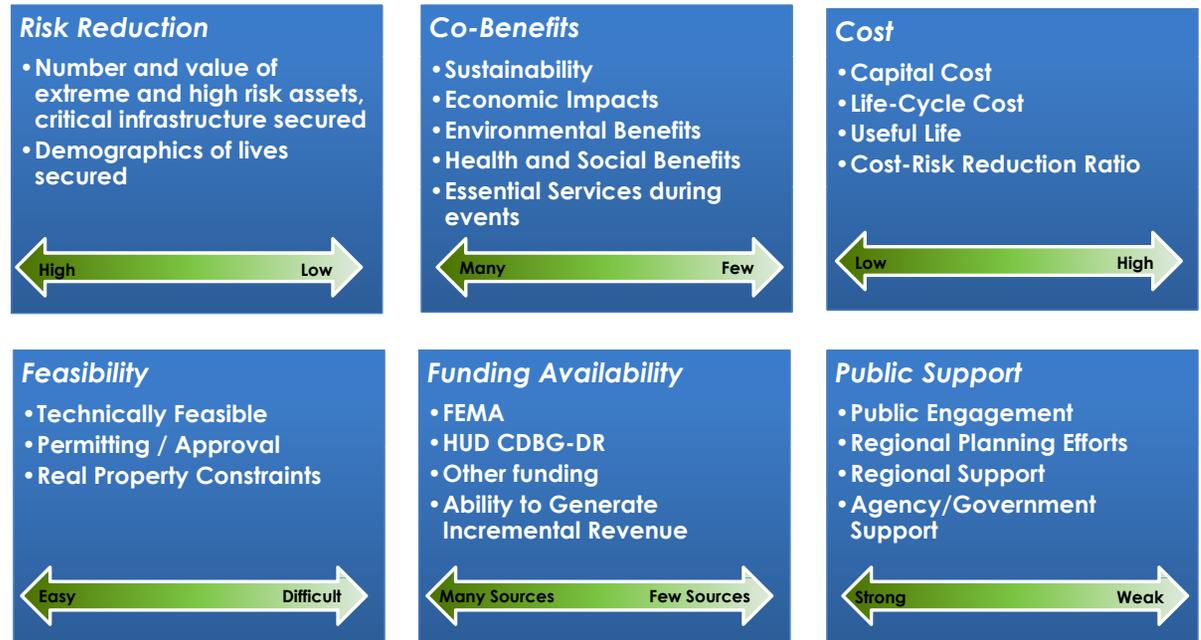


Figure 26: Project Screening Criteria

Additional Resiliency Recommendations (see Section V-A) are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

The total cost of Proposed Projects in the 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 the 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 the NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG DR funding or that it will be implemented.

## NYRCR Project Descriptions

This section provides an overview of each potential NYRCR project including the elements listed below:

- **Project Description:** a brief summary of the project including tasks, components or phases;
- **Cost:** high (over \$1 million), medium (between \$1 million and \$500,000), or low (less than \$500,000);
- **Benefits:** whether the project has local direct benefits within Bay Park & the Village of East Rockaway or regional benefits, and whether those benefits are primarily public or private;
- **Cost benefit:** The following types of benefits were reviewed for the cost-benefit analysis: risk reduction benefits, economic benefits, environmental benefits, and health and social benefits;
- **Timeframe for Implementation:** provides an anticipated timeframe required to implement the project. This is classified as immediate (can be completed in two years or less from start of project), intermediate (can be completed in two to five years from start of project), or long-range (will require more than five years to complete from start of project);
- **Regulatory Requirements:** consideration of whether a project is technically feasible, likely to face regulatory obstacles including issues with permits or other approvals, any real property constraints, and project readiness;

- **Jurisdiction:** The entity with jurisdiction over the project, such as the Village of East Rockaway or Town of Hempstead; and,
- **Funding:** consideration of whether a project is best suited for implementation funding through the NY Rising Community Reconstruction Program, or with other state, federal, county, or local funds. Possible funding sources are noted for each potential project; however, the ultimate funding source(s) will be determined at a later stage in the planning process.

### **Adding up the Costs**

The Committee worked with a team of cost estimators, engineers, architects, landscape architects and planners (Consultant Team) to develop estimated costs for each proposed/ featured project. All costs are preliminary and based on available data as well as the Consultant Team’s understanding of the issues learned through site visits, Committee member knowledge and feedback, and input from the greater East Rockaway/Bay Park community. Local government entities and nonprofit organizations also provided input regarding project scope and estimated costs. As available, Construction costs are based upon similar projects that have been constructed within the greater Nassau County area. Where applicable, actual construction cost quotes from vendors were used. Each phase within a project (design, construction, construction management and other direct labor costs) include a contingency factor; and, costs are based on the level of detail available for each individual project at the time of the estimate.

### **Maximizing the Benefits**

All Proposed and Featured Projects underwent a qualitative analysis of their anticipated costs and benefits, in accordance with NYRCR Program Guidance. The purpose of the cost-benefit analysis is to assist the Committee in improving these projects and to identify actions for implementation. The proposed implementation schedule developed by the Committee by utilizing this cost benefit analysis aims to identify a comprehensive set of projects that are best able to achieve the greatest benefits at the least cost.

The following types of benefits were reviewed for the cost-benefit analysis, in accordance with NYRCR Program Guidance:

- Risk Reduction Benefits;
- Economic Benefits;<sup>27</sup>
- Environmental Benefits; and,
- Health and Social Benefits.

For feasibility studies, action plans or advocacy projects, the discussion of benefits related to the potential benefits that would result from future implementation of the selected alternative or recommendations developed through the course of study or advocacy. In addition, some projects are scalable; the benefits of these projects are considered in their current state, and potential benefits that would result from development into regional or larger-scale projects are noted where appropriate.

## Bay Park and Village of East Rockaway

### **A1 - South Shoreline Improvement Program Study** [Proposed Project]

**Project Description:** This study would examine methods for making coordinated shoreline improvements along the shoreline of the Town of Hempstead to achieve a contiguous shoreline. The goal of the study would be to investigate funding mechanisms, streamlining permitting, and options for incentivizing bulkhead repairs and living shoreline improvements.

The Town of Hempstead shoreline is largely privately-owned and individual homeowners have limited resources to make necessary improvements. Feedback from Committee Meetings and Public Engagement events reinforced the need to study the potential for a coordinated approach to making necessary improvements.

The Community's shoreline is characterized by a mix of hard protection such as bulkheads and "soft" protection, such as wetlands, rip-rap and shoals. Both types of protection are in need of maintenance and repair and in some cases improvement to be able to withstand the eroding forces of the tides especially in regards to sea level rise along the back bays community, including those in the range identified above. Because the elevation of many of the areas behind the Town's shoreline are below the existing shoreline, any opening in the shoreline protection has the potential to spread flooding landside. Furthermore as vulnerable spots in the shoreline erode, they progressively erode faster leading to even more widespread flooding. The current condition of the Bay's shoreline provides incomplete protection against certain levels of tidal inundation; essentially bay water elevations of seven to eight feet and above. Although such

water levels include the conditions experienced with Superstorm Sandy, the specific water levels associated with Superstorm Sandy are rare.

The proposed study would address:

- A preliminary analysis of South Shore estuary shoreline conditions, including an inventory and assessment of shoreline conditions, development of a GIS database of current shoreline protection and development of options for potential solutions to restore shorelines with hard, hybrid-structural, living shoreline and wave attenuation measures;
- regulatory considerations and coordination between the government agencies that would need to be involved with this effort (including DOS, DEC, Town of Hempstead, the USACE, and FEMA);
- streamlining the permitting process to enable further control by the potential implementing agency over the process while still maintaining the established guidelines;
- implementation and administrative costs to be borne by the potential implementing agency (e.g., inspections, developing geographic information systems data, etc.); and,
- financing and funding opportunities (including grants) for improvements on privately owned properties.

**Cost:** : A suggested allocation of \$50,000 per Village or Hamlet, totaling \$100,000 for Bay Park – East Rockaway, would be utilized for the

purposes of this study; participation by additional NYRCR Communities would provide economies of scale for expanding the scope and outcomes of the study.

**Benefits:** The recommended implementation actions resulting of the study could provide local, private benefits to each participating NYRCR Community and regional, public benefits to the south shore of the Town of Hempstead. The populations that would benefit from a reduction of risk are those people that live along the Community's shoreline. The combined population of block groups along the project area shoreline is 33,213 persons.

*Economic benefits:* This project could create an estimated one (1) full time equivalent job from the funds contributed by the Bay Park – East Rockaway NYRCR Community.<sup>27</sup> While the study would not have direct economic benefits, its goal of contiguous shoreline improvements can have a positive impact on property values in the immediate area around the shoreline. As the shoreline becomes more attractive the resale value of the homes can increase. This would ultimately have an impact on the taxable values of the homes, which would translate into increased income for the Town and Village.

Additionally, the repaired bulkheads and restored shoreline could prevent future property damages. Since this area is a major contributor to storm surge damage, the savings from damages could be significant.

*Environmental Benefits:* Implementation of the study's potential recommendations would help

to secure all of all environmental assets in East Rockaway-Bay Park due to increased resiliency. The living shoreline component of the project could protect wetlands, enhance or maintain habitat for plants and animals and provide aesthetic value.

**Health and Social Benefits:** The Proposed Project impacts all populations along the shoreline in multiple communities within the Five Towns, South Valley Stream and East Rockaway-Bay Park Community Reconstruction NYRCR communities. The total population within each block group along the Hempstead shoreline is 33,213, which represents the overall population with improved access to health and social service facilities as a result of the Proposed Project.

The outcome of this study seeks not to secure a specific health and social services facility, but instead aims to protect the multiple health and social services assets along the Hempstead shoreline among several different NYRCR communities.

**Cost benefits:** In addition to protecting against storms of Superstorm Sandy’s magnitude, Bay Park/East Rockaway is one of several NYRCR Communities along the south shore that recognizes the need for regionally coordinated shoreline improvements to create a contiguous line of protection against smaller, more frequent storm events. The modest investment of \$100,000 for the Bay Park – East Rockaway Community could spur regional cooperation to determine the most cost-effective and feasible way to achieve this necessary level of coastal protection.

**Risk reduction:** The potential recommendations resulting from this study include strengthening

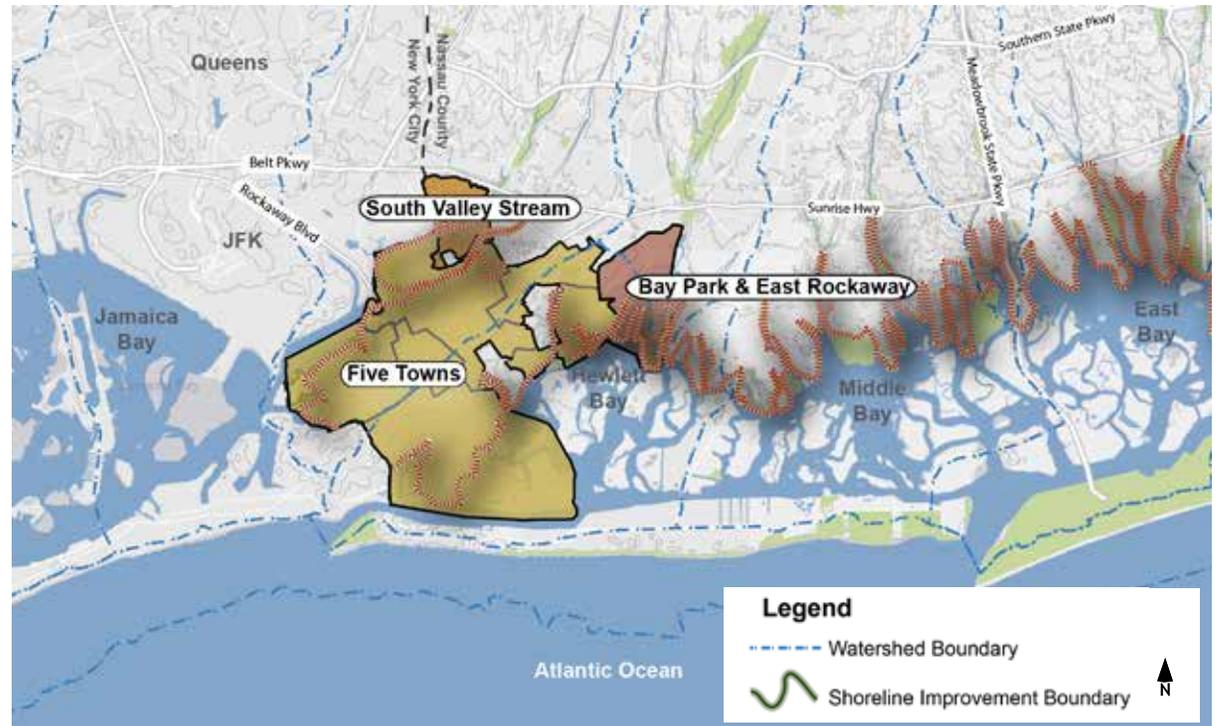


Figure 27: Shoreline Improvement Program Area

coastal defenses, such as bulkheads and seawalls, dunes and wetlands. Improving these coastal protective features would decrease the exposure experienced by landside assets by preventing or reducing the frequency of marine inundation, and by moderating damage caused by storm surge and wave action. Assets thus protected are less likely to experience flooding and are therefore less vulnerable.

For the purposes of the Coastal Hazard and Risk Assessment Tool, all landscape attributes would remain the same under project implementation, assuming that the study’s recommended improvements would protect against a 10-year

storm, while the Tool is calibrated to determine risk reduction benefits under a 100-year storm. However, the implementation of this project could reduce the vulnerability (loss of service) of assets to the impacts of 100-year storms; therefore, the vulnerability score of all assets was reduced by 1.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** No permits are required to complete a study. Coordination would be required with NYS Department of State, Department of Environmental Conservation, Town of Hempstead, Nassau County, the US

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Army Corps of Engineers, and Federal Emergency Management Agency; as well as public outreach to private property owners and nonprofit organizations.

**Jurisdiction:** Town of Hempstead, Nassau County



*Bulkhead condition along Higbie Creek*



*Bulkhead condition along Higbie Creek*

**B1 - East Rockaway - Bay Park Drainage Improvements [Sub-Projects 1-4: Proposed Projects, Sub-Projects 5-6: Featured Projects]**

**Project Description:** During Superstorm Sandy, the stormwater system within East Rockaway and Bay Park backed up with runoff and storm surge inundation as result of the lack of drainage into the canals and creeks and the lack of back-flow valves on the outfalls. The mixture of stormwater drainage flooding and surge flooding makes it difficult to assess whether the flooding resulted from water back up in the storm drains or overtopping of lower elevations. Rainfall was not significant with Superstorm Sandy, which would have compounded flooding effects. Some roads such as Lawson Avenue, North Boulevard, East Boulevard and West Boulevard experience recurring flooding approximately twice a month (on spring tide and moon tides). These corridors serve as “lifeline” routes that connect the communities to emergency services locations and critical facilities, and allow residents to evacuate to higher ground during storm events. As described earlier, the continual flooding has had many negative impacts to the delivery of municipal services, private property, safety, and quality of life throughout the community.

The existing drainage infrastructure is not operating properly for a number of reasons:

- The drainage outfalls are located below the high tide elevation, which causes tidal waters to enter the drainage system through unprotected outfalls and overflow into the streets;
- The outfalls are not equipped with backflow valves/gates;
- Storm drains are often blocked with debris

and sediment and require very frequent maintenance;

- The system is gravity driven and does not have enough potential energy to convey the flows to the outfalls, therefore the water gets to Lawson Avenue and it stays there; and,
- Despite cleaning of manholes, the system itself has so much siltation that it is functioning at 20-30% of its intended capacity. The capacity of the current drainage system may not meet current regional development demands, which warrant further study.

Although these are all likely to be contributing factors to the drainage infrastructure, limited available information about the existing stormwater infrastructure (i.e. maintenance of the pipes, sedimentation of the pipes, creeks and outfalls) requires that a hydrology and hydraulic (H & H) systems study be conducted first to assess the existing infrastructure – in order to determine the best interventions to undertake. The H & H study, identified as Sub-Project 1 below, would result in workable plans to fix drainage issues in Bay Park and East Rockaway.

Sub-Projects 2 through 6 are developed based on current available data and known stormwater issues along Lawson Avenue, West Boulevard and Higbie Creek, and East Boulevard. These projects were identified by the Village and the Town as preferred interventions to address the drainage issues. However, while project scope and costs were developed for these Sub-Projects, the results of the Sub-Project 1 H & H Study may recommend

other solutions/options to stormwater issues in these areas, resulting in alternative Sub-Projects 2 through 6. Furthermore, Sub-Projects 2 through 6 have been developed to resolve the stormwater management issues along these ‘lifeline’ corridors, and as such would proceed according to the recommendations developed in Sub-Project 1.

**Sub-Project 1: East Rockaway/Bay Park Hydrology and Hydraulic Study (Proposed)**

This project would study the hydrologic and hydraulic (H&H) systems affecting the Village of East Rockaway and Bay Park. The objective is to gain a watershed-level understanding of the hydrology and hydraulics affecting this area within the community and provide feasible alternatives to address the storm water inadequacies, which would better inform storm water management projects.

A hydrologic and hydraulic study of the watershed would be undertaken to determine where the runoff is coming from, how much, where is it going, and whether the current system is adequate to handle current and future conditions. The total cost of the study is estimated to be \$250,000, which includes four parts:

- An existing conditions analysis with visual inspections of the stormwater catch basins, pipes, outfalls and related infrastructure, stormwater pipe and outfall flow monitoring and updates of the existing stormwater infrastructure system mapping;
- A watershed analysis that compiles

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available GIS data, delineates drainage basins and defines drainage parameters;

- Development and calibration of a “future-conditions” model that includes long-term precipitation and tidal elevation datasets, evaluates historic and future synthetic design events, and simulates typical-year precipitation, accounting for projected land use, precipitation and sea-level rise changes; and,
- Conduct and analysis of alternatives that evaluates model results to identify existing system deficiencies, and develops stormwater and tidal-flow management alternatives to address those deficiencies. Alternative scenarios would be simulated within current and future-condition models, and results would be evaluated in conjunction with a cost-benefit analysis. The project would identify measures that would be needed to ensure adequate stormwater management/capture such as storage basins, the use of green infrastructure and pipe capacity increase.

### ***Sub-Project 2: Lawson Avenue Drainage Improvements - Part 1 (Proposed)***

To address the known condition of tidal water entering the stormwater system and flooding the adjacent street, this project would install a total of five (5) check valves at the outfall that drain from Lawson Avenue into Thixton Creek. The valves would prevent tidal waters from entering the system but allow for storm water flow to exit the system during low tides.

The total cost of the project is estimated to be \$120,000 which includes Installation of check valves on outfalls and Site Restoration - bulkheads, etc., Environmental Analysis (NEPA, ESA, Mitigation, etc.), and Regulatory Approvals/Permits Requirements. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, as well as contingencies for project design and construction management.

### ***Sub-Project 3: Lawson Avenue Drainage Improvements - Part 2 (Proposed)***

This project includes the raising of Lawson Avenue to an elevation of eight feet to address the gravity drainage issues underneath. During Superstorm Sandy and Hurricane Irene, and currently during moon tides or minor rain events, Lawson Avenue experiences localized flooding. The Hydrologic and Hydraulic (H&H) analysis in Sub-Project 1 would help determine the actual rainfall/runoff that would need to be captured within this area. Due to the groundwater elevations, groundwater recharge is not a viable option. The total cost of the project is estimated to be \$2,670,000 which includes surveying, excavation and disposal, new pipe to outfall, site restoration - pavement, sidewalks, etc., re-paving, traffic control and flagging. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, as well as contingencies for project design and construction management.

A potential section profile for this road raising is shown in Figure 28. Existing drainage issues and proposed improvements are also shown in Figures 29 & 30.

### ***Sub-Project 4: West Boulevard/Higbie Creek Drainage Improvements - Part 1 (Proposed)***

To address the known condition of tidal water from the Higbie Creek entering the stormwater system and flooding the adjacent streets, this project would install a total of three (3) check valves at the outfall that drain from West Boulevard into Higbie Creek. The valves would prevent tidal waters from entering the system but allow for stormwater flow to exit the system during low tides. The project would also address invasive species within the creek and excess sedimentation. Invasive species would be removed and excess sedimentation would be dredged. The Creek would then be re-graded and planted with native wetland species. The dredging of the excess sediment would allow for stormwater flow to exit the system.

This project would also raise the section of the roadway on West Boulevard between North Boulevard and Hudson Avenue to alleviate stormwater drainage issues and recurring localized flooding. The low elevation of segments of these roadways makes them susceptible to varying levels of tidal flooding from the adjacent Higbie Creek. Such tidal flooding occurs on a monthly basis along with significant flooding when major rainstorms coincide with a high tide period, resulting in roadway closures. In addition to the costs to the municipality caused by the necessary reaction to these events, there is a disruption in sanitary curbside garbage collection, interruption of mail services, and, school bus route changes. A general loss of productivity and enjoyment by the residents is experienced when one has to plan departing and returning to home around the tide schedule but there is also the threat of safety especially to the elderly and handicapped population of the area who may need access to

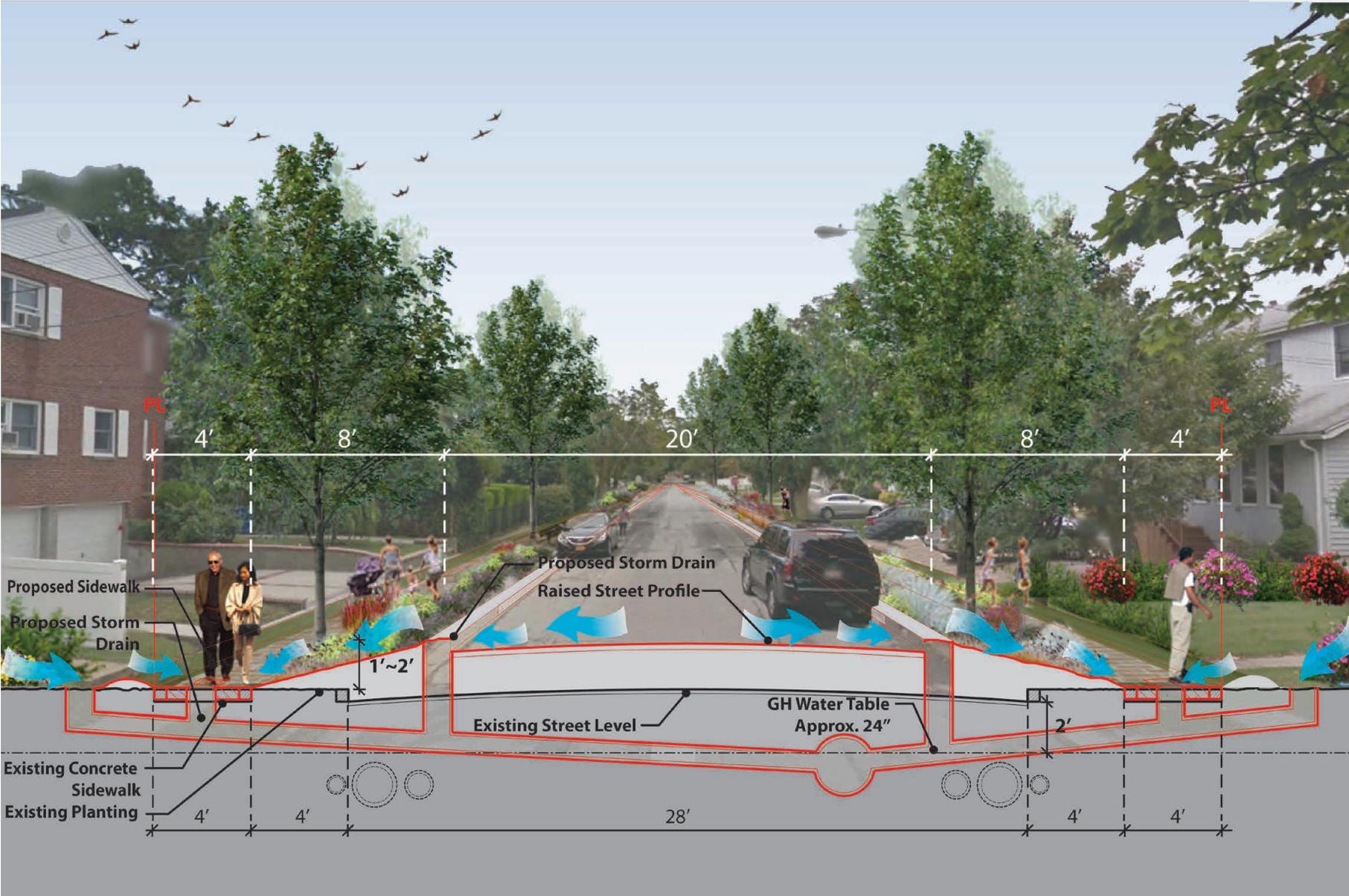


Figure 28: Potential section profile for Lawson Avenue road raising

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Figure 29: Existing drainage issues at Lawson Avenue



Figure 30: Proposed drainage improvements at Lawson Avenue

doctors, hospitals and or pharmacies. The tidal flooding has often caused damage to vehicles parked and/or driven through the salt water that is flooding the roadway. Residents also experience damage to private property including but not limited to their lawns and landscaping. The continual flooding has directly affected the quality of life throughout the community and property values have suffered.<sup>28</sup>

The total cost of the project is estimated to be \$4,600,000 which includes the installation of check valves on outfalls, dredging, wetland creation and Site Restoration - bulkheads, surveying, excavation and disposal, repaving roadways, traffic control and flagging. Environmental Analysis (NEPA, ESA, Mitigation, etc.), and Regulatory Approvals/Permits Requirements. Project costs incorporate operating and maintenance costs, escalation, construction

administration, contract management, as well as contingencies for project design and construction management.

### **Sub-Project 5: West Boulevard/Higbie Creek Drainage Improvements - Part 2 (Featured)**

This project addresses drainage issues from Higbie Creek tidal water entering the stormwater system and flooding the adjacent streets (see Figure 31 & 32). Check valves would be installed at five (5) outfalls that drain from West Boulevard into Higbie Creek. The valves would prevent tidal waters from entering the system but allow for storm water flow to exit the system during low tides. The project would also address excess sedimentation accumulating within the creek and would be dredged. The dredging of the excess sediment would allow for stormwater flow to exit the system.

This project would also raise the section of the roadway on West Boulevard between Hudson Avenue and Hewlett Bay to alleviate stormwater drainage issues and recurring localized flooding.

The total cost of the project is estimated to be \$5,500,000, which includes the installation of check valves on outfalls, dredging, wetland creation and site restoration - bulkheads, etc., surveying, excavation and disposal, repaving roadways, traffic control and flagging, environmental analysis (NEPA, ESA, mitigation, etc.), and regulatory approvals/permits requirements. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, as well as contingencies for project design and construction management.

**Sub-Project 6: East Boulevard/Connecting Streets Drainage Improvements (Featured)**

This project would build upon Sub-Projects 4 and 5 to raise additional roadways in Bay Park, including East Boulevard, surrounding streets and connecting streets to West Boulevard. The total cost of the project is estimated to be \$4,800,000, which includes surveying, excavation and disposal, new pipe to outfall, Site Restoration - pavement, sidewalks, repaving, traffic control and flagging. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, as well as contingencies for project design and construction management.

**Cost:**

- Sub-Project 1: Low (approximately \$250,000)
- Sub-Project 2: Low (approximately \$120,000)
- Sub-Project 3: High (approximately \$2,670,000)
- Sub-Project 4: High (approximately \$4,200,000)
- Sub-Project 5: High (approximately \$5,200,000)
- Sub-Project 6: High (approximately \$3,900,000)

**Benefits:** Local, Public

*Economic Benefits:* Sub-project 1 of this project could create an estimated 3 full-time equivalent jobs, while sub-projects 2-6 could create approximately 1, 29, 50, 60, and 52 jobs, respectively, for a cumulative total of approximately 192 full-time equivalent jobs.<sup>27</sup> These figures are tentative, as sub-projects 2-6 could change given the results of the sub-project 1 H&H Study. Additional job creation for maintenance of the new system improvements depends on the type of improvements being installed. Other economic benefits come from additional skills required



**Figure 31: Existing drainage issues at East & West Boulevards**

Photo source: Bing Maps

from workers to complete the improvements. Since significant portions of the improvements involve “green” techniques, many workers in the field would require new skill sets that often incorporate different approaches to drainage systems and soft infrastructure systems. A more skilled workforce can become more productive and also command a higher price for their work.

*Environmental Benefits:* The proposed stormwater infrastructure system improvements include increasing capacity and incorporation of green infrastructure measures, which would help to secure all environmental assets in the Community. Environmental assets that would be secured include upland resources such as Kevin

E. McNulty Park, Minore Park, Hewlett Point Park, Bay Park and White Cannon Point Park. The latter phases of the project would focus on the Lawson Avenue area, and include raising the elevation of Lawson Avenue to address the gravity drainage issues underneath, and incorporating green infrastructure to increase the infiltration and capture of stormwater and reduce the peak flow volumes of stormwater. The Lawson Avenue area improvements infrastructure would have beneficial effects to the water quality and aquatic habitat of Thixton Creek, helping to secure this environmental asset. The green infrastructure measures in particular would help to protect the creek from polluted runoff, prevent water quality degradation and restore water quality.

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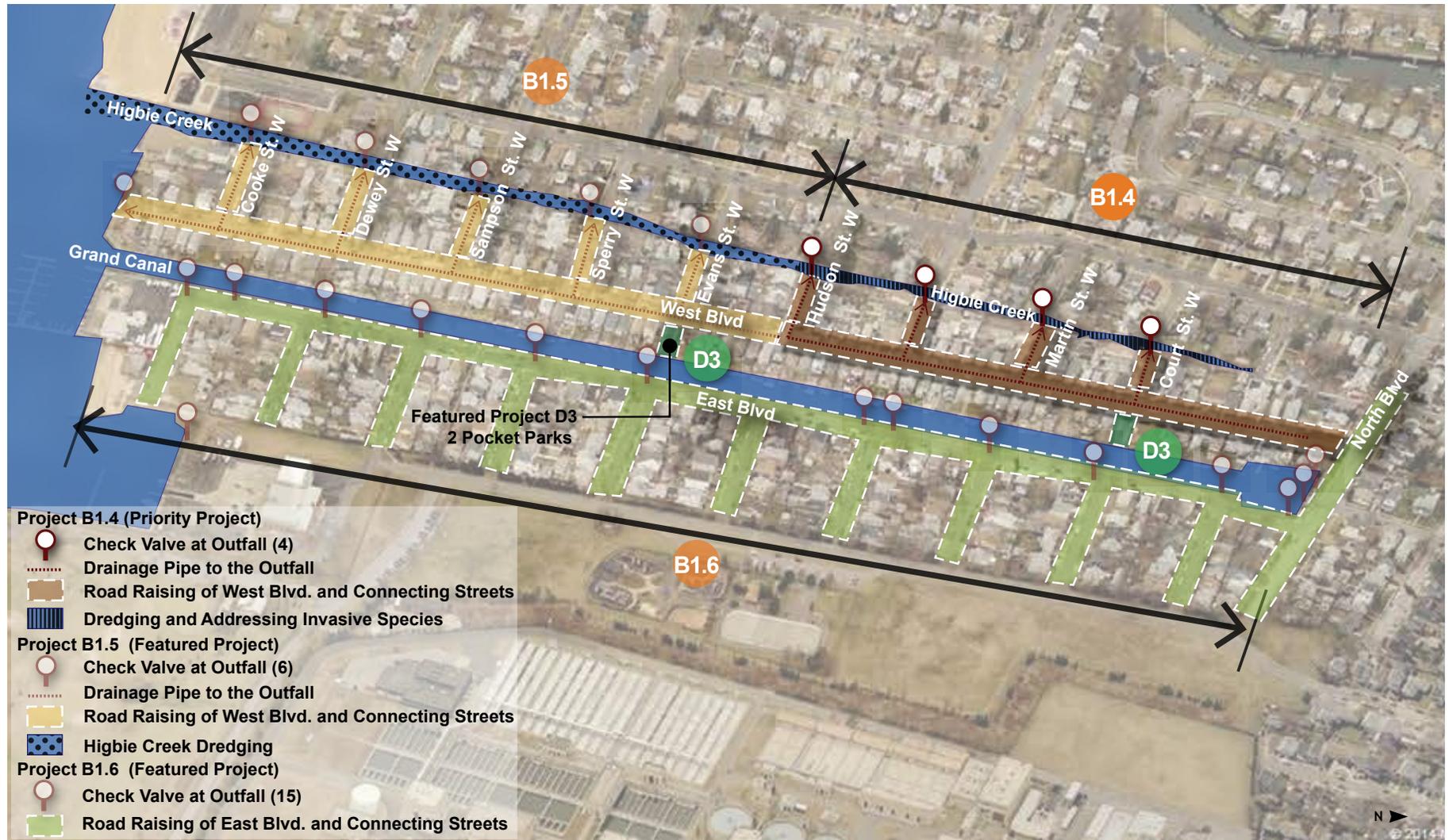


Figure 32: Projects addressing drainage issues at East Blvd., West Blvd., and Higbie Creek

Photo source: Bing Maps



Higbie Creek

The NYSDEC has identified three types of significant natural communities along portions of the western shore of Thixton Creek and along portions of the Bay Park shoreline: Low salt marsh at West Hempstead Bay Wetlands, High salt marsh at West Hempstead Bay Wetlands, and Salt panne at West Hempstead Bay Wetlands.<sup>29</sup> These significant natural communities would also benefit from the Proposed Project.

The proposed stormwater management measures in Higbie Creek include natural stormwater infiltration and wetlands restoration, which would benefit and secure Higbie Creek. The project design would minimize impacts to threatened and endangered reed grass species, if any present in the Creek and would incorporate any necessary mitigation. By converting habitat dominated by invasive species to habitat with native wetland plant species, the project would increase the overall ecological uplift of the area. The project would have an overall beneficial effect on the water quality and aquatic habitat of Higbie Creek as well as Hewlett Bay and the greater Hempstead Bays, including habitat that



Higbie Creek

may support threatened and endangered wildlife species. As the Proposed Project would increase the resiliency of the Higbie Creek area in general, it would also protect additional environmental assets in the immediate vicinity such as Hewlett Point Park.

An unidentified threatened or endangered species of reed grass occupies portions of Higbie Creek. The project would require work in the creek that would displace some of the reed population. As such, the project would require the appropriate approval from NYSDEC and would likely include development and implementation of mitigation measures for the reed grass. A possible location for the mitigation site is the upper reaches of the creek. The project would include the identification of alternative or additional mitigation sites, if necessary.

Sub-projects 4, 5 and 6 would raise the elevation of West Boulevard and East Boulevard. Protected environmental and cultural assets include the Bay Park Playground and the open space surrounding the playground.

**Health and Social Benefits:** The Proposed Project impacts the a total population of 3,451. This project does not secure a specific health and social services facility, but instead aims to protect all health and social services assets by improving stormwater management within the East Rockaway/Bay Park Community, especially in the vicinity of Lawson Avenue in East Rockaway and East and West Boulevards in Bay Park. The project may provide health and social benefits by filtering stormwater runoff from impervious surfaces using green infrastructure, and improving water quality for the Community.

**Cost Benefits:** Stormwater drainage issues were identified as important to the NYRCR Committee, Community and Village of East Rockaway due to routine localized flooding following Superstorm Sandy. This phased approach to resolving critical stormwater drainage issues, at a cost of \$7,640,000 for four proposed sub-projects and \$9,400,000 for two featured sub-projects, would provide a comprehensive flood mitigation strategy that would improve access along three key roadways, avoid costs of damaged property and reduce government expenditures for emergency response, while improving the environmental quality of Higbie Creek.

**Risk Reduction:** Assets in Bay Park and East Rockaway are susceptible to flooding because of poor drainage of precipitation through the stormwater sewer system, inundation by seawater back flowing through the stormwater sewer system, and the generally low elevations in portions of the communities. These projects would reduce the vulnerability of assets along Lawson Avenue, East Boulevard and West Boulevard by addressing these problems and thus reducing

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the frequency and severity of flooding during precipitation events and spring tides. Assets that provide a service would therefore experience fewer and/or shorter periods when service is unavailable.

Sub-project 1 would provide feasible alternatives to address the stormwater inadequacies and prevent flood in the area by upgrading pipe capacity, preventing backflow, and ensuring adequate stormwater management. The study would also identify the implementation of Green Infrastructure practices.

Sub-project 2, and portions of Phase 4 and 5 and the Implementation of Sub-project 1 recommendations, aims to prevent backflow of the drainage system, so water can flow in the discharge direction only, improving drainage capacity and helps to prevent or minimize flood damage.

By raising the roadway elevations in Sub-projects 3, 4, 5 and 6, rain water would take longer to raise above road level and rain intensity has to be higher to be a hazard; by upgrading the drainage pipe capacity, water would be discharged faster and minimize the time that water stands above road level. After the implementation of these projects the community would benefit from avoiding walking or driving in a flooded road, and emergency vehicles provide better service to the community.

Sub-project 1 of this project would benefit the entire population of the East Rockaway/Bay Park community, approximately 11,973. As Lawson Avenue is a key access corridor in the Village of East Rockaway, and East and West Boulevards are key access corridors in Bay Park,

Sub-projects 2 – 6 would indirectly benefit the entire East Rockaway/Bay Park community. Sub-projects 2 and 3 would have direct benefits on the population of approximately 449 living along Lawson Avenue. Phases 4 and Phase 5 would have a direct benefit on the population living along West Boulevard, approximately 194, while Sub-project 6 would have direct benefit on the population living along East Boulevard, approximately 512. Specific characteristics of the population are described below in the health and social benefits subsection.

### **Timeframe for Implementation:**

Sub-Project 1: Immediate (< 2 years)  
Sub-Project 2: Immediate (< 2 years)  
Sub-Project 3: Intermediate (2-5 years)  
Sub-Project 4: Intermediate (2-5 years)  
Sub-Project 5: Intermediate (2-5 years)  
Sub-Project 6: Intermediate (2-5 years)

**Regulatory Requirements:** All 6 Sub-Projects that fall under this East Rockaway – Bay Park Drainage Improvements project are likely feasible and build upon one another for complete storm water drainage solutions. Sub-Project 1 aims at looking at a watershed approach to determine the deficiencies, if any, in the existing system within East Rockaway and Bay Park. Sub-Project 2 implements an immediate solution to the tidal water entering the storm water system and preventing nuisance flooding. Sub-Project 3 would require a wholesale coordination with owners of private property fronting Lawson Avenue and would require approvals and easements from property owners.

Coordination with the Town and Village would be required, as well as DEC given that changes

to drainage, hydrology and stormwater would occur. Necessary regulatory permits may include Nassau County and the Town of Hempstead as well as National Water Permit #7, 43, if the sub-project is seaward of mean high water and/or discharge or removal of fill into waters of the United States.

Project implementation can begin once Sub-Project 1 is completed and the design, permitting and environmental review are complete. The Engineering Study would be completed in Sub-Project 1 to determine and reinforce the feasibility of Sub-Projects 2 through 6.

**Jurisdiction:** Town of Hempstead, Village of East Rockaway, Nassau County. A multi-jurisdictional committee/consortium of municipalities could be considered, as well. This form of governance and administration has proven successful on Long Island, as represented by both the Hempstead Harbor Protection Committee and Manhasset Bay Protection Committee. Potential actions of such a multi-jurisdictional committee/consortium might include being able to appoint a fiduciary to be responsible for grant management, with the committee/consortium itself being responsible for project management. The recent New York – Connecticut Sustainable Communities Consortium, a program funded by a HUD Sustainable Communities Regional Planning Grant, used this structure and was successful in carrying out the planning program over a wide geography and across numerous municipal boundaries.

## B2 - Green Infrastructure Implementation Program [Featured]

**Project Description:** This project would develop a Green Infrastructure Implementation Program for the NYRCR Community. As discussed in the previous project, the stormwater infrastructure system in East Rockaway and Bay Park contributed to localized flooding during Superstorm Sandy. While the system requires further study to identify specific problem areas, minor localized flooding could be alleviated by retaining stormwater upstream through green infrastructure. Program measures include converting impervious pavements to pervious pavements on public property (e.g. school parking lots), developing a homeowner education campaign to encourage green infrastructure improvements on private property, and enacting zoning changes to incentivize green infrastructure for redevelopment.

The total cost of the project is estimated to be \$5,620,000, which includes review of existing information, siting analysis, and the design and construction of best management practices (i.e., constructed wetlands, vegetated swales, stormwater street trees, rain gardens, permeable pavements, rainwater harvest and reuse). The project cost also incorporate environmental review, regulatory approvals and permit requirements, and contingencies for project design and construction management.

**Cost:** High (approximately \$5,200,000)

**Benefits:** Local, Public

**Economic Benefits:** This project could create an estimated 61 full-time equivalent jobs.<sup>27</sup> Other economic benefits come from additional skills required from workers to complete the

improvements. Since significant portions of the improvements involve “green” techniques, many workers in the field would require new skill sets that often incorporate different approaches to drainage systems and soft infrastructure systems. A more skilled workforce can become more productive and also command a higher price for their work.

**Environmental Benefits:** Proposed green infrastructure program implementation would increase the stormwater capacity of the Community and improve the sustainability of the stormwater network. Installation of green infrastructure/construction of Best Management Practices (BMPs) on public and private property throughout the area would more effectively control runoff and help to protect streams from polluted runoff, prevent stream degradation of water bodies, and restore water quality. Thus the proposed program could result in beneficial effects to water quality and aquatic habitat of five water body assets in the Community: Thixton Creek, Higbie Creek, Grand Canal, Mill River, and Hewlett Bay. Three types of significant natural communities have been identified by NYSDEC in portions of these water bodies and along a few sections of adjacent shorelines: Low salt marsh at West Hempstead Bay Wetlands, High salt marsh at West Hempstead Bay Wetlands, and Salt panne at West Hempstead Bay Wetlands. These significant natural communities would also benefit from the Proposed Project.

The proposed program would also increase the resiliency of the community and reduce the overall risk of flooding. Thus it would help to secure additional environmental assets (parks,

natural areas, riparian habitat, etc.) in Bay Park and the Village of East Rockaway, including Kevin E. McNulty Park, Minore Park, Hewlett Point Park, Bay Park, and White Cannon Point Park.

**Health and Social Benefits:** The Proposed Project impacts the entire population within East Rockaway/Bay Park covering ten block groups with a total population of 11,973. This project does not secure a specific health and social services facility.

**Cost Benefits:** Using ‘green infrastructure’ for upstream retention of stormwater, at a total project cost of \$5,620,000, would build upon the proposed investment in ‘gray infrastructure’ (i.e., the East Rockaway-Bay Park Drainage Improvements) while providing co-benefits such as improved water and air quality, public health, and aesthetic value which could potentially increase property values.

**Risk Reduction:** This project would reduce the *vulnerability* of assets by reducing the frequency and severity of flooding during frequent, low-intensity storm *hazards*. Assets that provide a service would therefore experience fewer and/or shorter periods when service is unavailable and parks and open space would be available for use sooner following a storm. Green infrastructure, including constructed wetlands, vegetated swales, stormwater street trees, rain gardens, permeable pavements, rainwater harvest and reuse, increases infiltration thereby reducing the frequency and severity of flooding. Additional benefits include increased downstream water quality, potential habitat improvements and more attractive environments for residents and visitors.

## Bay Park and Village of East Rockaway



**Figure 33: Profile of potential green infrastructure improvements applied to a typical street**

The entire East Rockaway/Bay Park population of 11,973 would benefit from these drainage improvements, as 'upstream' retention of stormwater would reduce peak flow volumes into the stormwater system and may minimize localized flooding 'downstream.' Specific characteristics of the population are described below in the health and social benefits subsection.

**Timeframe for Implementation:** Long-range (> 5 years)

**Regulatory Requirements:** The project is likely to be technically feasible. A municipality would need to maintain the new pervious pavements. Regulatory permits would be required from Nassau County and the Town of Hempstead. Coordination with the Town and Village would be required, as

well as New York State DEC given that changes to drainage, hydrology and stormwater would occur. Project scoping and implementation can begin immediately, after program development, design, and environmental review.

**Jurisdiction:** Town of Hempstead, Village of East Rockaway

**C1 - Harden East Rockaway DPW Garage and John Street Recreation Center [Proposed]**

**Project Description:** This project would protect locally significant Village of East Rockaway facilities that are located in the extreme risk zones, including the Department of Public Works (DPW) facility and its equipment, and the John Street Recreation Center, through dry floodproofing and movable flood barriers. During Superstorm Sandy, the John Street Recreational Center and the DPW were flooded, leaving debris in the rec center for months. Most equipment from the DPW was saved because it was preemptively moved. The Recreation Center is within walking distance of residential communities in both East Rockaway and Bay Park, and could serve as a staging facility during storm events if properly hardened.

The total cost of the project is estimated to be \$580,000 which includes purchase of removable flood walls for the perimeter of the building; dry floodproofing of doors and building perimeter; and, a sump pump with electric, piping and interior drain. The project costs also include environmental analysis and the identification of regulatory approvals and permit requirements.

**Cost:** Low (approximately \$580,000); estimated annual operations and maintenance costs are \$30,500 resulting in a present worth of approximately \$1,000,000.

**Benefits:** Local, Public

**Economic Benefits:** This project would create an estimated five (5) full-time equivalent jobs.<sup>27</sup> Additional economic impacts include the jobs that would be generated from an active recreation center. This includes preserving employees who work at the center.



Figure 34: Proposed strategies to harden the DPW

Source: Bing Maps

## Bay Park and Village of East Rockaway

**Environmental Benefits:** The project would not directly protect natural or cultural resources.

**Health and Social Benefits:** The Proposed Project can be expected to benefit the Village of East Rockaway, with a total population of 9882. This project directly impacts the John Street Recreation Center, which is identified as a health and social services asset and serves the local population.

**Cost Benefits:** The DPW Garage was flooded during Superstorm Sandy and the Village requires protection for both this critical facility and the equipment within from future storm events. The total project cost of \$580,000 is an innovative and cost-effective way to provide flood protection from future storm events, avoiding costs of property and equipment damage, and reducing expenditures for emergency response by enabling the DPW facility to play a larger role in operations.

**Risk Reduction:** This project would reduce the vulnerability of the two facilities. As such, the project would indirectly reduce vulnerability of additional assets in the community by releasing for duty to other facilities resources that would be directed to the DPW and the John Street Recreation Center. In addition, since these facilities can operate as shelters during storm events, flood prevention protecting the facility and equipment would secure the function of these facilities as community shelters.

All residents of the Village of East Rockaway would benefit from this project. It is considered a reduction in risk to the entire population of



DPW Garage: Existing conditions

9,882 since protecting the East Rockaway DPW garage would enhance the Village's response and recovery capabilities.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and can be implemented immediately, following permitting and environmental review. Coordination with Nassau County, the Village of East Rockaway and other agencies is recommended. Some permits may be required depending on the footprint affected by hardening,



Dry floodproofing example

**Jurisdiction:** Village of East Rockaway

**C2 - Local Disaster Recovery Manager (LDRM) [Proposed]**

**Project Description:** This project would fund a local disaster recovery manager who can coordinate and manage the overall long-term recovery and redevelopment of the East Rockaway/Bay Park community. The Village of East Rockaway and the Hamlet of Bay Park need more grant funds to rebuild from Superstorm Sandy than are provided by the NYRCR Program, therefore a grant writer would help them secure additional funding for long term recovery.

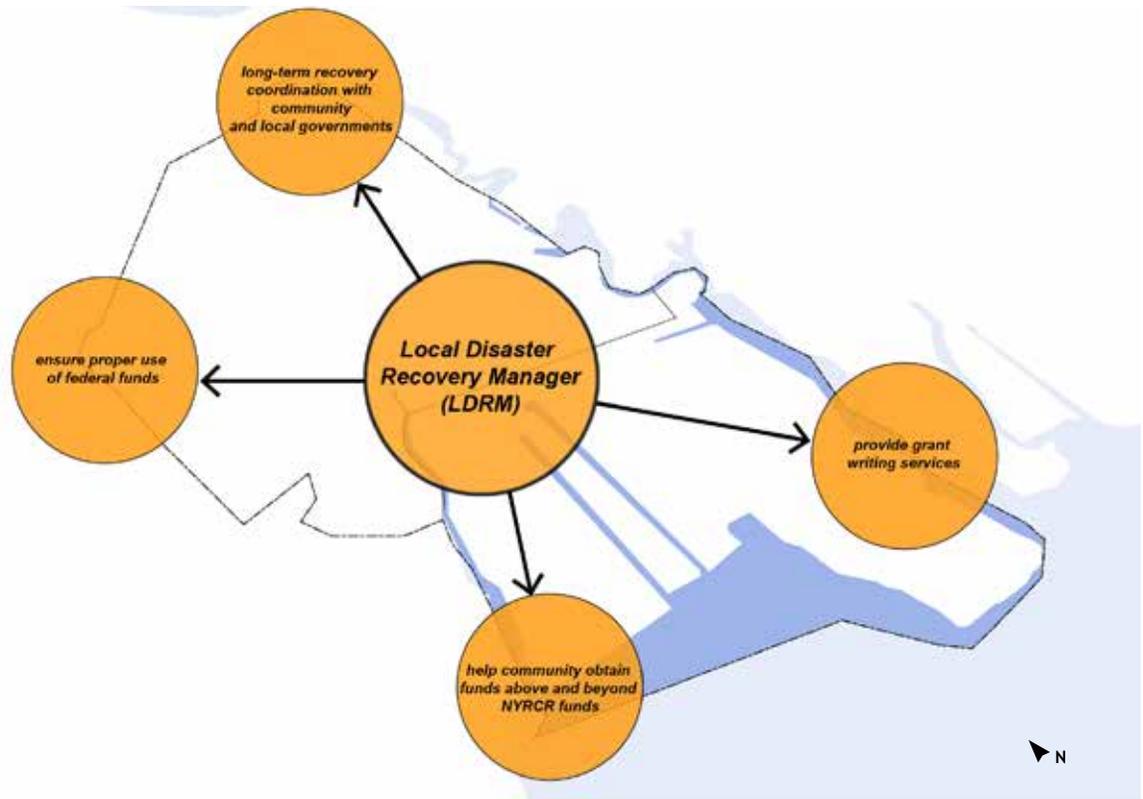
This LDRM would provide local administration and leveraging of multiple federally-funded projects and programs, as well as ensure that Federal funds are used properly. In order to coordinate long-term recovery, the LDRM can provide grant-writing services for the Village of East Rockaway to improve the Village’s capacity to receive additional grants for long-term recovery projects. This would benefit the entire Village and possibly its neighbor Bay Park by expanding the available funds to pursue projects beyond the scope of the NYRCR Program.

The approximate cost for this project is \$200,000, which would fund an LDRM for a period of two years following procurement. The cost also includes funds to prepare bid documents for procurement.

**Project Type:** Implementation

**Cost:** Low (approximately \$200,000)

**Benefits:** Local, Public



Potential LDRM responsibilities

**Economic Benefits:** It is anticipated that there would be one (1) job created.<sup>27</sup> The supplemental economic impact of this project depends on the success of the LDRM in completing, submitting, and winning grant funding. The potential of this position is limited only to what types of funding is available.

**Environmental Benefits:** The LDRM project would secure funding necessary to construct and implement numerous resiliency projects, ultimately benefiting many environmental assets in the Community. Given that the specific projects cannot be identified, environmental benefits cannot be quantified.

**Health and Social Benefits:** The Proposed Project can be expected to benefit the Village of East

## Bay Park and Village of East Rockaway

Rockaway, with a total population of 9,882. This project does not immediately secure a specific health and social services facility.

**Cost Benefits:** While NY Rising is one avenue for funding long-term recovery actions necessitated by Superstorm Sandy, the NYRCR Committee recognizes that additional funding sources will need to be secured to achieve greater resiliency. The total project cost of \$200,000 to fund an LDRM is a minor investment that could secure exponentially higher amounts of grant funds for

the Village to proceed with featured projects or additional resiliency measures.

**Timeframe for Implementation:** Immediate (< 2 years)

**Risk Reduction:** This project, while not reducing the risk of assets from flooding and storm activity, would reduce the vulnerability of residents and visitors in the Community. A dedicated LDRM would help procure and expedite transfer of available funds to pursue projects that would

reduce risk to the population. Therefore, this action is assumed to be a reduction in risk to the population of 9,882 within East Rockaway.

**Regulatory Requirements:** The project is likely to be technically feasible and can be implemented immediately, as no permitting or environmental reviews are required. Coordination with Nassau County, the Town of Hempstead, and the Village of East Rockaway would be required.

**Jurisdiction:** Village of East Rockaway

**C3 - Micro-grid network for backup power supply at Village Hall, Senior Center, Public Library, Post Office and both Fire Departments [Featured]**

**Project Description:** This project would establish a micro-grid network to provide a backup power supply during primary power outage. Key nodes of the micro-grid network may include Village Hall, the East Rockaway Senior Center, East Rockaway High School, the two fire departments, the public library and the post office. After Superstorm Sandy, residents in the East Rockaway - Bay Park experienced widespread power outages and the generator in Village Hall failed. The generator has since been replaced with an automatic switch and can serve as a hub for a future microgrid.

The total cost of the project is estimated to be \$1,000,000 which includes the installation of a backup power supply for Village Hall, as well as excavation and construction costs to install underground conduits between the two facilities to establish the microgrid. Future nodes of the microgrid could include the Village of East Rockaway Fire Department and Bay Park Sewage Treatment Plant.

**Cost:** High (approximately \$1,000,000)

**Benefits:** Local, Public

**Economic Benefits:** This project would create an estimated 11 full-time equivalent jobs.<sup>27</sup> The installation of micro-grids and other energy saving devices can reduce the overall strain on the regional electrical network. In addition to storm-related power outages, this project could have potential economic benefits such as reducing the impact of blackouts and brownouts due to

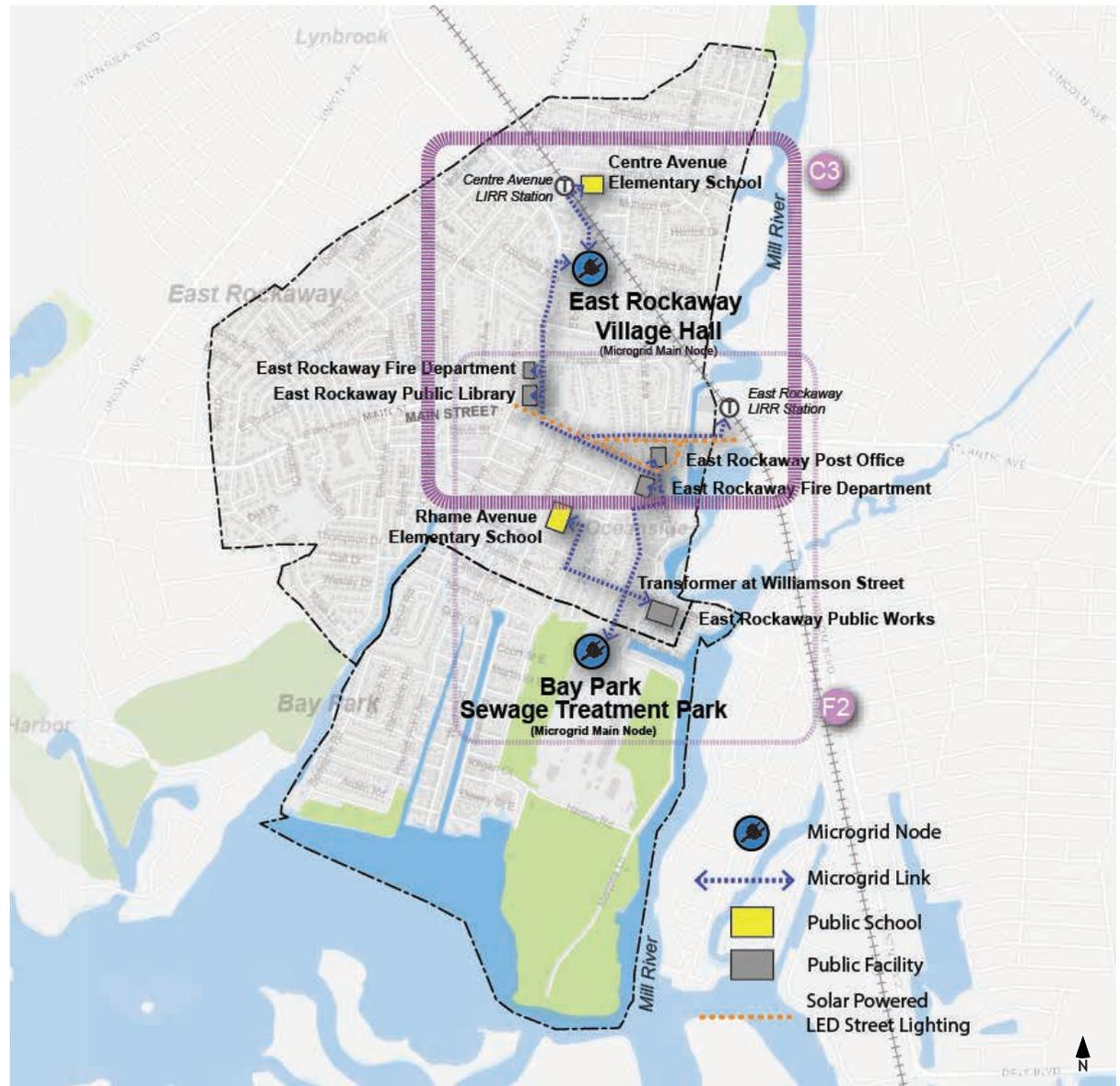


Figure 35: Potential microgrid centered at East Rockaway Village Hall

## Bay Park and Village of East Rockaway

demand outpacing the system's capacity. The municipality can receive funding for demand response programs. The potential for this type of funding stream depends on the type of systems being installed and the market price for this service.

This project can also impact the region's economy during periods of peak electricity usage if it helps in preventing brownouts and blackouts, which have a negative impact on the region's productivity and output.

*Environmental Benefits:* Development of this project would help protect these cultural resources by providing backup power to operate floodwater pumping infrastructure in the event of a main power outage.

### **Health and Social Benefits**

The Proposed Project can be expected to benefit the entire Bay Park/East Rockaway community with a total population of 11,973. This project directly impacts the East Rockaway Village Hall

and Senior Center which is identified as a health and social services asset serving the population of East Rockaway. The Proposed Project may also secure other assets such as East Rockaway High School and the Public Library.

**Cost Benefits:** Superstorm Sandy illustrated the negative impacts that power outages can have on emergency response by interrupting the communications network and disabling building systems. Connecting critical and locally significant facilities by a microgrid network, at a total project cost of \$1,000,000, would yield a high value in providing reliable, efficient emergency response operations during future storm events.

**Risk Reduction:** Development of a microgrid would provide backup power in the event of primary power outage. In addition to providing secure communications, backup power could also operate pumps at critical facilities, thus reducing the **vulnerability** of these assets.

All residents of the Village of East Rockaway would benefit from this project. It is considered

a reduction in risk to the entire Community population since reliable power would enhance the Village's response and recovery capabilities.

**Timeframe for Implementation:** Intermediate (2-5 years)

**Regulatory Requirements:** The project is likely to be technically feasible, but would require regulatory permits from Nassau County and the Village of East Rockaway. The project may face regulatory obstacles and permitting challenges from energy regulatory agencies, including NYSEDA and the utilities (LIPA/PSEG and National Grid). Therefore, coordination with NYSEDA, local communities, and utilities would be necessary. The project can begin immediately when funding is available, following design, permitting and environmental review.

**Jurisdiction:** Village of East Rockaway

## **C4 - Expand mobile disaster response capacity in East Rockaway through Village Purchasing Program [Featured]**

**Project Description:** This project includes the purchase of a coordinated mobile emergency response unit. The Village did not have enough boats, rescue vehicles or even batteries during Superstorm Sandy to perform the necessary life safety rescues required. Additional project elements, not currently included in the preliminary cost, may include the purchase of low-profile boats and a high water vehicle; the expansion of storage space for vehicles; and the floodproofing of radio towers that provide communication for first responders and are required for operation of the emergency alert system. This project would benefit Bay Park as the Town of Hempstead contracts with the Village of East Rockaway for fire control services in Bay Park.

The project cost of \$325,000 includes the purchase of a coordinated mobile response unit. Additional project elements would increase project cost; to be determined through further discussions with the Village of East Rockaway.

**Cost:** N/A (Advocacy); life cycle analysis was not performed as this project would result in a program, the implementation of which could vary (e.g. equipment purchased and purchasing entity), rather than a capital project with easily defined initial investments / capital costs and annual operations, maintenance and administrative costs.

**Benefits:** Local, Public

**Economic Benefits:** Although no direct jobs would be created by this project, closer coordination between jurisdictions, and cost sharing of infrastructure, equipment, and labor may reduce expenditures and thereby place less of a burden on tax payers. In addition the project would reduce emergency response costs and could potentially reduce recovery costs.

**Environmental Benefits:** This project would not directly protect natural or cultural resources.

**Health and Social Benefits:** The Proposed Project can be expected to benefit the Village of East Rockaway and Bay Park, with a total population of 13,030. This project does not secure a specific health and social services facility.

**Cost Benefits:** The Village of East Rockaway recognizes that it could provide greater emergency response services in future storms with reliable communications resources and additional equipment for water rescues. The total project cost of \$325,000 is a cost-effective way to improve the Village's emergency communications and disaster response capacity, leading to more efficient emergency response operations and reduced government expenditures in future storm events.

**Risk Reduction:** This project, while not reducing the risk of assets from flooding and storm activity, would reduce the vulnerability of residents and visitors in the Community by increasing emergency response capacity.

All populations living in the Community, a total of 13,030 persons, would benefit from a reduction in risk due to improved response capabilities by government officials. Specific characteristics of the population are described below in the health and social benefits subsection.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and can begin immediately; no regulatory permits would be required for the actions proposed in this initial project. Additional project elements, should they be included, such as the proposed floodproofing of radio towers may require permits depending on the scope of the project and footprint. Coordination with the Village of East Rockaway, the Village Fire Department, Town of Hempstead and Nassau County Office of Emergency Management is required.

**Jurisdiction:** Village of East Rockaway

## Bay Park and Village of East Rockaway

### C5 - Install Solar Panels at Schools [Featured]

**Project Description:** This project would install solar panels on the roofs of three schools within the East Rockaway Union Free School District, including Centre Avenue School, Rhame Avenue School, and East Rockaway High School. During Superstorm Sandy, all three schools lost power. The High School is the most important facility for backup power because it has sump pumps in its crawl spaces, and given its location on Mill River, the school district needs the pumps to operate to prevent flooding. In addition to being a locally significant facility with a high community value, this building supplies the other schools with lunches, and would lose all the food in its walk-in refrigerator and freezer during power outages.

While the solar power may not work immediately during a disaster, it would enable the school's

power supply to bounce back faster, serving as a component of a more resilient power supply network. Future projects could include connecting these power sources to the potential NYRCR project microgrid network with a hub at Bay Park Sewage Treatment Plant. Furthermore, the schools have been identified as critical assets under the Health and Social Services category by the Planning Committee. As such, the ability to provide backup power is considered by the Planning Committee as capacity enhancing opportunities of these critical assets.

This project would capitalize on the number of solar systems installed in close proximity, making it a model implementation project for Governor Andrew M. Cuomo's Community K-Solar program. The total cost of the project

is approximately \$250,000, which would fund the legal and administrative fees necessary to establish a power-purchase agreement in conjunction with K-Solar.

**Cost:** Medium (approximately \$250,000)

**Benefits:** Local, Public

**Economic Benefits:** This project would create an estimated three full-time equivalent jobs for the installation phase.<sup>27</sup> The project would create an opportunity for reducing the East Rockaway School District's expenditures on electricity. This savings can be translated into additional benefits for students.

As a secondary economic benefit, the solar energy can be used to offset risks to the regional



Rhame Avenue School

Source: Google Earth



East Rockaway High School

Source: Google Earth

## NY Rising Community Reconstruction Plan

electrical grid system. By participating in the region's demand response programs, the School District can receive additional income for having the ability to reduce demand on, or supply energy to, the grid. This would assist the electrical system in times of peak use when brownouts and blackouts can occur. This type of project can help reduce the risks of electrical grid issues and thereby impact potential losses of regional productivity due to loss of power.

*Health and Social Benefits:* The Proposed Project can be expected to benefit both Bay Park and East Rockaway, which are both within the East Rockaway Union Free School District. The total population of the Community is 11,973. This project directly impacts the Waverly Park School, Rhame Avenue School, Marion Street School and East Rockaway High School, which are all

identified as health and social services assets within the Community.

**Cost Benefits:** Superstorm Sandy illustrated the negative impacts that power outages can have on emergency response operations by interrupting the communications network and disabling building systems at varying levels across the district. The total cost of \$250,000 would be a cost-effective way to leverage an investment, which could reduce the costs of property damage and shorten the recovery time for these schools.

**Risk Reduction:** This project, while not reducing the risk of assets from flooding and storm activity, would reduce the *vulnerability* of residents and visitors in the Community by providing backup power in the event of primary power outage. All residents of Bay Park and East Rockaway

would benefit from this project. It is considered a reduction in risk to the entire Community population of 11,973 residents since it would enhance the community's response capabilities. Specific characteristics of the population are described below in the health and social benefits subsection.

**Timeframe for Implementation:** Immediate (2-5 years)

**Regulatory Requirements:** The project is technically feasible and can be implemented immediately, following permitting and environmental review. Coordination with PSEG / LIPA, NYSERDA, the Town of Hempstead, Village of East Rockaway and other agencies is recommended.

**Jurisdiction:** Village of East Rockaway, Town of Hempstead, East Rockaway School District

## Bay Park and Village of East Rockaway

### **D1/E1 - Downtown Resiliency and Redevelopment Strategic Plan [Proposed]**

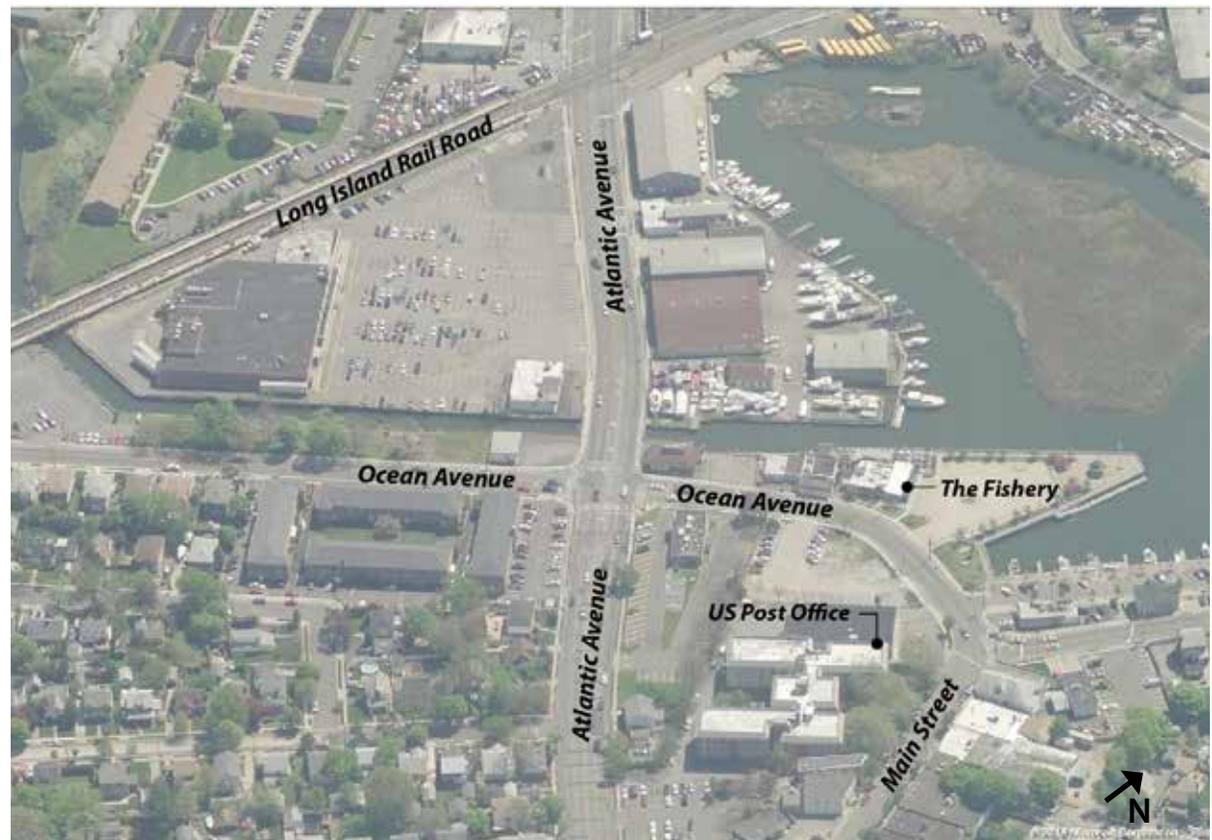
**Project Description:** This project would enable the development of a plan to protect from flooding the area of Downtown East Rockaway along the Main Street Corridor extending to Lawson Avenue. Downtown East Rockaway straddles extreme and high flood zones, and was inundated during Superstorm Sandy. This is one of East Rockaway's two commercial corridors, encompassing retail services that the Village of East Rockaway and the community of Bay Park depend on for daily services. This plan would develop solutions for both economic development and flood protection, serving as a redevelopment plan to guide future zoning changes.

The objective of this plan is to increase the resiliency of the Main Street corridor by:

- Identifying new measures for leveraging publicly-owned land along the Mill River's edge to accommodate tidal surge and establish a larger open space and trail system;
- Identifying opportunities for new redevelopment that can renew downtown as a destination; and,
- Reestablish civic pride in downtown.

Pursuant to the completion of the redevelopment plan, the Village could adopt zoning requirements to protect businesses from flooding, implement new shoreline improvements along the River's edge and improve the resiliency of the commercial district through redevelopment.

The total cost of the project is estimated to be \$195,000, which includes a comprehensive



Talfor Boat Basin

Source: Bing Maps

strategy for improvement of the Mill River waterfront, open space plan, identification of redevelopment opportunities, and implementation and funding recommendations.

**Cost:** Low (approximately \$195,000)

**Benefits:** Local, Private

**Economic Benefits:** This project would create an estimated two (2) full-time equivalent jobs.<sup>27</sup> However, the economic impact of this project would be felt more in the real estate and ancillary job creation from the redevelopment efforts. When implemented, the implementation could generate significant gains in tax ratables as rezoning and land use changes maximize real estate potential in more suitable areas. As the land use changes

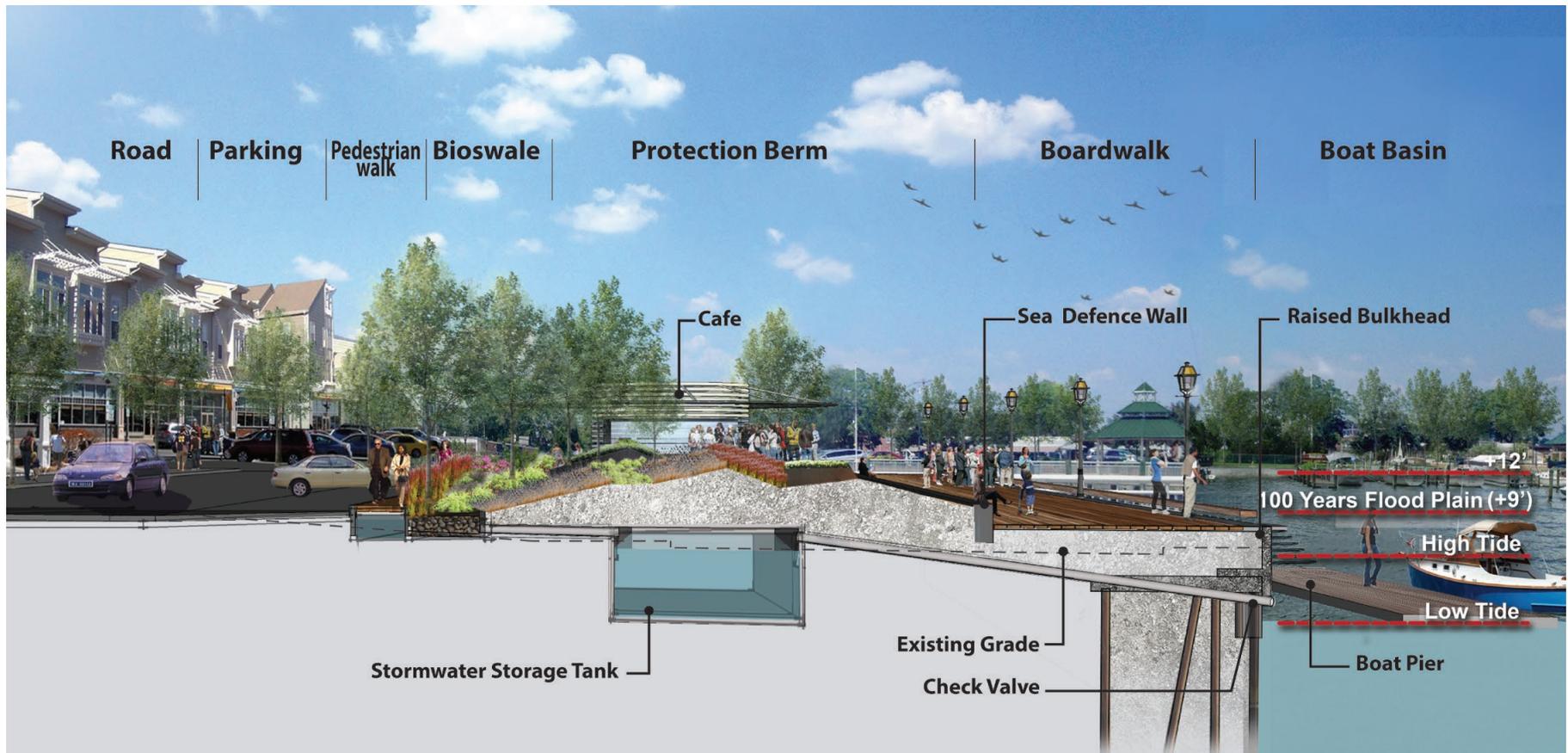


Figure 36: Dock Street illustrative section

occur it is anticipated that job creation in the newly developed areas would follow.

*Environmental Benefits:* This project would not directly protect natural or cultural resources. Projects adopted through the plan, for example, improvements to the Mill River Waterfront could protect these resources.

*Health and Social Benefits:* The Proposed Project can be expected to benefit the downtown area of

East Rockaway, with a total population of 6,567. This project does not secure a specific health and social services facility, but instead aims to protect all health and social services assets within the Main Street East Rockaway area including; East Rockaway Fire Department Headquarters and the Village Hall.

**Cost:** Low (approximately \$195,000); a life cycle cost analysis was not performed, as this project would result in a plan, rather than a capital improvement project with easily defined initial investments and

capital costs and annual operations, maintenance and administrative costs.

**Cost Benefits:** Businesses in downtown East Rockaway suffered from inundation during Superstorm Sandy, and the downtown requires an innovative solution to prevent repetitive losses from flooding in order to maintain its central business district. The total project cost of \$195,000 will enable the Village to plan comprehensively for business continuity and economic development that

## Bay Park and Village of East Rockaway

promotes resilience, while laying the groundwork for future policy changes to spur investment.

**Risk Reduction:** The strategic plan is to find options for protecting Downtown East Rockaway, increasing resilience to flood events and to preserve and/or increase property value of the Village of East Rockaway and the community of Bay Park. The plan would also increase economic activity in the area.

This project may provide direct risk reduction impacts to businesses in downtown East Rockaway, a population of approximately 6,567. It may also indirectly benefit all residents of the Community by decreasing the vulnerability (i.e., loss of service) of local businesses and allowing them to bounce back quicker from disaster events. According to Census blocks in the area, this is an approximate population of 11,973. Specific characteristics of the population can be found below in the health and social services subsection.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The program is technically feasible and can begin as soon as funding is available. There are no regulatory constraints or permitting requirements.

**Jurisdiction:** Village of East Rockaway



*Making room for the River*



*Mill River as an asset for economic development*

## D2 - Neighborhood Home Improvement Assistance Program [Featured]

**Project Description:** This project would provide gap funding for resiliency costs not covered by either traditional lending practices or government assistance. As discussed in Section II, homes in Bay Park and East Rockaway were hit hard by Superstorm Sandy. While the community received FEMA funds for replacement of pre-existing structures, further government assistance for the raising of homes would have a beneficial impact in terms of resilience. Further, several homeowners do not meet the requirements to qualify for funds to rebuild after Superstorm Sandy under NY Rising Housing programs, therefore this would provide ‘gap funding’ to those individuals as an individual assistance program.

The imminent increase in flood insurance costs would be devastating to many households that are rebuilt but not resilient and that could otherwise be rebuilt and reoccupied. The projected impact of this need, if unaddressed, is disinvestment, blight and displacement in the short-term, and in the long term the loss of middle-income housing to lot consolidation and high-end buildings that would bear the costs of impacted area construction while serving a much smaller population than the area’s infrastructure can reasonably support. Typical costs for elevating a home range from between \$80,000 to \$100,000. This project would create a loan-processing program with an existing or newly created CDFI (Community Development Funding Institution) having an Article XI Corporation (aka Housing Development Fund Corporation [“HDFC”]) component, a “Resiliency Lender.” The CDFI would be eligible to accept and lend public funds while the HDFC would generate options for mitigating transaction costs and facilitating long-term affordability.

**Cost:** High (approximately \$3,000,000)

**Benefits:** Local, Private

**Economic Benefits:** The costs for elevating a home range from \$80,000 to \$100,000 per home. Therefore, this project could effectively enable between 30 and 35 homes, and would create an estimated 33 full-time equivalent jobs.<sup>27</sup> The improvements on homes would have several impacts that would positively impact the economies of the region. Firstly, construction jobs and other trade jobs would be in higher demand through this project. Secondly, the real estate values of the homes improved would increase, or in some instances stay at a level that is consistent with their previous pre-Superstorm Sandy values. Thirdly, these increased or preserved real estate valuations can provide the Town of Hempstead and Village of Bay Park with much needed ratables.

**Health and Social Benefits:** The Proposed Project impacts the entire population within East Rockaway/ Bay Park covering ten block groups with a total population of 11,973. This project is specific to homeowners and does not secure health and social services facilities.

**Cost Benefits:** Superstorm Sandy’s damage to the housing stock in Bay Park /East Rockaway requires funding beyond that available through the NY Rising Housing Recovery Program, therefore this project will build upon an existing State storm recovery program at a total project cost of \$3,000,000, with benefits to those who cannot qualify for other programs. In doing so, the project will prevent blight and avoid the loss of tax revenues associated with vacant properties, as well as preserve the Bay Park/ East Rockaway community character.

**Risk Reduction:** The program would decrease vulnerability of homes in Bay Park/East Rockaway. This project would allow for elevation of homes above base flood elevation and increased freeboard. In conjunction with the New York State Fire Prevention and Building Code, resilient construction through this program can improve safety through enhanced standards and design.

The project could provide direct risk reduction benefits to the homeowners that take advantage of the program, affecting between 30 and 35 homes and their occupants. Indirectly, this project may provide a reduction of risk to all residents living in the NYRCR Community by increasing resiliency of residential properties and stabilizing neighborhoods to prevent blight. According to census blocks in the area, this is a population of 11,973. Specific characteristics of the population can be found below in the health and social benefits subsection.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and no permits would be required. Coordination with NYSDEC, US HUD, and NY Homes and Community Renewal would be necessary, as well as coordination with local communities and the Nassau County Office of Community development, which provides other housing assistance programs. The project can begin immediately when funding is available, following environmental review. Building permits may be required from the Town of Hempstead or Village of East Rockaway, depending on the type of improvements (e.g. construction, elevation, etc.)

**Jurisdiction:** TBD

## Bay Park and Village of East Rockaway

### **E2 - Program for Floodproofing Downtown Businesses [Featured]**

**Project Description:** Downtown East Rockaway straddles extreme and high flood zones, and was inundated during Superstorm Sandy. This program would work to provide flood protection to businesses. This project would incentivize floodproofing of buildings by providing local businesses in downtown East Rockaway with a tax credit or stipend to utilize permanent dry floodproofing improvements (i.e., fixed deployable flood walls but not moveable flood barriers), raising building utilities, or implementing other resilient flood protection measures.

The total cost of the project is estimated to be \$150,000 which would fund a tax credit for businesses along Main Street, Front Street, Atlantic Avenue and New Street. Project costs incorporate environmental analysis and the identification of regulatory approvals and permit requirements.

**Cost:** Low (approximately \$150,000)

**Benefits:** Local, Private

**Economic Benefits:** This project would create an estimated two (2) full-time equivalent jobs.<sup>27</sup> The work to prevent flooding in the downtown area would preserve jobs and the economic activity that occurs there. This would also ensure that ratables and tax income from those establishments are also sustained.

**Health and Social Benefits:** The Proposed Project can be expected to directly benefit the downtown East Rockaway area, with a total population of 6,567. This project does not secure a specific health and social services facility, but instead aims to protect all health and social services



*Downtown map showing primary focus area*

assets within the Main Street East Rockaway area including the East Rockaway Fire Department Headquarters, Village Hall and the Post Office.

**Cost Benefits:** Businesses in downtown East Rockaway suffered from inundation during Superstorm Sandy, and the downtown requires an innovative solution to prevent repetitive losses from flooding in order to maintain its central business district. The total project cost of \$150,000 is a low-cost way to encourage dry floodproofing of economic assets, improving business continuity in future storm events.

**Risk Reduction:** This project would reduce vulnerability of assets in the Community by the floodproofing of downtown buildings and raising utilities and sensitive building infrastructure above flood level. As such, buildings would more resilient to flood damage and merchants could resume business as soon as flood waters retreat.

This project may provide direct risk reduction impacts to businesses in downtown East Rockaway, a population of approximately 6,567. It may also indirectly benefit all residents of the Community by decreasing the vulnerability (i.e., loss of service)

of local businesses and allowing them to bounce back quicker from disaster events. According to census blocks in the area, this is an approximate population of 11,973. Specific characteristics of the population can be found below in the health and social benefits subsection.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The program is likely to be technically feasible and can begin as soon as funding is available, following environmental review and acquisition of building permits from the Village of East Rockaway. Coordination is necessary with Nassau County and NYS DEC. The project would face real property constraints, as participation is voluntary by private business owners and program success is conditional on this voluntary participation.

**Jurisdiction:** Village of East Rockaway



Main Street retail

## Bay Park and Village of East Rockaway

### **F1 - Repairs at Bay County Park, Bay Park [Featured]**

**Project Description:** This project would advocate for Nassau County to provide further improvements to the southern and western areas of Bay County Park in Bay Park. Bay County Park was damaged during Superstorm Sandy and fields have not yet been repaired and the electrical wiring needs replacement. Portions of Bay County Park including the ball fields were also polluted from the sewage overflow from the Bay Park STP.

This proposes the relocation of ball fields to the south side of the park, which would allow the construction staging for Bay Park STP to continue while improvements are made concurrently to the Park. Such phasing would allow for the redesign of the existing ball fields as passive recreational space, and provide residents with access to the canal for fishing.

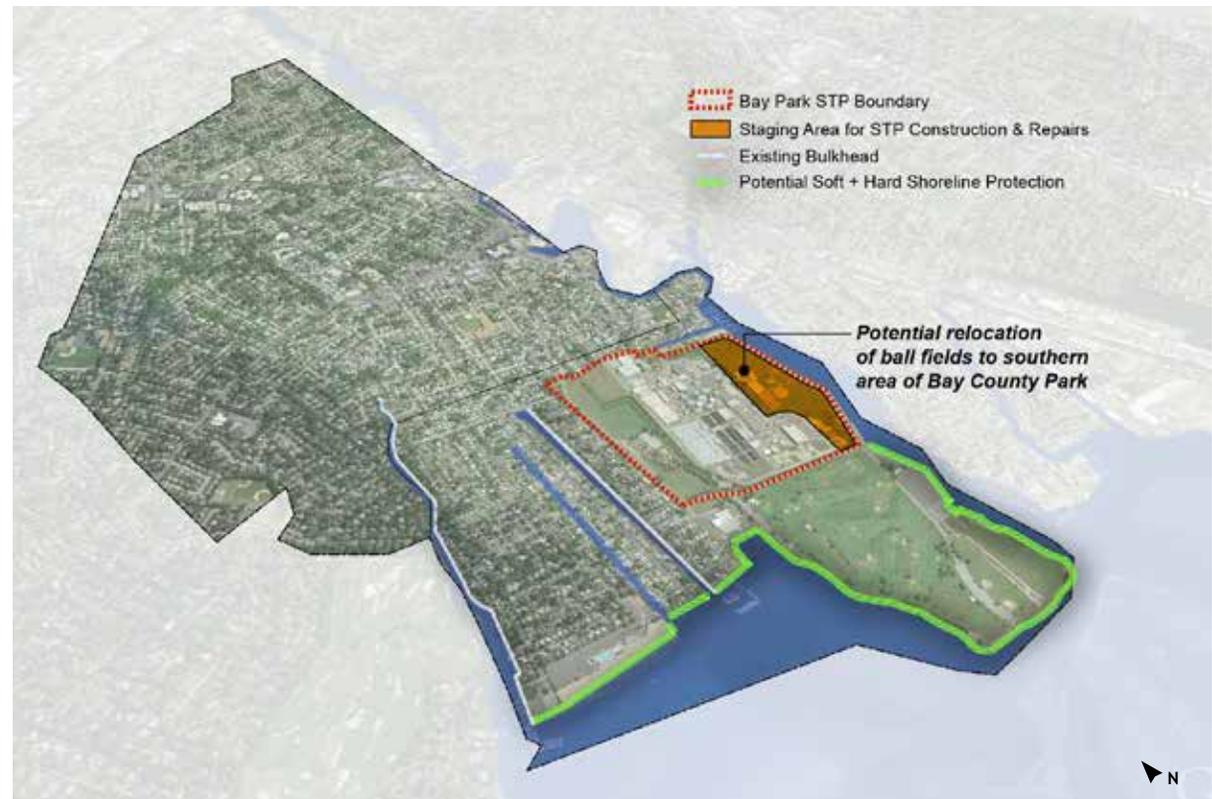
**Cost:** N/A (Advocacy)

**Benefits:** Regional, Public

**Economic Benefits:** The improved park facilities may have positive effects on real estate around the immediate park area.

**Environmental Benefits:** This project would remove approximately one acre of impervious surface and replace it with pervious surface. As such, it can be expected that infiltration rates would improve slightly, thereby adding a measure of protection to the Bay Park STP.

**Health and Social Benefits:** The Proposed Project can be expected to indirectly benefit the whole of



Advocacy for Bay County Park ball fields relocation

Nassau County, with an approximate population of 1,346,158 as it is a County facility used by various communities. It would also directly benefit the entire Bay Park – East Rockaway community, with an approximate population of 11,973. This project does not secure a specific health and social services facility.

**Cost Benefits:** The NYRCR Committee seeks to advocate for more immediate improvements to Bay County Park in conjunction with improvements to Bay Park STP, which bears no cost to the citizen

advocates, but provides benefits to public health through active recreation and improved quality of life, while the design of future improvements may provide environmental benefits and reduce risk.

**Risk Reduction:** In addition to phasing and staging changes to the repairs planned for the Bay park Sewerage Treatment Plant, this project would increase pervious surfaces at Bay Park, thereby reducing the *vulnerability* of assets in the vicinity.



*Existing Bay County Park ball fields*

This project would provide a reduction of risk to the population of Bay Park, a total of 2,091 persons. Specific characteristics of the population are provided below in the health and social benefits subsection.

**Timeframe for Implementation:** Intermediate (2-5 years)

**Regulatory Requirements:** The project is likely to be technically feasible. Regulatory permits from the NY Department of Environmental Conservation would be required, and a nationwide permit #7, 43 may be required if the project disturbance is seaward of mean high water and/or the project results in discharge or removal of fill into waters of the United States. Project scoping and implementation can begin immediately, following design, permitting and environmental review.

**Jurisdiction:** Nassau County



*Bird's eyeview of Bay Park Sewage Treatment Plant*

## Bay Park and Village of East Rockaway

### **F2 - Micro-grid network for backup power supply at Bay Park Sewage Treatment Plant [Featured]**

This project proposes the establishment of a microgrid network node at Bay Park STP to provide a backup power supply during storm events for critical facilities and facilities that support the community during a disaster event. Following widespread power outages during Superstorm Sandy, this microgrid network would construct above ground conduits to backup power to community facilities near the Bay Park STP, including the Public Works Facility, Rhame Avenue Elementary School and possibly the Nassau County Police Department Marine Bureau. The microgrid could also connect to a transformer at Williamson Street. Future phases of the project could connect this microgrid network to a microgrid at Village Hall and the Senior Center.

The total cost of the project is estimated to be \$875,000 which includes as excavation and construction costs to install underground conduits to connect to the community; it does not include the cost to construct a backup power supply, as the minimal electricity load demanded by one or more of these facilities may be covered by the backup power supply sources (generators) that would be installed at the Bay Park STP.

**Cost:** High (approximately \$800,000)

**Benefits:** Regional, Public and Private

**Economic Benefits:** This project could create an estimated 33 full-time equivalent jobs.<sup>27</sup> The installation of micro-grids and other energy saving devices can reduce the overall strain on the regional electrical network. In addition to storm related power outages, this project could have potential economic benefits such as reducing

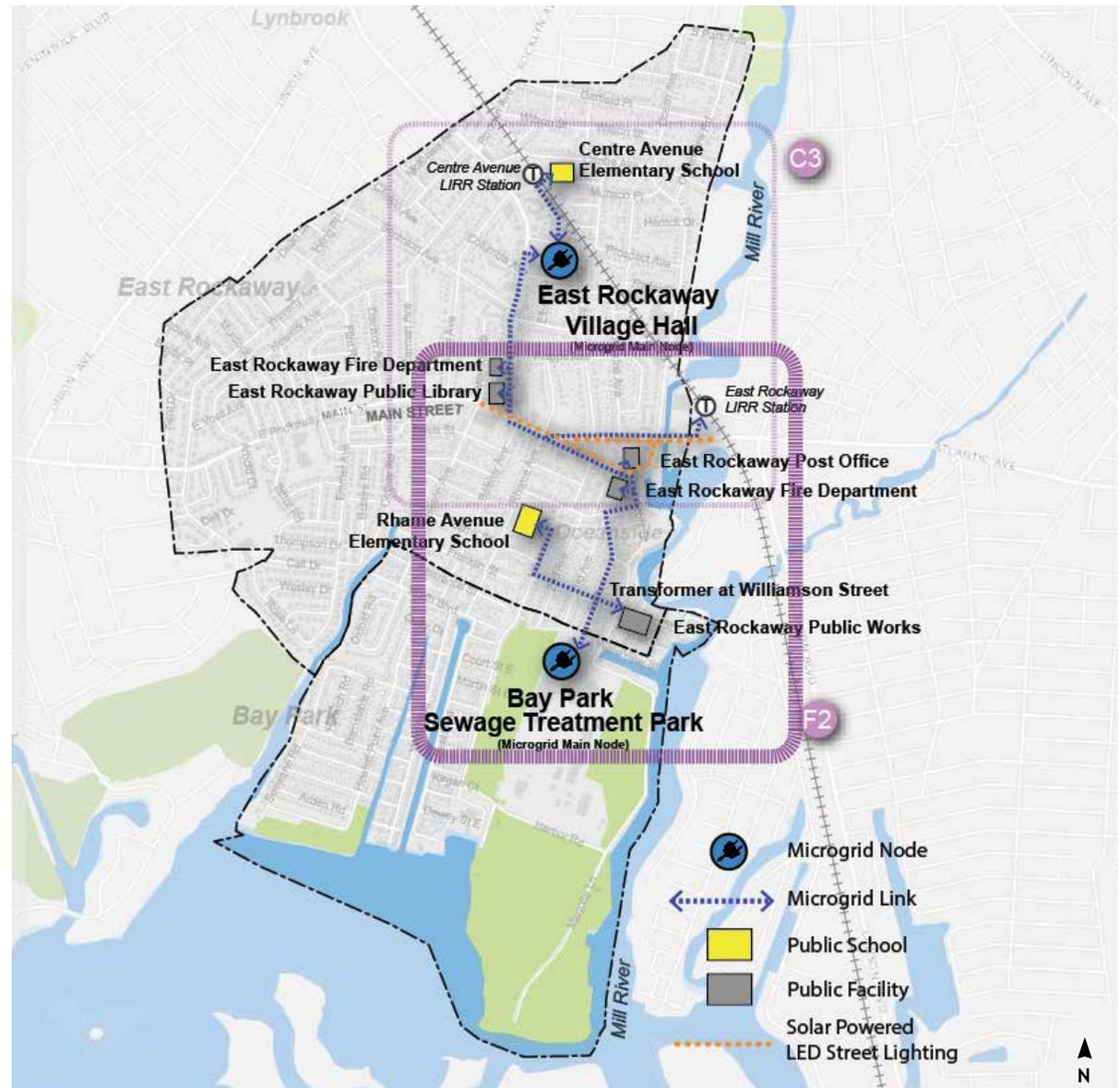


Figure 37: Microgrid network node at Bay Park STP

the impact of blackouts and brownouts due to demand out pacing capacity.

*Environmental Benefits:* Development of this project would help protect these cultural resources by providing backup power to operate floodwater pumping infrastructure in the event of a main power outage.

*Health and Social Benefits:* The Proposed Project impacts the entire population (11,973) within the NYRCR Community. This project would secure health and social services assets by providing a backup power supply to the Rhame Avenue Elementary School, Nassau County Police Department Marine Bureau and Village of East Rockaway Department of Public Works, as well as potentially the Village of East Rockaway Fire Department and Post Office on Main Street.

*Cost Benefits:* In response to power outages during Superstorm Sandy, a microgrid network stemming from Bay Park STP would provide added public benefit to the local residents of Bay Park and East Rockaway. The total project cost of \$800,000, is a cost-effective way to capitalize on resiliency investments at the STP for the benefit of the surrounding community by providing backup power to its critical and locally significant facilities,

which would yield a high value in providing reliable, efficient emergency response operations during future storm events.

*Risk Reduction:* Development of a microgrid would provide backup power in the event of primary power outage. In addition to providing secure communications, backup power could also operate pumps at critical facilities, thus reducing the *vulnerability* of these assets.

All residents of the NYRCR Community, a total population of 2,091, would benefit from this project. It is considered a reduction in risk to the entire population since reliable power would enhance the community's response and recovery capabilities.

*Timeframe:* Intermediate (2-5 years)

*Regulatory Requirements:* The project is likely to be technically feasible, but would require regulatory permits from Nassau County, the Village of East Rockaway and the Town of Hempstead. The project may face regulatory obstacles and permitting challenges from energy regulatory agencies, including NYSERDA and the utilities (LIPA/PSEG and National Grid). Therefore, coordination with NYSERDA, local communities,

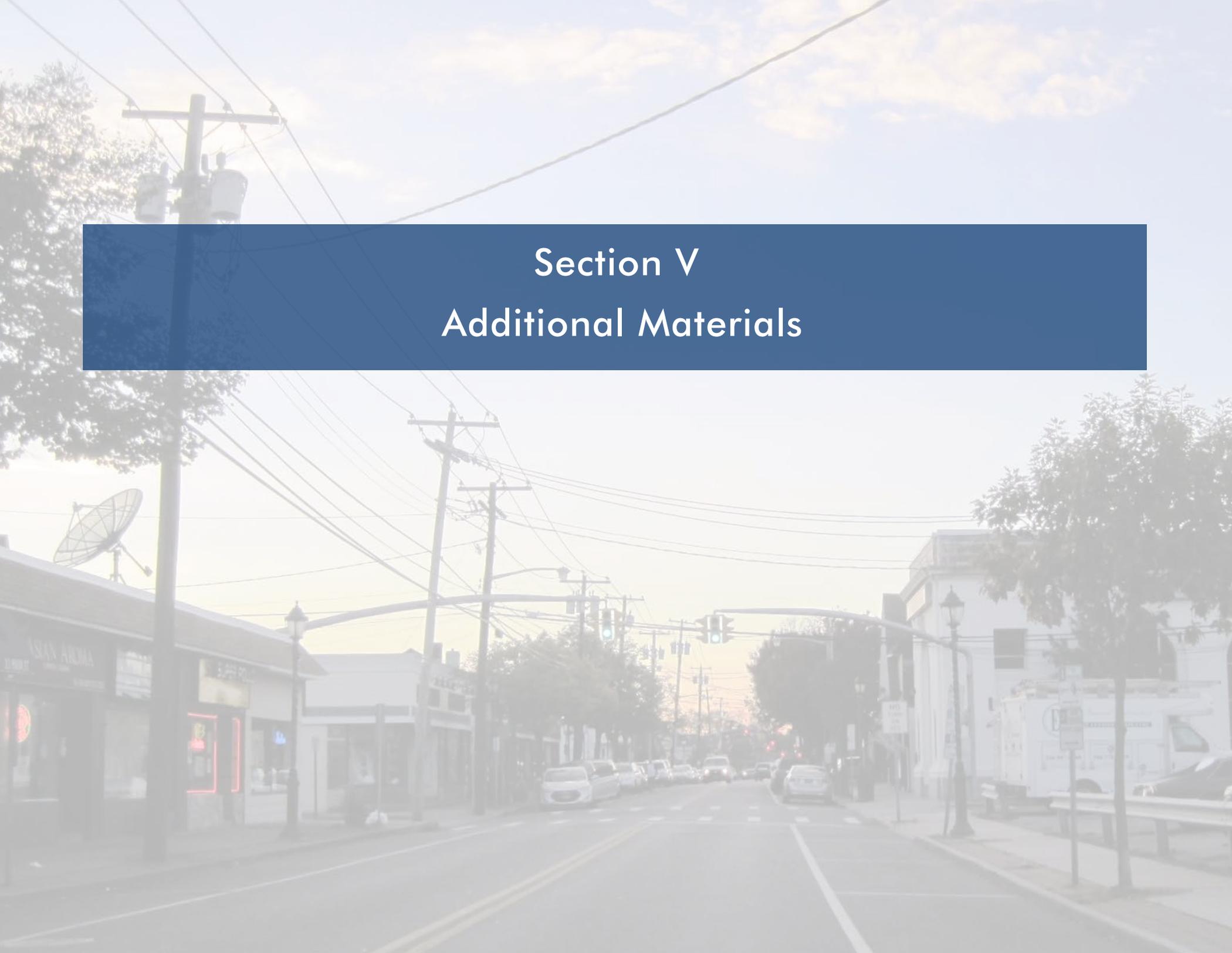
and utilities would be necessary. The project can begin immediately when funding is available, following design, permitting and environmental review.

*Jurisdiction:* Nassau County, Village of East Rockaway, East Rockaway Union Free School District

## Bay Park and Village of East Rockaway

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*Picture to right: Main Street in downtown East Rockaway*



# Section V

## Additional Materials

## A. Additional Resiliency Recommendations

**Table 7: Additional Resiliency Recommendations**

Strategy	Project Name	Project Description
<b>A: Protect the coastline from flooding</b>	Bay Park Tidal Surge Barriers Feasibility Study (A2)	Study locations for potential movable tidal surge barriers to intercept tidal flows from West Hempstead Bay at Higbie Creek, Grand Canal, Mill River and Thixton Creek.
	Reynolds Channel Tidal Surge Barriers Feasibility Study (A3)	Study potential movable tidal surge barriers at two locations on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge and Long Beach Boulevard) to intercept tidal flows into Hempstead Bay.
	Construct Movable Flood Gates in Bay Park (A4)	Pending the outcome of the Bay Park Tidal Surge Barriers Feasibility Study, this project would construct: Option A - Construct Flood Gates in Bay Park, or Option B - Construct Marsh Barrier Islands and Pedestrian Walkways
	Construct Movable Flood Gates at Reynolds Channel (A5)	Pending the outcome of the Reynolds Channel Tidal Surge Barriers Feasibility Study, this project would construct movable tidal surge barriers on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge) to intercept tidal flows into Hempstead Bay.
<b>B: Address recurring stormwater drainage issues</b>	County-wide Stormwater Mitigation Plan with Community Education and Awareness (B3)	Advocate for Nassau County to develop a stormwater system maintenance and monitoring plan which would allow for proper maintenance of the current system to prevent back flows and overflows.
	Construct Bulkheads at East Rockaway Junior-Senior High School (B4)	Build/repair 750' of bulkheading along the Mill River at East Rockaway High School.
	Hydrologic and Hydraulic Study of the Reynolds Channel-East Rockaway Inlet and Mill River Watersheds (B5)	Comprehensive study of hydrologic and hydraulic systems of the two watersheds that impact stormwater management and tidal flows in Community.
<b>C: Harden municipal infrastructure and improve capability to respond to storm events</b>	Construct pedestrian bridges in Bay Park (C6)	Construct pedestrian bridges over Grand Canal and Higbie Creek to provide alternate evacuation route for residents.
<b>D: Improve the overall quality of life to maintain housing values and give people a reason to stay and invest in the community</b>	Pocket parks on West Boulevard, Bay Park (D3)	Creation of recreational space with green infrastructure at vacant parcels adjacent to Grand Canal.

### Bay Park Tidal Surge Barriers Feasibility Study (A2)

This project would study potential movable tidal surge barriers at Higbie Creek, Grand Canal, Thixton Creek, and Mill River to intercept tidal flows from Hempstead Bay. Barriers would extend across the terminus of Higbie Creek, Grand Canal, and Thixton Creek, and would extend across the mouth of Mill River. The study would also consider what additional bulkheads or living shoreline improvements and wetlands restoration may be necessary as a result of potential tidal surge barriers (i.e., at Bay County Park).

The total cost of the project is estimated to be \$256,450, which includes a review of existing information and baseline studies such as habitat mapping, wetland delineations, surveys, geology, and hydrodynamic/hydrologic/hydraulic modeling. The study would include an alternatives analysis, conceptual design of the preferred alternative, environmental analysis, and regulatory approvals/permit requirements evaluation, and would consider flood damage reduction and life risk output.

**Benefits:** Regional, Public

**Cost:** Low (approximately \$256,000);

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and can begin immediately as no permits are required for studies. Regulatory coordination and involvement would be required. Community involvement regarding the placement and effects of barriers would be required, and the Town of Hempstead would need to maintain the barriers and deploy them as necessary.

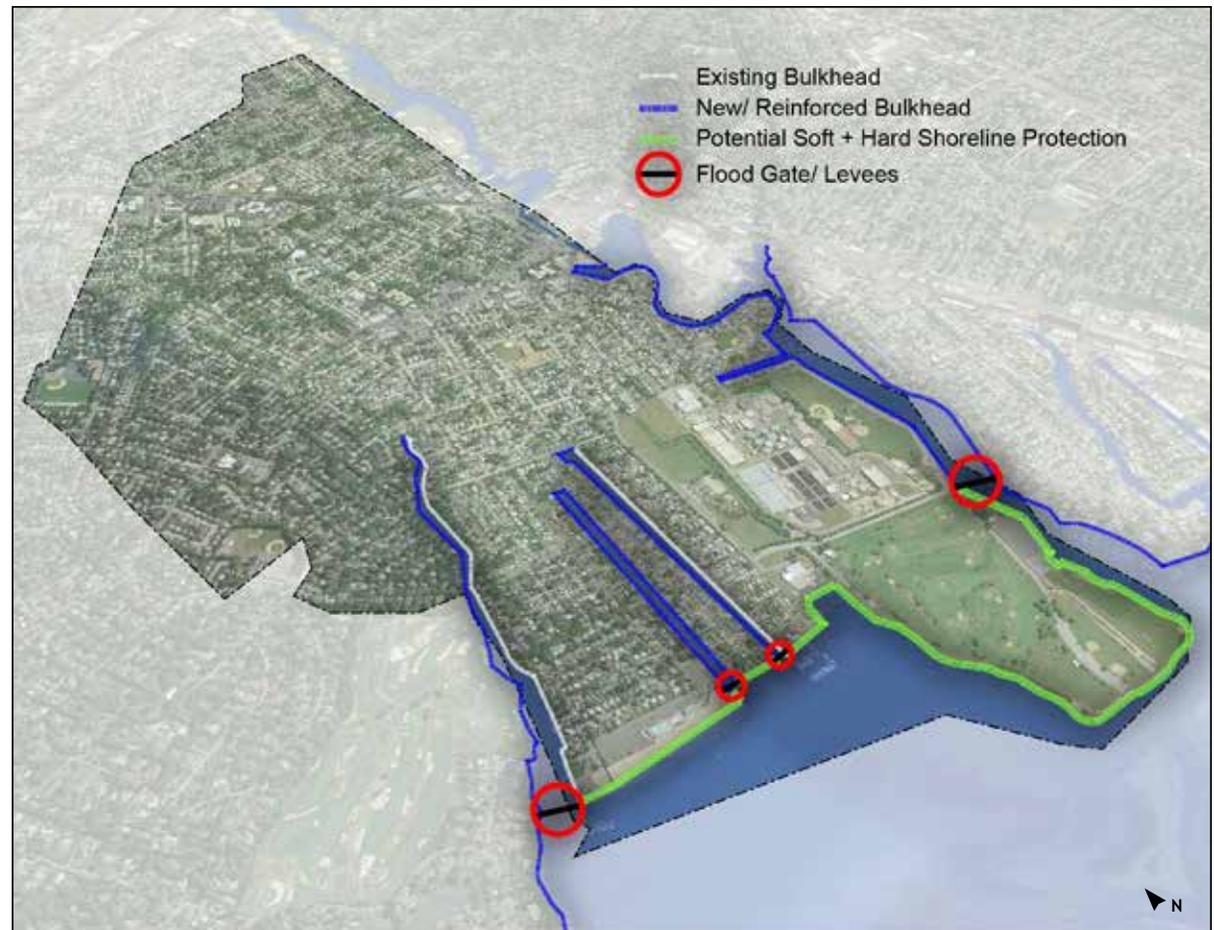


Figure 38: Potential locations for floodgates in NYRCR Community

## Bay Park and Village of East Rockaway

### Reynolds Channel Surge Barriers Feasibility Study (A3)

**Project Description:** This project would study potential movable tidal surge barriers at two locations on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge and Long Beach Boulevard) to intercept tidal flows into Hempstead Bay.

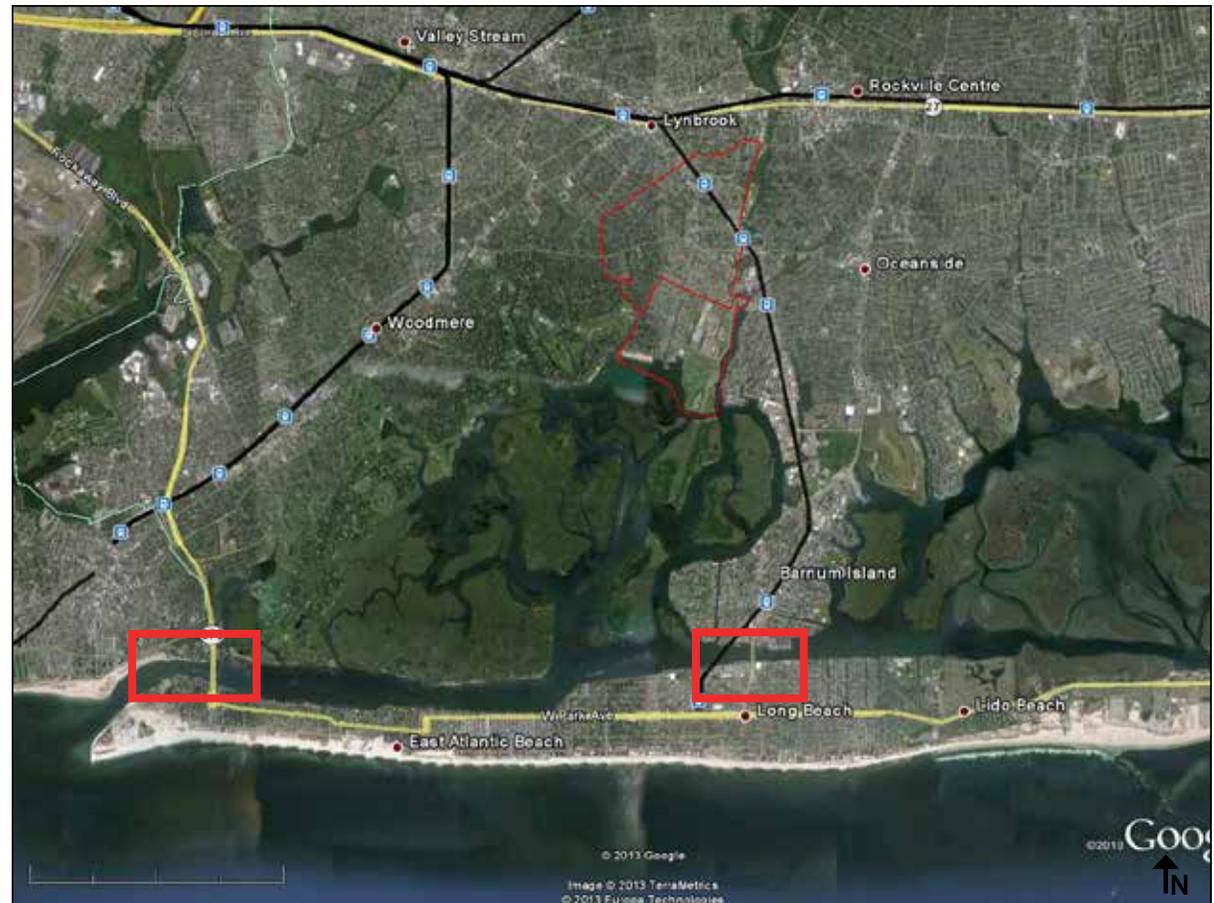
The total cost of the project is estimated to be \$484,150 which includes a review of existing information, and baseline studies such as habitat mapping, wetland delineations, surveys, hydrodynamic/hydrologic/hydraulic modeling, geology, and structural bridge analysis. The study would include an alternatives analysis, conceptual design of the preferred alternative, environmental analysis and regulatory approvals/permit requirements evaluation, and would consider flood damage reduction and life risk output.

**Benefits:** Regional, Public

**Cost:** Low (approximately \$484,000)

**Timeframe for Implementation:** Immediate (2-5 years)

**Regulatory Requirements:** The project is likely technically feasible and can begin immediately. Regulatory coordination and involvement would be required. Community involvement regarding the placement and effects of barriers would be required, and the County or USACE would need to maintain the barriers and deploy them as necessary.



**Figure 39: Potential location for flood gates at 2 locations on Reynolds Channel**

Source: Google earth

**Construct Movable Flood Gates in Bay Park (A4)**

*Option A: Construct Movable Flood Gates at Higbie Creek, Grand Canal, Mill River, and Thixton Creek*

Pending the outcome of the Bay Park Tidal Surge Barriers Feasibility Study, this project would construct movable tidal surge barriers on Higbie Creek, Grand Canal, Thixton Creek, and Mill River. These gates would usually be open for normal tidal but can be shut when needed to hold back rising waters. The total cost of Option A is estimated to be \$58,877,727 which includes As-built surveying, installation of erosion and sediment control, site clearing, and construction of tie-in measures (levee, berm) and eight-foot contour line tie-ins at Thixton Creek, Grand Canal, Higbie Creek, and Mill River. The project also includes sand/rubble backfill, site restoration, permitting, and environmental review. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, and contingencies for project design and construction management. Benefits of the project are public in nature to protect the region from future flood damage.

*Option B: Construct Marsh Barrier Islands and Pedestrian Walkways*

Pending the outcome of the Bay Park Tidal Surge Barriers Feasibility Study, this project would construct marsh barrier islands (connected by wave attenuation walkways) in conjunction with construction of a living shoreline on the south shore of Bay Park. The islands would have a height of 6 feet and taper out at a 3:1 slope. The toe of the slope would be reinforced with rip

rap on the Bay front and a 20"1 natural slope landwards. Native salt marsh wetland plants, scrub shrub and tress would be planted on each island.

**Benefits:** Regional, Public

**Cost: Option A:** High (approximately \$59,000,000); **Option B:** N/A (Advocacy)

**Timeframe for Implementation:** Long-Range (> 5 years)

**Regulatory Requirements:** Pending the outcome of the study, the project is technically feasible and can begin once the study is complete, followed by engineering design and environmental review. Regulatory permits (NYSDEC, DEP, Army Corps of Engineers) would be required, and material would need to be located for filling in marsh islands (beneficial reuse). Community involvement regarding the placement and effects of barriers would be required, and the Town of Hempstead would need to maintain the moveable flood gates and deploy them as necessary.

**Construct Movable Flood Gates at Reynolds Channel (A5)**

Pending the outcome of the Reynolds Channel Tidal Surge Barriers Feasibility Study, this project would construct movable tidal surge barriers on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge) to intercept tidal flows into Hempstead Bay. This gate would usually be open for normal tidal but can be shut when needed to hold back rising waters.

Benefits of the project are public in nature to protect the region from future flood damage.

**Benefits:** Regional, Public

**Cost:** N/A (Advocacy)

**Timeframe for Implementation:** Long-Range (> 5 years)

**Regulatory Requirements:** Pending the outcome of the study, this project is potentially technically feasible and can begin once the study is complete. Regulatory permits (NYSDEC, DEP, Army Corps of Engineers, U.S. Coast Guard) would be required, as well as completion of engineering design and environmental review. Community involvement regarding the placement and effects of barriers would be required, and jurisdiction would need to be determined with regard to maintenance of the barriers and deployment when necessary.

**County-wide Stormwater Mitigation Plan with Community Education and Awareness (B3)**

Coordinate with and advocate for Nassau County to develop a stormwater system maintenance and monitoring plan which would allow for proper maintenance of the current system to prevent back flows and overflows. Documentation of flooding conditions would help understand specific storm conditions and the effectiveness of stormwater management measures.

**Timeframe for Implementation:** Immediate (< 2 years)

**Cost:** N/A (Advocacy)

## Bay Park and Village of East Rockaway

**Regulatory Requirements:** The project is technically feasible, not likely to face regulatory obstacles including issues with permits or other approvals, has no real property constraints and is ready to begin. It would require cooperation from the Town of Hempstead and the Nassau County Department of Public Works.

### Construct Bulkheads at East Rockaway Junior-Senior High School (B5)

Approximately 750 linear feet of bulkheading is missing behind the athletic field at East Rockaway High School. Erosion and safety are concerns of the East Rockaway Union Free School District. This project would create continuous bulkheading along the High School Property by constructing new bulkheads and tying into existing adjacent bulkheads.

**Benefits:** Local, Public

**Cost:** Low (approximately \$1,500,000)

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible but may face regulatory obstacles and permitting issues with DEC as it is the construction of new bulkheads. Coordination with Nassau County and the Village of East Rockaway would be required.



**Figure 40: Shoreline at East Rockaway High School without a bulkhead**

Source: Bing Maps

**Hydrologic and Hydraulic Study of the Reynolds Channel-East Rockaway Inlet and Mill River Watersheds (B4)**

This project would study the hydrologic and hydraulic systems affecting the Reynolds Channel-East Rockaway Inlet and Mill River Watersheds, which impact both stormwater management and tidal flows for Bay Park and the Village of East Rockaway. The objective is to gain a regional, watershed-level understanding of the hydrology affecting East Rockaway/Bay Park, which would better inform stormwater management projects. A hydrologic and hydraulic study of the Reynolds Channel-East Rockaway Inlet and Mill River Watersheds would be undertaken to determine where the runoff is coming from, how much, where is it going, and whether the current systems are adequate to handle 2013 conditions and future conditions. The study would identify measures that would be needed to ensure adequate stormwater management.

**Benefits:** Regional, Public

**Cost:** N/A (advocacy)

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and can be implemented immediately. Coordination with Nassau County, the Town of Hempstead, Village of East Rockaway and other agencies is recommended. No permits are required.

**Jurisdiction:** Nassau County, Town of Hempstead, Village of East Rockaway. A multi-jurisdictional committee/consortium of municipalities could be considered, as well. This form of governance and administration has proven successful on Long Island, as represented by both the Hempstead Harbor Protection Committee and Manhasset Bay Protection Committee. Potential actions of such a multi-jurisdictional committee/consortium might include being able to appoint a fiduciary to be responsible for grant management, with the committee/consortium itself being responsible for project management. The recent New York – Connecticut Sustainable Communities Consortium, a program funded by a HUD Sustainable Communities Regional Planning Grant, used this structure and was successful in carrying out the planning program over a wide geography and across numerous municipal boundaries.

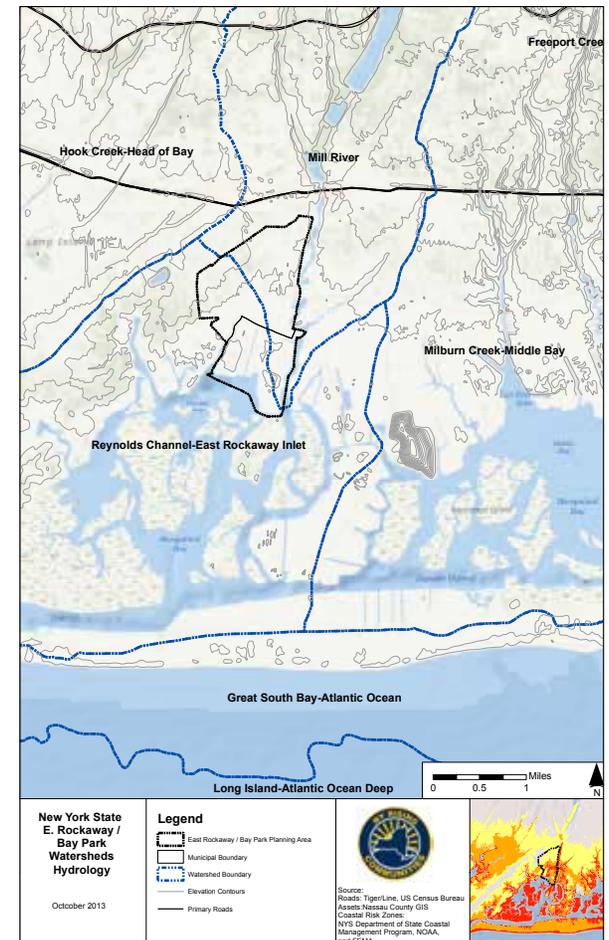


Figure 41: Watersheds and Hydrology

## Bay Park and Village of East Rockaway

### Construct Pedestrian Bridges in Bay Park (C6)

This project would construct pedestrian bridges over Grand Canal and Higbie Creek to provide alternate evacuation routes for residents in Bay Park. With flooded roadways during Superstorm Sandy, residents need another means to evacuate; pedestrian bridges could serve as alternate evacuation routes, and allow access to key facilities like Bay County Park. These bridges would extend over the proposed movable tidal surge barriers at the mouth of Grand Canal and Higbie Creek.

The total cost of the project is estimated to be \$1,400,000 which includes As-built surveying, site clearing, (pre-fabricated, ADA-compliant) pedestrian bridges over Grand Canal and Higbie Creek, bulkhead modification, allowances for approaches, site restoration and plantings, permitting, and environmental review. Project costs incorporate operating and maintenance costs, escalation, construction administration, contract management, as well as contingencies for project design and construction management.

**Benefits:** Local, Public

**Cost:** High (approximately \$1,300,000); estimated annual operations and maintenance costs are \$72,800 resulting in a present worth of approximately \$2,400,000.

**Timeframe for Implementation:** Intermediate (2-5 years)

**Regulatory Requirements:** The project is technically feasible and can be implemented immediately following design, permitting and environmental review. Federal wetlands permits and potentially a nationwide permit will be necessary, as well



Figure 42: Potential location for 2 pedestrian bridges in Bay Park

as permits from NYS DEC, NYS Coastal Zone Management (CZM), Nassau County and the Town of Hempstead. Potential mitigation for disturbance of habitat may be required.

**Risk Reduction:** This project, while not reducing the risk of assets from flooding and storm activity, would reduce the vulnerability of residents and visitors in the Planning Area by providing alternatives for evacuation efforts and by allowing residents to move to safe areas. This project provides a reduction in risk to all residents in Bay Park, a total population of 2,091.

**Economic Benefits:** This project will create an estimated 15 full-time equivalent jobs.<sup>27</sup>

**Environmental Benefits:** This project would not directly protect natural or cultural resources.

**Health and Social Benefits:** The Proposed Project can be expected to benefit the Hamlet of Bay Park with a total population of 2,091. This project is intended to provide additional evacuation routes and does not secure a specific health and social services facility.



Figure 43: Potential Pocket Parks at 2 locations on West Blvd.

Source: Bing Maps

**Construct two pocket parks on West Boulevard, Bay Park (D3)**

This project would provide funds to create pocket parks on two Town-owned parcels (Block 045 Lot 117, Block 047 Lot 12) on West Boulevard in Bay Park. The parks will provide recreational space and future phases could include the installation of green infrastructure strategies such as rain gardens or bioswales.

A sponsor for this project could be a local neighborhood organization interested in fostering civic pride, beautifying the neighborhood and increasing open spaces.

The total cost of the project is estimated to be \$100,000, which includes \$50,000 per park for cleaning and beautifying the municipal property.

The cost includes the purchase of plants, soil media, and mulch for the first year of the parks' establishment.

**Benefits:** Local, Public

**Cost:** Low (approximately \$100,000); estimated annual operations and maintenance costs are \$3,600 resulting in a present worth of approximately \$150,000.

**Timeframe for Implementation:** Immediate (< 2 years)

**Regulatory Requirements:** The project is technically feasible and provides opportunity for volunteers and education. Permits may be required from the Town of Hempstead.

The project can begin immediately, following design, permitting and environmental review. Coordination will be required with the Town of Hempstead, and is recommended with the NY Department of Environmental Conservation.

**Risk Reduction:** Depending on the existing conditions of the parks, this project could reduce vulnerability of assets in the immediate vicinity of the two parks by increasing infiltration and thereby reducing flooding. The Proposed Project may aid in reduction of risk to the population of Bay Park, a total of 2,091 persons.

**Economic Benefits:** Although this project is only estimated to create one full-time equivalent job, the addition of pocket parks may have a positive impact on property values in the area by

## **Bay Park and Village of East Rockaway**

providing open space and reducing the chances of flooding.

*Environmental Benefits:* This project envisions future installation of green infrastructure strategies such as rain gardens or bioswales at two small parks. As such, the project would serve, in a limited capacity, to increase stormwater and floodwater recharge and protect the two assets and decrease local flooding. This project would also improve recreational open space for the community.

*Health and Social Benefits:* The Proposed Project can be expected to benefit the Hamlet of Bay Park with a total population of 2,091. This project does not secure a specific health and social services facility, but instead aims to protect all health and social services assets within Bay Park including; the Nassau County Police Department Marine Bureau and the Bay Park Fire District building.

**B. Master Table of Projects**

**Table 8: Master Table of Projects**

Strategy	Project Name	Project Description	Estimated Cost	Project Category	Regional Project (Y/N)
<b>A: Protect the coastline from flooding</b>	South Shoreline Improvement Program Study (A1)	Comprehensive program to facilitate coordinated bulkhead repairs and living shoreline improvements on private property.	\$100,000	Proposed	Y
	Bay Park Tidal Surge Barriers Feasibility Study (A2)	Study locations for potential movable tidal surge barriers to intercept tidal flows from West Hempstead Bay. at Higbie Creek, Grand Canal, Mill River and Thixton Creek.	\$256,450	Additional	Y
	Reynolds Channel Tidal Surge Barriers Feasibility Study (A3)	Study potential movable tidal surge barriers at two locations on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge and Long Beach Boulevard) to intercept tidal flows into Hempstead Bay.	\$484,150	Additional	Y
	Construct Movable Flood Gates in Bay Park (A4)	Pending the outcome of the Bay Park Tidal Surge Barriers Feasibility Study, this project would construct Option A or Option B.			
	<i>Option A</i>	Construct Flood Gates in Bay Park	\$58,877,727	Additional	Y
	<i>Option B</i>	Construct Marsh Barrier Islands and Pedestrian Walkways	\$40,310,000	Additional	Y
	Construct Movable Flood Gates at Reynolds Channel (A5)	Pending the outcome of the Reynolds Channel Tidal Surge Barriers Feasibility Study, this project would construct movable tidal surge barriers on Reynolds Channel (i.e., near Silver Point County Park/Atlantic Beach Bridge) to intercept tidal flows into Hempstead Bay.	\$27,670,000	Additional	Y

Bay Park and Village of East Rockaway

Table 8: Master Table of Projects (continued)

Strategy	Project Name	Project Description	Estimated Cost	Project Category	Regional Project (Y/N)
<b>B: Address recurring stormwater drainage issues</b>	East Rockaway – Bay Park Drainage Improvements (B1)	Drainage Improvements are broken into 6 distinct sub-projects. Sub-project 1 (H&H Study) would identify specific needs and plans for Sub-projects 2-6.			
	Sub-project 1: East Rockaway – Bay Park Drainage Hydrology and Hydraulic Study (B1.1)	Hydrologic and hydraulic study on the existing stormwater system.	\$250,000	Proposed	N
	Sub-project 2: Lawson Ave Part 1 (B1.2)	Resolve stormwater issues at Lawson Ave with installation of check valves, wet weather pumps and water storage tank where feasible.	\$120,000	Proposed	N
	Sub-project 3: Lawson Ave part 2 (B1.3)	Road raising of Lawson Avenue to 8' and site restoration to address drainage issues.	\$2,670,000	Proposed	N
	Sub-project 4: West Blvd Part 1 (B1.4)	Road raising of north half of West Blvd with site restoration. Includes installation of outfalls, dredging, wetland creation and site restoration at Higbie Creek.	\$4,200,000	Proposed	N
	Sub-project 5: West Blvd Part 2 (B1.5)	Road raising of south half of West Blvd. Includes installation of outfalls, dredging, wetland creation and site restoration at Higbie Creek.	\$5,200,000	Featured	N
	Sub-project 6: East Boulevard and connecting streets (B1.6)	Road raising and site restoration of East Boulevard and connecting streets.	\$4,800,000	Featured	N
	Green Infrastructure Implementation Program (B-2)	Green infrastructure measures to increase stormwater retention and detention including constructed wetlands, vegetated swales, stormwater street trees, rain gardens and permeable pavements.	\$5,200,000	Featured	N
	County-wide Stormwater Mitigation Plan with Community Education and Awareness (B3)	Advocate for Nassau County to develop a stormwater system maintenance and monitoring plan which would allow for proper maintenance of the current system to prevent back flows and overflows.	\$500,000	Additional	Y
	Construct Bulkheads at East Rockaway Junior-Senior High School (B4)	Build/repair 750' of bulkheading along the Mill River at East Rockaway High School.	\$1,500,000	Additional	N
Hydrologic and Hydraulic Study of the Reynolds Channel-East Rockaway Inlet and Mill River Watersheds (B5)	Comprehensive study of hydrologic and hydraulic systems of the two watersheds that impact stormwater management and tidal flows in Community	\$750,000	Additional	Y	

**Table 8: Master Table of Projects (continued)**

Strategy	Project Name	Project Description	Estimated Cost	Project Category	Regional Project (Y/N)
<b>C:</b> <i>Harden municipal infrastructure and improve capability to respond to storm events</i>	Harden East Rockaway DPW Garage and John Street Recreation Center (C1)	Dry floodproofing and installation of flood barriers to protect the DPW site and the John Street Rec Center.	\$460,000	Proposed	N
	Local Disaster Recovery Manager (LDRM) (C2)	Fund a local LDRM to coordinate long-term recovery and redevelopment. LDRM would coordinate and manage the overall long-term recovery, provide grant writing services, administration and leveraging of multiple federally-funded projects and programs.	\$200,000 (2 years)	Proposed	N
	Microgrid network for backup power supply (C3)	Establish a micro-grid network to provide backup power for key facilities. A microgrid hub could be located at the (1) Bay Park STP or (2) East Rockaway Village Hall.	\$1,000,000	Proposed	N
	Expand Mobile Disaster Response Capacity in East Rockaway (C4)	Purchase of low profile boat and high water vehicle, expansion of storage and floodproofing of radio tower.	N/A (advocacy)	Featured	N
	Install Solar Panels at Schools (C5)	Install solar panels on roofs of four schools within East Rockaway Union Free School District.	\$250,000	Featured	N
	Construct pedestrian bridges in Bay Park (C6)	Construct pedestrian bridges over Grand Canal and Higbie Creek to provide alternate evacuation route for residents.	\$1,400,000	Additional	N
<b>D:</b> <i>Improve the overall quality of life to maintain housing values and give people a reason to stay and invest in the community</i>	Downtown Resiliency and Redevelopment Strategic Plan (D1/E1)	Plan that identifies housing and economic development opportunities, zoning changes, streetscape improvements and shoreline improvements that improve the resiliency of the downtown commercial district.	\$195,000	Proposed	N
	Neighborhood Home Improvement Assistance Program (D2)	Program to facilitate and incentivize home raising and other permanent floodproofing measures.	\$3,000,000	Featured	N
	Pocket parks on West Boulevard, Bay Park (D3)	Creation of recreational space with green infrastructure at vacant parcels adjacent to Grand Canal.	\$1,000,000	Featured	N

Bay Park and Village of East Rockaway

**Table 8: Master Table of Projects (continued)**

Strategy	Project Name	Project Description	Estimated Cost	Project Category	Regional Project (Y/N)
<b>E:</b> <i>Strengthen and protect the local economy</i>	Program for Floodproofing of Downtown Businesses (E2)	Program to facilitate and incentivize permanent floodproofing measures for businesses.	\$150,000	Featured	N
<b>F:</b> <i>Leverage improvements to the Bay Park STP</i>	Repairs to Bay County Park (F1)	Improvements to Bay County Park including ball fields, passive recreation space and access to water for fishing and boating.	N/A (advocacy)	Featured	Y
	Microgrid network for backup power supply at Bay Park STP (F2)	Establish a microgrid network with hub at BP STP and above-ground conduits to transformer at 5th & Williamson, DPW, and Rhame Avenue School	\$800,000	Featured	N

## C. Public Engagement Process

The Public Engagement plan for Bay Park and the Village of East Rockaway was structured to encourage broad community participation, including people from all areas and sectors comprising the study area. The goal was to actively engage the community in the process of creating a pragmatic program that envisions a resilient and sustainable future for the two communities.

The plan was effective in informing a wide spectrum of the community about the State’s efforts and the actions that could be taken in the future to enhance the resiliency of the area. It provided multiple opportunities for public input and direction, and helped to identify a group of potential project “champions” who can oversee and monitor projects as they proceed in the future.

### NYRCR Planning Committee

The NYRCR Planning Committee was composed of 13 members representing both jurisdictions. Members included long-term residents, business representatives, institutional leaders, and municipal representatives. The NYRCR Planning Committee was instrumental in providing input and information to shape the Plan and in assisting with the broader Community Engagement Strategy through their constituent and social networks.

The Public Engagement Strategy included regular, monthly NYRCR Planning Committee meetings focused on the development of the Plan. At these meetings, which were open to the public, the

NYRCR Planning Committee provided input on:

- The issues currently facing Bay Park and East Rockaway as a result of Superstorm Sandy and other extreme events;
- Bay Park and East Rockaway’s existing assets and the opportunities they might provide for a more resilient future;
- Input regarding the appropriate strategies needed to make the area more resilient;
- Preliminary ideas for projects in the area that can be initiated through the current planning process;
- Discussions regarding the prioritization of recommended actions and projects;
- Input regarding the format and content for public engagement events; and,
- Major outreach efforts focused on “getting the word out” about the project, the planning process, and the public engagement meetings.

NYRCR Planning Committee meetings were held on the following dates:

- Meeting #1: September 23, 2013;
- Meeting #2: October 8, 2013;
- Meeting #3: October 22, 2013;
- Meeting #4: December 4, 2013;
- Meeting #5: January 23, 2014; and,
- Meeting #6: March 6, 2014.

### Public Meetings

There were three public meetings, held in October 2013, November 2013, and February 2014. A fourth public meeting would be held in April 2014, after completion of this plan. Though each meeting focused on a different part of the planning process, the entire process, purpose, and timeline was explained during the presentation at each of the three meetings. Representatives from NY Rising Housing Recovery Program, FEMA, Project Hope, and Catholic Charities were available at each meeting to speak with residents about any individual or property-related concerns.

#### Public meeting #1

The first Public Meeting was held on October 16, 2013. Approximately 25 people attended the meeting, which focused on gathering the public’s knowledge, experience, and recommendations for the development of the NYRCR Conceptual Plan. The public was invited to provide input on the NYRCR Planning Committee’s work to date, including the Community Vision, Identification of Community Assets, and Potential Projects.

#### Public meeting #2

The second Public Meeting was held on November 18, 2013, with approximately 70 members of the public in attendance. The purpose of the meeting was to show residents the draft NYRCR Conceptual Plan and get their input.

The format of the meeting was a short presentation followed by an invitation for the attendees to walk

## Bay Park and Village of East Rockaway



Public Engagement Event #1



around the room to various stations to view ideas and strategies from the Plan. Attendees gave their feedback by asking questions or speaking with the member of the consultant team who was standing near each station, and they were invited to mark up maps and boards and respond to specific questions posted at each station. Some attendees voted by placing sticker dots on the boards next to projects or ideas that they felt most positive about.

There were several copies of the draft Conceptual Plan at the meeting, for the community to review. Meeting attendees were also informed that the draft Conceptual Plan was posted on the website for their review.



Public Engagement Event #2



### Public meeting #3

The third Public Meeting was held on February 4, 2014. The purpose of this meeting, attended by approximately 40 people, was to discuss the list of specific projects that aim to address issues related to resilience and recovery in Bay Park and the Village of East Rockaway. The format of the meeting was a presentation followed by a question and answer session, during which residents gave their input and asked questions about the NYRCR Planning Committee's preferred menu of projects.

### Public meeting #4

A fourth public meeting is forthcoming in Spring 2014 where the final NYRCR Plan would be presented to the community.



Public Engagement Event #3





## D. Community Asset Inventory and Risk Assessment

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### Coastal Hazard and Risk Assessment Tool (“Risk Assessment Tool”)

The Risk score for each group of assets is determined by multiplying its hazard, exposure and vulnerability values (Risk = Hazard x Exposure x Vulnerability). The Coastal Hazard and Risk Assessment Tool automatically generates this risk score, which represents the relative risk of the community. Risk scores include some subjective analysis and should not be compared from one community to another. Risk scores can range from 1.5, the lowest score reflecting negligible or ‘residual’ risk, to 75, the highest score reflecting severe risk. These ranges are broken down as follows:

**Residual (Risk Score <6):** Residual risk scores result from both low exposure and vulnerability, however if assets are critical or have a very high community value, actions may be warranted to reduce their risk.

**Moderate (Risk Score 6 - 23):** A moderate risk score represents that the assets may suffer moderate to serious storm impacts, but that adaptation may be of a lower priority because either exposure or vulnerability are low

**High (Risk Score 24 - 53):** Risk scores in the high range are indicative of conditions that could lead to significant negative impacts from a storm, and actions should be taken to reduce the assets’ vulnerability and restore the assets’ coastal protections.

**Severe (Risk Score >53):** A severe risk score represents that the assets are in a dangerous situation and that both exposure and vulnerability should be reduced.

Risk scores help identify assets with increased potential for storm damage and serve as one of many factors that helped the Committee to determine the potential projects to include in the NYRCR Plan; see Section IV for further discussion on project screening and selection. In addition to the risk score, other contributing factors in determining which assets should be addressed and how immediately they should be addressed include:

- The assets’ contribution to life safety;
- If the asset(s) are critical or locally significant;
- The assets’ community value,
- Environmental services provided by the assets;
- Economic contribution of the assets;
- Availability or alternative assets or facilities, and,
- The capacity of the assets to adapt.

The Coastal Hazard and Risk Assessment Tool measures against a 100-year storm, or a Hazard Score of 3. The Hazard score is based on the likelihood an event would occur and the magnitude (destructive capacity) of the event. For the purpose of preparing a NY Rising Community Reconstruction Plan, NY State recommends that Bay Park/East Rockaway consider a 100-

year storm (1% annual chance). Because the magnitude of storm events increases as the likelihood decreases (100-year storms have higher magnitude than 10-year storms), the Hazard score increases as the likelihood goes down. Therefore, the Coastal Hazard and Risk Assessment Tool is calibrated to a 100-year storm. Although the NYRCR Plan seeks to protect against a 100-year storm, equally important is protecting against smaller, more frequent storm events such as the 10-year storm, which has a 10% chance of occurrence each year. Several projects may not have risk reduction benefits, measured by the Tool or qualitatively, for the 10-year storm. These benefits are described qualitatively.

Table 9: Asset Inventory and Risk Assessment Tool

Asset Information					Risk Assessment			
Asset*	Risk Area	Asset Class	Critical Facility	Com. Value	Hazard Score	Exposure Score	Vuln. Score	Risk Score
Main St	High	Infrastructure Sys.	No, Locally Sign.	High	3	3.50	3	32
Atlantic Ave_Extreme	Extreme	Infrastructure Sys.	No, Locally Sign.	High	3	4.50	4	54
Atlantic Ave_High	High	Infrastructure Sys.	No, Locally Sign.	Medium	3	3.00	4	36
Lawson Ave_Extreme	Extreme	Infrastructure Sys.	No, Locally Sign.	High	3	4.00	4	48
Lawson Ave_High	High	Infrastructure Sys.	No, Locally Sign.	Medium	3	2.50	4	30
Sewer Pipe Assets_High	High	Infrastructure Sys.	No	Medium	3	2.50	2	15
Sewer Pipe Assets_Extreme	Extreme	Infrastructure Sys.	No	High	3	4.50	4	54
Roadway Assets_Extreme	Extreme	Infrastructure Sys.	No	High	3	4.50	3	41
Roadway Assets_High	High	Infrastructure Sys.	No	Medium	3	2.50	3	23
Mill River	Extreme	Natural and Cultural Res.	No, Locally Sign.	Low	3	4.50	4	54
Thixton Creek	Extreme	Natural and Cultural Res.	No, Locally Sign.	Low	3	4.50	4	54
Higbie Canal	Extreme	Natural and Cultural Res.	No, Locally Sign.	Low	3	4.50	4	54
Grand Canal	Extreme	Natural and Cultural Res.	No, Locally Sign.	Low	3	4.50	4	54
Stormwater Outfall_High	High	Infrastructure Sys.	No	Medium	3	3.00	4	36
Stormwater Outfall_Extreme	Extreme	Infrastructure Sys.	No	Medium	3	4.00	4	48
Nassau County Police Department Tel. Tower	Extreme	Infrastructure Sys.	No	Medium	3	4.00	4	48
Nassau County Bay Park Sewage Treatment Plan	High	Infrastructure Sys.	Yes, FEMA	Medium	3	3.50	4	42
Minute Man Cleaners Remediation Site	High	Infrastructure Sys.	No	Medium	3	3.00	4	36
East Rockaway Village Hall Tel. Tower	Moderate	Infrastructure Sys.	Yes, FEMA	High	3	2.50	2	15
Centre Ave LIRR Station	Moderate	Infrastructure Sys.	No, Locally Sign.	High	3	2.50	4	30
Atlantic Avenue Bridge	0	Infrastructure Sys.	No, Locally Sign.	Medium	3		4	0
White Cannon Point Park	High	Natural and Cultural Res.	No	High	3	3.50	4	42
Gulf Gas Station	Moderate	Infrastructure Sys.	No, Locally Sign.	High	3	2.00	3	18
Bay Park Field #3/Bay Park Golf Course	High	Natural and Cultural Res.	No	High	3	3.00	4	36
New St Economic Corridor_Extreme	Extreme	Economic	No	Low	3	4.50	4	54
North East Rockaway Housing Assets_Extreme	Extreme	Housing	No	Low	3	4.00	4	48
Atlantic Ave/Ocean Ave Economic Corridor_High	High	Economic	No	High	3	3.00	4	36
Front St Economic Corridor_High	High	Economic	No	Low	3	3.50	4	42
Woodmere Bay Yacht Club	Extreme	Economic	No	Low	3	4.50	4	54
Atlantic Ave/Ocean Ave Economic Corridor_Extreme	Extreme	Economic	No	High	3	4.00	4	48
Bay Park East Housing Assets_Extreme	Extreme	Housing	No	Low	3	3.50	4	42
Central East Rockaway Housing Assets_Extreme	Extreme	Housing	No	Low	3	3.50	4	42
Front St Economic Corridor_Extreme	Extreme	Economic	No	Low	3	4.50	3	41
Bay Park West Housing Assets_Extreme	Extreme	Housing	No	Low	3	4.50	5	68
Lawson Ave Housing Assets_High	High	Housing	No	Low	3	2.50	4	30
Main St Economic Corridor_High	High	Economic	No	Low	3	2.50	1	8

Legend: Risk Score

Residual Moderate High Severe

\* Note: For the purposes of the Asset Inventory and Risk Assessment Tool, assets that crossed multiple Risk Areas were split up and categorized by their corresponding Risk Area (e.g., the portion of Atlantic Avenue in the Extreme Risk Area is identified as "Atlantic Avenue\_Extreme," the portion in the High Risk Area is "Atlantic Avenue\_High."

Bay Park and Village of East Rockaway

Table 9: Asset Inventory and Risk Assessment Tool (continued)

Asset Information					Risk Assessment			
Asset*	Risk Area	Asset Class	Critical Facility	Com. Value	Hazard Score	Exposure Score	Vuln. Score	Risk Score
Bay Park East Housing Assets_High	High	Housing	No	Low	3	2.50	5	38
East/West Blvd Housing Assets_Extreme	Extreme	Housing	No	Low	3	4.00	4	48
East/West Blvd Housing Assets_High	High	Housing	No	Low	3	3.00	4	36
Lawson Ave Housing Assets_Extreme	Extreme	Housing	No	Low	3	4.00	3	36
Williamson St Housing Assets_Extreme	Extreme	Housing	No	Low	3	4.00	4	48
Williamson St Housing Assets_High	High	Housing	No	Low	3	2.50	4	30
Central East Rockaway Housing Assets_High	High	Housing	No	Low	3	2.50	4	30
North East Rockaway Housing Assets_High	High	Housing	No	Low	3	3.00	4	36
Bay Park West Housing Assets_High	High	Housing	No	Low	3	3.00	5	45
East Rockaway Fd House 1	Moderate	Health and Social Services	Yes, FEMA	High	3	2.00	3	18
Talfor Boat Basin	High	Economic	No	High	3	3.50	3	32
Minore Park	High	Natural and Cultural Res.	No	High	3	2.50	4	30
Bay Park Fire District	Extreme	Health and Social Services	Yes, FEMA	High	3	4.50	4	54
Town of Hempstead Property -Vacant parcel at Court S	Extreme	Natural and Cultural Res.	No	Low	3	4.50	4	54
Knights of Columbus	High	Natural and Cultural Res.	No	High	3	2.50	4	30
Bay Park Boat Ramp	High	Natural and Cultural Res.	No	High	3	3.00	4	36
Hewlett Point Park Center	Extreme	Natural and Cultural Res.	No	High	3	4.50	4	54
East Rockaway Fd House 2	Moderate	Health and Social Services	Yes, FEMA	High	3	2.00	4	24
Centre Avenue Elementary Schoo	Moderate	Health and Social Services	No, Locally Sign.	High	3	2.00	4	24
John Street Recreational Center_Extreme	Extreme	Natural and Cultural Res.	No	High	3	4.00	4	48
East Rockaway High School	Extreme	Health and Social Services	No, Locally Sign. H	High	3	4.00	4	48
Bay Park Playground + Administration Building	High	Health and Social Services	No, Locally Sign., H	High	3	3.50	5	53
Nassau County Police Department Marine Bureau	High	Health and Social Services	No, Locally Sign., H	High	3	3.50	4	42
East Rockaway Fd Headquarters	Moderate	Health and Social Services	Yes, FEMA	High	3	2.00	4	24
East Rockaway Village Hall / Senior Center	High	Health and Social Services	No	High	3	3.00	2	18
Town of Hempstead Property - Vacant parcel at W. Eva	Extreme	Natural and Cultural Res.	No	Low	3	4.50	4	54
Former Jack and Jill Playland (now ERFD)	High	Health and Social Services	No, Locally Sign.	Low	3	3.50	4	42
Kevin E. McNulty Park	Extreme	Natural and Cultural Res.	No	High	3	4.00	3	36
Rolling River Day School	Extreme	Health and Social Services	No, Locally Sign.	High	3	4.00	4	48
East Rockaway Progressive Care (Nursing Home)	Moderate	Health and Social Services	Yes, FEMA	High	3	2.00	2	12
Village of East Rockaway: Fire Dept.	Moderate	Health and Social Services	Yes, FEMA	High	3	2.00	4	24
Rhame Avenue School	High	Health and Social Services	No, Locally Sign. H	High	3	2.50	4	30
Hewlett Point Park	High	Natural and Cultural Res.	No	High	3	3.00	4	36
Waverly Park School	Moderate	Health and Social Services	No, Locally Sign. H	High	3	2.00	4	24
East Rockaway Fd Truck 1 + Engine 1	High	Health and Social Services	Yes, FEMA	High	3	3.00	4	36
Marion Street School	Moderate	Health and Social Services	No, Locally Sign. H	High	3	2.00	4	24

Legend: Risk Score

Residual Moderate High Severe

\* Note: For the purposes of the Asset Inventory and Risk Assessment Tool, assets that crossed multiple Risk Areas were split up and categorized by their corresponding Risk Area (e.g., the portion of Atlantic Avenue in the Extreme Risk Area is identified as "Atlantic Avenue\_Extreme," the portion in the High Risk Area is "Atlantic Avenue\_High."

Table 9: Asset Inventory and Risk Assessment Tool (continued)

Asset Information					Risk Assessment			
Asset*	Risk Area	Asset Class	Critical Facility	Com. Value	Hazard Score	Exposure Score	Vuln. Score	Risk Score
John Street Recreation Center	Extreme	Health and Social Services	Yes, FEMA	High	3	4.00	4	48
U S Post Office East Rockaway	High	Health and Social Services	No	High	3	3.50	4	42
Shell Gas Station	High	Infrastructure Sys.	No, Locally Sign.	High	3	2.50	3	23
East Rockaway DPW	High	Health and Social Services	Yes, FEMA	High	3	3.00	4	36
Hewlett Point Yacht Club	Extreme	Economic	No	Low	3	4.00	4	48
East Rockaway Bldg Dept	High	Health and Social Services	No	Low	3	2.50	4	30
N and R Fuel Oil Company Incorporated	High	Health and Social Services	Yes, FEMA	High	3	3.50	4	42

Legend: Risk Score

Residual Moderate High Severe

\* Note: For the purposes of the Asset Inventory and Risk Assessment Tool, assets that crossed multiple Risk Areas were split up and categorized by their corresponding Risk Area (e.g., the portion of Atlantic Avenue in the Extreme Risk Area is identified as "Atlantic Avenue\_Extreme," the portion in the High Risk Area is "Atlantic Avenue\_High."

## E. Economic and Housing Profile

### Economic Profile

#### Employment

East Rockaway and Bay Park are primarily bedroom communities. After fluctuating with the economy since 2002 as seen in the chart below, as of 2011, there were 1,852 jobs in the Community.

Roughly one in five jobs in the Community was held by a local resident (14.6% from East Rockaway and 4.6% from Bay Park). The largest single share of workers (18.3%) travels to the Community from New York City. Other concentrations of workers come from Lynbrook and Oceanside at 5.6% and 5.5%, respectively. Local jobs are generally low-paying (36.6% pay

minimum wage) and are dominated by education, health care and social services and retail.

#### Employed Residents

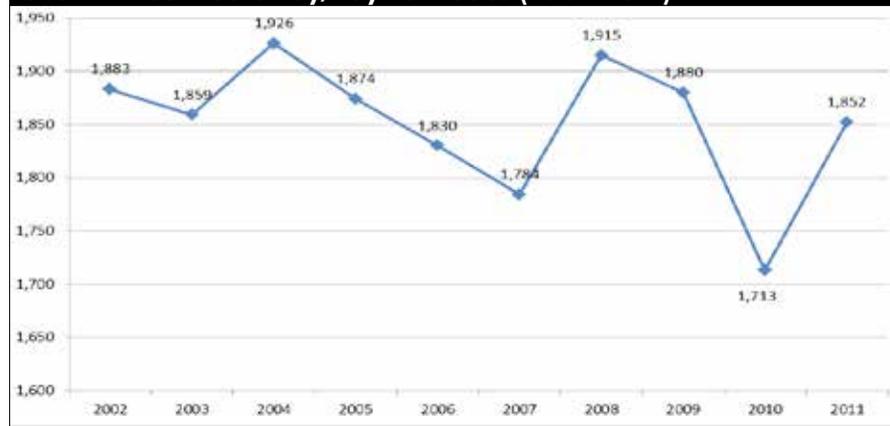
The number of employed residents has fluctuated as well; however, unlike the number of local jobs, the number of employed residents has not rebounded since 2010 and has continued to decline to the lowest level in the last decade.

Of the 5,358 employed residents, only 6.6 % work in the Community. The largest share (39.8%) work in New York City, followed by East Rockaway (6.4%), Lynbrook (4.2%), and Oceanside and Mineola (4.1%, each).

There is greater industry diversity among employed Community residents. Leading industries include Health Care and Social Services

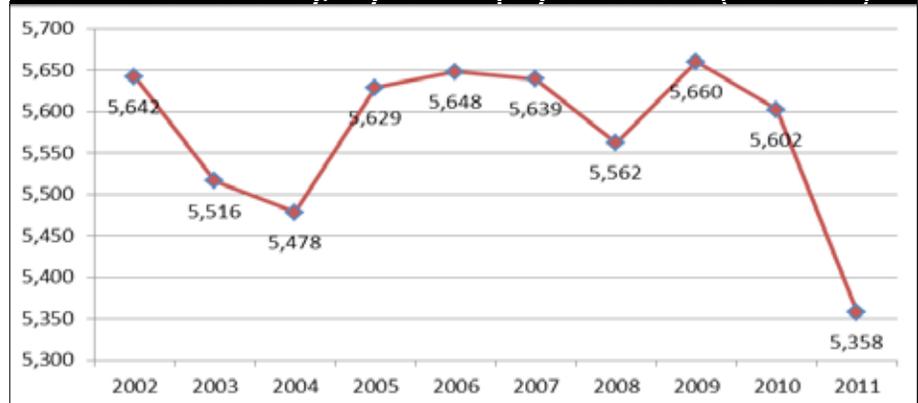
(16.6%), Education (15.4%), Retail (8.4%) and Professional, Scientific and Technical Services (8.0%). Wages of employed residents reflect the diversity with the majority (56.4%) making \$3,333 per month or more, however one in five (20.4%) still make minimum wage.

**Chart 1: East Rockaway/Bay Park Jobs (2002-2011)**



Source: US Bureau of the Census OnTheMap LED dataset

**Chart 2: East Rockaway/Bay Park Employed Residents (2002-2011)**



Source: US Bureau of the Census OnTheMap LED dataset

### East Rockaway/Bay Park Tax Base

Table 10 summarizes the number and assessed value of all parcels, residential, non-residential and commercial in Bay Park and the Village of East Rockaway. According to the 2012-2013 Assessment data from Nassau County, the number of non-residential parcels in the NYRCR area number only 211, or 5.6% of all parcels. These 211 parcels account for 52.9% of the total assessed value in the area. Approximately 25% of these properties are institutional and open space uses that are exempt from property taxes.

To get a better picture of the tax base, the taxable commercial properties were identified. Of all non-residential properties in East Rockaway and Bay Park, 154 are classified as retail, industrial, mixed use, vacant commercial or vacant industrial. These taxable commercial properties make up 4.1% of all parcels, but provide 9.8% of assessed land value and 8.3% of total assessed value.

### Commercial Land Use

When looking at land use in the NYRCR Community, it is notable that while roughly three quarters of all parcels and 79.9% of total assessed value is located in East Rockaway, when those parcels are restricted to commercial properties, including Office, Retail, Mixed Use, Industrial and Vacant Commercial or Industrial, East Rockaway’s share increases to 95.5% of all parcels and 95.6% of total assessed commercial value. (I.e., Bay Park is primarily residential and therefore would not figure heavily in this section.)

**Table 10: Assessed Value of Parcels**

All Parcels	Parcels	Share of Parcels	Share of Land Value	Share of Total Assessed Value
<b>All Parcels</b>				
East Rockaway	2909	76.6%	63.7%	79.9%
Bay Park	891	23.4%	36.3%	20.1%
<b>Commercial Parcels</b>				
East Rockaway	147	95.5%	93.8%	95.6%
Bay Park	7	4.5%	6.2%	4.4%

Source: Nassau County Land Use and 2012-13 Assessment data

**Table 11: Assessed Value of Commercial Parcels**

	Parcels	Land Value	Total Assessed Value
<b>All Parcels</b>	3,800	\$4,132,002	\$8,100,665
All Residential	3,589	\$1,947,869	\$3,812,917
All Non-Residential	211	\$2,184,133	\$4,287,748
All Commercial	154	\$406,775	\$671,924
<b>Share of All Parcel Values</b>			
All Residential Parcels	94.4%	47.1%	47.1%
All Non-Residential	5.6%	52.9%	52.9%
All Commercial	4.1%	9.8%	8.3%

Source: Nassau County Land Use and 2012-13 Assessment data

## Bay Park and Village of East Rockaway

### Market Potential for Future Development

The community has great tourism potential near the Talfor Boat Basin. This area includes the Fishery Restaurant, Davison's Marina, and the East Rockaway Yacht Club. There are also a number of properties that are vacant or have heavily damaged buildings. These sites present an opportunity for redevelopment at the Talfor Boat Basin. Current local consumer expenditures and retail sales were investigated to determine the types of uses and establishments that have the potential to succeed in East Rockaway/Bay Park.

The 2012 Median disposable household income was \$58,603, based on a per capita income of \$41,168. This yields potential residential expenditures of \$275.3 million dollars per year. In 2012, there were 76 retail and restaurant businesses, with sales of \$68.3 million; however, local residents spent \$190.6 million within the area and \$122.3 million outside of East Rockaway and Bay Park.

Chart 3 shows the retail gap by category. The labels in red show drinking places, health & personal care stores, grocery stores and food and beverage stores, which are the only categories where local sales exceed, local expenditures. This means that people come from outside of the area patronize these types of establishments. Resident expenditures exceed retail sales in every other category, meaning that residents go elsewhere for these services.

In terms of the types of businesses that would be appropriate for any potential Harbor development, there is an unmet demand of \$9 million for full service restaurants, another \$7

**Chart 3: Retail Gap by Category**



Source: ESRI Retail Market Assessment 2012, East Rockaway & Bay Park

million for limited-service restaurants and \$1.3 million for specialty food services. Other potential fits for a mixed use, harbor-focused development include sporting goods and hobby as well as clothing and accessory stores --\$4.0 million and \$13.0 million in unmet demand, respectively.

**Housing Profile**

Data from the American Community Survey (ACS) (2007-2011) was used to analyze housing conditions in Bay Park and east Rockaway. It is important to note that this data represents housing conditions prior to Superstorm Sandy. A discussion of Superstorm Sandy impacts related to housing will be discussed later in this section.

According to the 2007-2011 ACS there were 4,514 housing units in the Community, 3,683 in East Rockaway and 831 in Bay Park. Of these units, only 225 were vacant. This yields an overall vacancy rate of 5%. The homeowner vacancy rate in East Rockaway was 1.2%, while the rental vacancy rate was 8.9%. In Bay Park, the homeowner vacancy rate was 4.9% and there were no vacant rental units.

Sixty-one percent of housing units in Bay Park-East Rockaway are traditional single-family detached,

21.7% are two-unit structures and 8.4% are large buildings with 20 units or more. Bay Park is a traditional suburb in that it consists entirely of single-family homes, with 810 being single-family, detached units, and 21 being single-family attached. As shown in Table 12, many of the single-family homes in Bay Park are small Cape Cod style bungalows built following World War I (1918). Single-family housing types in both communities also includes ranch style and small two-story homes. East Rockaway has a number of historic homes north of Main Street, some dating back more than 200 years.

In East Rockaway, after single-family homes, the next most common housing type is two-unit structures with 981 or 26.6% of the total units. This is followed by 20+ unit structures with 377 units; 3 or 4 unit structures with 212 total units; and, 10 to 19 unit structures with 108 units. There are also 36 units located in buildings with 5 to 9 units. Most of the multi-family residences are

located along Atlantic Avenue. Some of these buildings were protected from the surge by the East Rockaway High School, others were flooded by Mill River and remain unoccupied. There is also a concentration of multi-family buildings (i.e., the Lindemere East and St. Regis Apartments) in the flood prone areas south of Main Street. There were 4,452 occupied housing units in Bay Park-East Rockaway in 2011. 74.3% of all units were owner-occupied and roughly two thirds of owners (66.3%) had mortgages.

**Age of Stock**

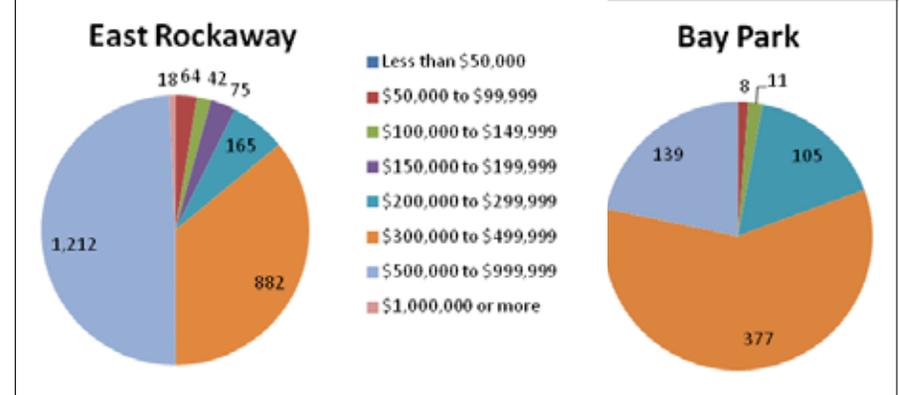
95.9% of the housing stock was constructed before 1980. The majority of this housing, 82.4% for East Rockaway and 92.2% for Bay Park was constructed before 1960. Base Flood Elevations were established in the 1970s and most building codes went into effect in the 1980s, leaving the vast majority housing not constructed to current standards. The aging single-family housing

**Table 12: Units Built by Year**

	East Rockaway		Bay Park CDP	
	#	%	#	%
1959 or earlier	3,073	83.4%	766	92.2%
1979 or earlier	3,534	96%	797	95.9%

Source: American Community Survey 2007-2011

**Chart 4: Housing Value of Owner-Occupied Units**



Source: American Community Survey 2007-2011

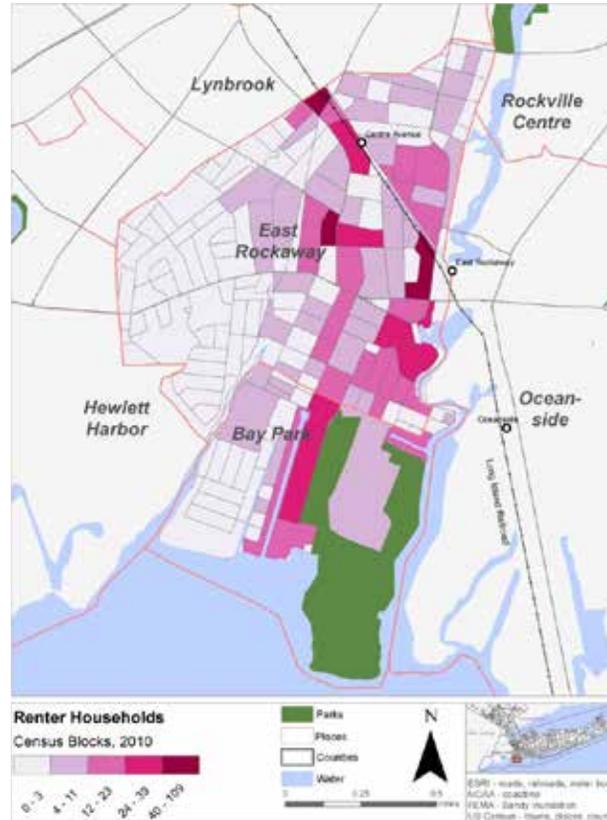
## Bay Park and Village of East Rockaway

stock, especially the bungalow style homes are vulnerable as they have ground floors below BFE and have substandard structural reinforcement. Many of the home's heating fuel tanks are unsecured. Data on the year structure built is shown below.

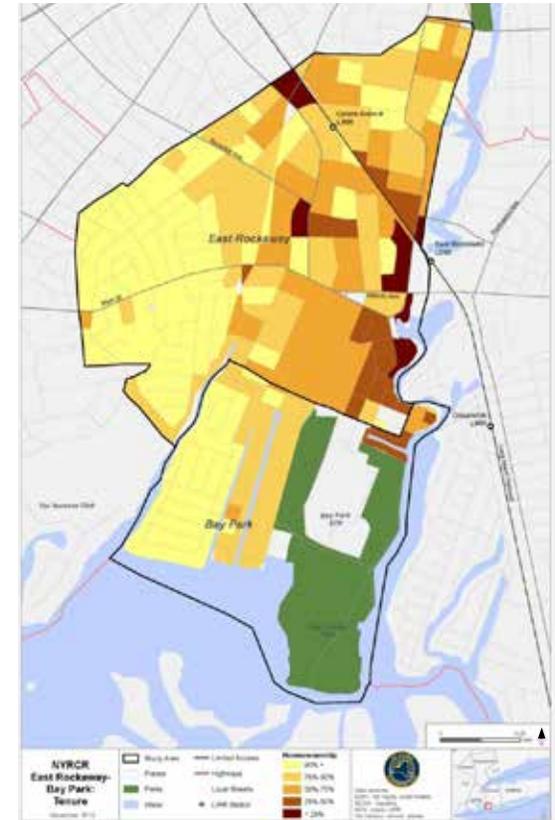
### Housing Value

Median Housing Value was obtained for East Rockaway and Bay Park as well as the Census tracts that make up the area for the most recent year available (2011). The median housing value in East Rockaway was \$500,300, while the median value for housing in Bay Park was \$395,100.

The values by Census tract were distributed by majority area to each risk zone.<sup>30</sup> It is interesting to note that housing values in the Moderate Risk Area were \$493,300 in 2011, or 7.9% higher than the median value in the High Risk Area; however, the household incomes were reversed; the median household income was 11.9% higher in the High Risk Area than in the Moderate Risk Area.



**Figure 44: Renter Households**



**Figure 45: Tenure**

### Household Characteristics: Tenure

Of the 4,289 occupied housing units in the Community, the vast majority are owner-occupied. The ownership rate in East Rockaway is 70.4%, while the ownership rate in Bay Park is an even higher 80.2%. The majority of rental units are

in the northern tract of East Rockaway--which includes the multi-unit structures surrounding the East Rockaway LIRR station as well as the Main Street and Atlantic Avenue corridors. The figures below map the number of rental units and the ownership rate by census block.

### Age of Householder

The largest share of householders in East Rockaway is those between the ages of 45 and 54 at 29.6%. This is followed by those 65 or older at 22.1% and those between 35 and 44 years of age at 21.8%. Only 10.8% has a head in the youngest category, between the ages of 25 and 34.

In Bay Park, the largest share of householders (25.4%) is age 65 or older. However, the next three largest age categories are the youngest: those between 35 and 44 (18.9%), 25 to 34 (17.9%), and 45 to 54 (17.4%). Householders between the ages of 55 and 59 account for 11.4% of households, while 8.9% are between the ages of 60 and 64. As shown on the map on the following page, the largest number of households with heads 65 and older are found in Bay Park along West Boulevard all the way to the harbor, the upland section of Bay Park along Hewlett Boulevard, and also in East Rockaway Village in the cooperative residences near the Centre Avenue LIRR station. It is important to note that the areas of Bay Park that suffered the most from inundation have the largest number of elderly households.

### Mortgage Status and Owner Costs

Of the 2,458 owner occupied units in East Rockaway, 68.5% had mortgages, while 65.8% of Bay Park’s 640 owner-occupied units had mortgages. Monthly costs for mortgage holders ranged from between \$300 and \$499 to more than \$2,000 for each household.

**Table 13: Households by Age of Householder: East Rockaway and Bay Park**

	East Rockaway		Bay Park	
	Households	% of Total	Households	% of Total
Householder 25 to 34 years	377	10.8%	143	17.9%
Householder 35 to 44 years	760	21.8%	151	18.9%
Householder 45 to 54 years	1,035	29.6%	139	17.4%
Householder 55 to 59 years	255	7.3%	91	11.4%
Householder 60 to 64 years	292	8.4%	71	8.9%
Householder 65 years and over	772	22.1%	203	25.4%
Householder 65 to 74 years	330	9.5%	119	14.9%
Householder 75 to 84 years	269	7.7%	65	8.1%
Householder 85 years and over	173	5.0%	19	2.4%

Source: American Community Survey 2007-2011

The majority of mortgage holders in both areas had costs of \$2,000 or more per month. According to the American Community Survey, the median cost for East Rockaway mortgage holders was \$3,288 while the median costs for mortgage holders in Bay Park was \$2,708.

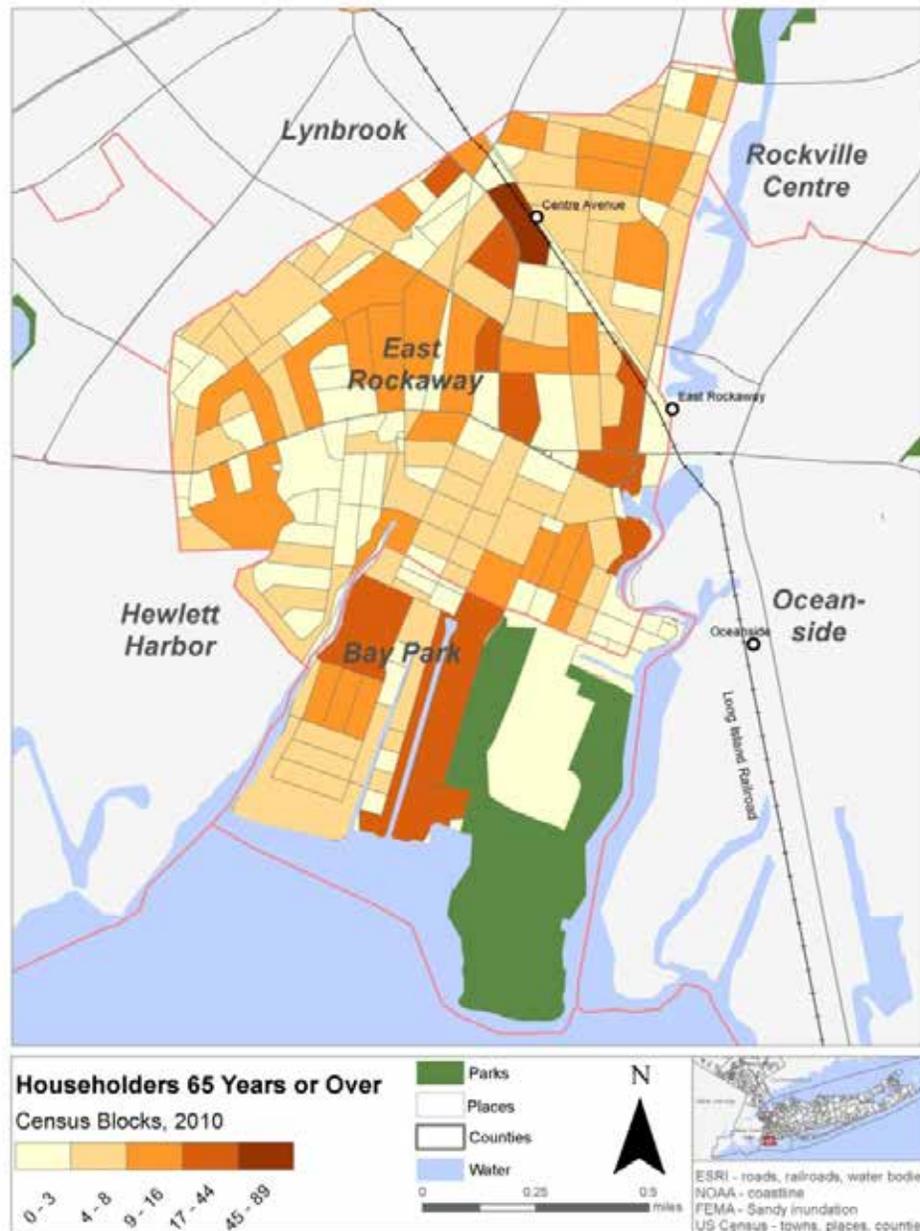
### Affordability

Housing is considered affordable if less than 35% of the household’s collective income goes to housing costs. As of 2011 one third of East Rockaway households (34.3%) and one quarter

of Bay Park households (26.0%) were paying more than 35% of their income, or more than they can afford, on housing.

In East Rockaway, this breaks down to 29.9% of all owners and 44.8% of all renters with housing costs beyond their means. In Bay Park, 29.1% of owners and only 12.5% of renters were spending more than 35% of household income on housing costs.

## Bay Park and Village of East Rockaway



**Figure 46: Householders 65+ Years**

## Foreclosures

East Rockaway had suffered from the housing crisis along with the rest of the suburbs in Long Island. Initially peaking in 2009-10 with 41 foreclosures with mortgage values totaling \$13.9 million, the numbers gradually decreased until Superstorm Sandy hit. After Superstorm Sandy, the number of foreclosures increased to 49 homes with a value of \$16.5 million—which could be the result of homeowners who decided to cut their losses after Superstorm Sandy.

**Table 14: Annual Foreclosure Filings and Values, Zip Code 11518**

	Filings	Values
2008-09	26	\$9,136,400
2009-10	41	\$13,915,546
2010-11	32	\$11,422,350
2011-12	28	\$15,856,232
2012-13	49	\$16,469,814

Source: Newsday

## F. Summaries of Existing Plans and Studies

There are a diversity of plans, policies, procedures and resources available that address the existing conditions, regulatory frameworks, community goals and issues and resiliency opportunities in Bay Park and the Village of East Rockaway. These resources have been produced by a variety of stakeholders including public agencies at all levels (Federal, State, County, Town and Village), regional planning groups, non-profit organizations, academic institutions, community stakeholders and private groups. A brief summary of the relevant regulatory and advisory documents is included below.

### Regulatory

***Federally approved Significant Coastal Fish and Wildlife Habitats (NYS DOS/NYS DEC, 2008)***

West Hempstead Bay the water body to the south of Bay Park is designated as a Significant Coastal Fish & Wildlife Habitat. For each designated SCFWH site, a habitat map and narrative are created to provide site-specific information. The habitat narrative constitutes a record of the basis for the significant coastal fish and wildlife habitat's designation and provides specific information regarding the fish and wildlife resources that depend on this area. General information is also provided to assist in evaluating impacts of proposed activities on characteristics of the habitat which are essential to the habitat's values.

***Nassau County Department of Public Works Drainage Requirements (Nassau County DPW)***

The Phase II Storm Water Regulations requires all municipalities in Nassau County to prepare and implement a Storm Water Management Program. A major component of the County's Storm Water Management Program is the drainage requirements set by the Department of Public Works for the development of Subdivisions. This comprehensive document includes the drainage requirements for street grading and drainage and the requirements for erosion and sediment control.

***Nassau County Stormwater Management Program Plan (Nassau County, 2009)***

The NCSWMP includes a listing of Best Management Practices (BMP's) that have been implemented by the County and a coalition of local municipalities in order to achieve the regulatory standard of reducing pollutants in the County's storm water to the maximum extent practicable. Initial measurable goals and an implementation schedule were developed for each of the BMP's in the NCSWMP.

***Town of Hempstead Adopted 2013 Budget (Town of Hempstead, 2013)***

Town of Hempstead's 2013 spending plan for municipal programs and services. Hempstead maintains 1,200 miles of roadway, operates over 200 parks, pools, beaches and marinas, collects garbage from 85,000 homes, provides water to

130,000 customers and furnishes life enhancing services to more than 190,000 senior citizens. At \$419.4 million, this 2013 budget proposal presents a modest positive adjustment of 1.1% or \$4.6 million more than the 2012 figure.

### Advisory

***Long Island South Shore Estuary Reserve - Comprehensive Plan (NYS DOS, 2001)***

The Long Island South Shore Estuary Reserve encompasses one of the New York State's unique estuaries and its 326 square mile watershed in Nassau and Suffolk counties. The plan provides a blueprint for the long-term health of the Reserve's bays and tributaries, its tidal wetlands and wildlife, and its tourism and economy.

***Hurricane Superstorm Sandy Rebuilding Strategy (U.S., Hurricane Superstorm Sandy Rebuilding Task Force, 2012)***

The Rebuilding strategy document developed by the task force establishes guidelines for the investment of the Federal funds made available for recovery. The document focuses on long-term rebuilding, and strategies to sponsor coordination amongst various agencies to remove obstacles to resilient rebuilding.

***Nassau County Draft Master Plan (Nassau, 2010)***

Master Plan recommends targeting development in growth areas, which account for approximately 10% of Nassau's land area. Specifically identified

## Bay Park and Village of East Rockaway

growth areas include “Transit-Oriented” downtowns, the Nassau Hub, and the Grumman Property. The Master Plan details changes in demographic and economic conditions for past decades and projects future changes through 2030. In addition, the Master Plan identifies specific policy tools to encourage growth, diversify the housing stock, protect commercial and residential neighborhoods, improve transportation, and reduce costs to residents.

### ***Nassau County Multi-Jurisdictional Hazard Mitigation Plan (Nassau, 2007)***

Description of various hazards, identification of assets in hazard areas, estimated damages in assessment areas (includes assets exposed to storm surge), development trends in hazard areas and capabilities and resources. Asset information and community specific recommendations are developed for some communities however this information is sparse for Bay Park and the Village of East Rockaway. Implementation strategies and mitigation measures can be learnt from recommendations for neighboring communities. Document lists Federal technical assistance and funding programs to assist in long-term recovery.

### ***Long Island Regional Economic Development Council Strategic Plan (LIRDC, 2011)***

Long term economic development strategy discusses 13 priority projects. Infrastructure strategies include: Revitalize downtowns and commercial centers; Repair and upgrade aging infrastructure (specifically addresses sewer system and Bay Park STP); Create new housing opportunities; Promote new government policies to foster economic growth. Natural Asset Strategies include: Improve sustainable agriculture

enterprises; Improve the Economic Potential and Employment Opportunities of Fisheries & Aquaculture; and, Enhance Ecotourism Activities and Infrastructure

### ***Cleaner Greener Long Island (CGCLI, 2013)***

Cleaner Greener Consortium of Long Island is group of municipalities and non-governmental organizations organized to articulate a community based vision for a more sustainable future. Goals and strategies were developed for the following subject areas: Economic development and workforce housing; energy; transportation; land use and livable communities, waste management; water management; governance, and implementation. The Plan is intended to serve as a common point of reference for local governments, non-governmental organizations, businesses and residents. It includes initiatives for implementation, objectives and performance targets, as well as a wealth of baseline information (in the appendices) that can be incorporated into comprehensive plans, management plans, zoning, and other planning and strategy initiatives.

### ***The Long Island Index: “Places to Grow” (2010)***

Report analyzed the future growth potential for Long Island, focusing on the Island’s ability to accommodate forecasted residential and commercial growth in transit-rich downtowns through an analysis of infrastructure capacity, land use, and demographic data. The report found that nearly 8,300 acres of vacant land and parking lots lie within a ½ mile radius of downtown centers (or LIRR stations). Report supports targeting future growth to downtowns

given the host of environmental, social, and economic advantages. In addition, the report cites the downtown revitalization efforts of the Village of Mineola which adopted overlay zoning district to attract and incentivize transit-oriented development.

### ***Long Island Infrastructure Priorities to Recover from Hurricane Superstorm Sandy (2012)***

This list represents the work of several leading organizations on Long Island. Priorities are listed in the following order: (1) Public Health: Wastewater Treatment Facilities, Water Supply and Solid Waste; (2) Utilities: Electric, Gas and Telecommunications; (3) Transportation, Transit and Shoreline; and, (4) Housing.

Infrastructure needs were at the top of the list because of the significant public health and economic development impacts of wastewater treatment facilities, water supply and solid waste. These priorities are also responsive to the charge given to the Infrastructure Working Group of Governor Cuomo’s Long Island Economic Development Council.

### ***Nassau County 2013 Annual MS4 Report (Nassau County Stormwater Coalition, 2013)***

The NCSWMP is a comprehensive program to reduce the levels of contaminants in Nassau County’s storm water runoff and educate the public about their impacts on storm water. Nassau County has taken the lead in coordinating the NCSWMP and acting as a clearinghouse of information for concerned parties. The Nassau County Department of Public Works Water Engineering Unit is in charge of implementing the plan, including water testing, education,

and pollution prevention measures. The six elements of the NCSWMP are: public education, public involvement, illicit discharge detection and elimination, construction site storm water runoff control and post-construction storm water management, pollution prevention and good housekeeping for municipal operations.

***Nassau Urban County Consortium 5-Year Consolidated Plan (Nassau, 2010)***

Presents a five-year strategy for addressing housing and community revitalization needs within the 34 member Urban County Consortium. It includes a One Year Action Plan for spending approximately \$21,524,865 in Community Development Block Grant, HOME, Emergency Shelter Grant and program income funds. Funds will be spent on a wide range of housing and community development activities including new construction and rehabilitation of housing; commercial and economic improvements; public services for senior, youths and other low income persons; architectural barrier removal in private homes and in public buildings; homeless shelter operations and renovation; acquisition, demolition and relocation activities of blighted properties in targeted redevelopment areas; and infrastructure improvements in low income areas; and, other related activities. East Rockaway is listed as one of the revitalization areas where activities will be carried out.

***Nassau County Infill Redevelopment Feasibility Study: Cultivating Opportunities for Sustainable Development (Nassau County, Regional Plan Association, and NY-CT Sustainable Communities Consortium, 2013)***

Feasibility study of sustainable infill development

and presents opportunities to promote transit-orientated development around up to three (3) Long Island Rail Road (LIRR) stations in the Preliminary Regional Nassau Hub Study Area. Closest LIRR stations in study are Rockville Center and Baldwin.

***Long Island 2035 Sustainability Plan and Visioning Initiative (LIRPC/Nassau/Suffolk/NYMTC/RPA, 2009)***

Established to help achieve a regional public consensus on where the next generation of Long Islanders could live and work, the transportation systems needed to support these settlements and the public and private actions required to ensure a prosperous, equitable and environmentally sustainable Long Island.

***Long Island 2035 Comprehensive Sustainability Plan (Nassau/Suffolk/LIRDC/LI2035, 2010)***

Involved stakeholder input from Leadership Advisory Cabinet (LAC), made up of key government officials and private sector stakeholders. LAC tested and vetted strengths, weaknesses, issues and opportunities facing region and identified a vision, goals and objectives for the Long Island 2035 Regional Comprehensive Sustainability Plan. The plan is focused into four general areas: Economy, Infrastructure, Human Systems, and the Built and Natural Environments.

## G. Endnotes

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Attributions: All photos are attributed to the Consultant Team unless otherwise specified

- 1 Five of the 102 localities in the program—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.
- 2 The following localities' allocations comprise the NYRCR Community's total allocation: Bay Park - \$3,650,555; Village of East Rockaway - \$3,000,000.
- 3 US Fish & Wildlife Service. Hempstead Bay: Northeast Coastal Areas Study, Significant Coastal Habitats (Accessed on 3/2014 at [http://nctc.fws.gov/resources/knowledge-resources/pubs5/necas/web\\_link/18\\_hempstead%20bay.htm](http://nctc.fws.gov/resources/knowledge-resources/pubs5/necas/web_link/18_hempstead%20bay.htm))
- 4 National Hurricane Center. Tropical Cyclone Report: Hurricane Sandy (AL182012) 22 – 29 October 2012. (Accessed on 9/2013 at [http://www.nhc.noaa.gov/data/tcr/AL182012\\_Superstorm\\_Sandy.pdf](http://www.nhc.noaa.gov/data/tcr/AL182012_Superstorm_Sandy.pdf))
- 5 US Department of Commerce. Hurricane/Post-Tropical Cyclone Sandy, October 22–29, 2012. (Accessed 9/2013 at [http://www.nws.noaa.gov/os/assessments/pdfs/Superstorm\\_Sandy13.pdf](http://www.nws.noaa.gov/os/assessments/pdfs/Superstorm_Sandy13.pdf))
- 6 Nassau County, Mangano Orders Mandatory Evacuation of Flood and Storm Surge Zones. (Accessed 10/2013 at <http://www.nassaucountyny.gov/agencies/countyexecutive/newsrelease/2012/10-28-2012b.html>)
- 7 MTA, Superstorm Sandy: One Year Later. (Accessed 9/2013 at <http://web.mta.info/sandy/>)
- 8 Based upon the calculation performed by Joseph Davenport of Nassau County DPW
- 9 Emergency Response and Restoration of the Bay Park STP in the Aftermath of Hurricane Superstorm Sandy. A report prepared by Nassau County, 5/13/2013.
- 10 Technical Memorandum 11 submitted by Nassau County Department of Public Works for Sludge Dewatering Facility, Damage Assessment, Emergency Work and Interim Stabilization Narrative.
- 11 Long Island Newsday. LIPA Outages. (Accessed on 9/2013 at <http://data.newsday.com/long-island/lipaOutages/>) Two weeks after the storm (October 12), approximately 7% of Nassau and 1% of Suffolk LIPA customers were experiencing outages.
- 12 [http://www.neiwpc.org/lustline/lustline\\_pdf/lustline\\_current.pdf](http://www.neiwpc.org/lustline/lustline_pdf/lustline_current.pdf)
- 13 US Department of Commerce. Service Assessment Hurricane Irene, August 21–30, 2011. (Accessed 10/2013 at <http://www.nws.noaa.gov/os/assessments/pdfs/Irene2012.pdf>)
- 14 NOAA Water Level and Meteorological Data Report. Hurricane Irene. (Accessed on 10/2013 [http://tidesandcurrents.noaa.gov/publications/Hurricane\\_Irene\\_Water\\_Level\\_and\\_Meteorological\\_Data\\_Report.pdf](http://tidesandcurrents.noaa.gov/publications/Hurricane_Irene_Water_Level_and_Meteorological_Data_Report.pdf))
- 15 US Department of Commerce. Service Assessment Hurricane Irene, August 21–30, 2011. (Accessed 10/2013 at <http://www.nws.noaa.gov/os/assessments/pdfs/Irene2012.pdf>)
- 16 American Community Survey, 2007-2011
- 17 Nassau County. Report: Emergency Response and Restoration of the Bay Park STP in the Aftermath of Hurricane Sandy, 5/13/2013.
- 18 Nassau County, Hazard Mitigation General Information. (Accessed 10/2013 at [<http://www.nassaucountyny.gov/agencies/oem/hazmit/hazmitGI.html>])
- 19 Conversation with Juan A. Garcia, P.E., Engineer for Village of East Rockaway
- 20 American Community Survey, 2007-2011; Nassau County Land Use GIS
- 21 The study uses a low income threshold of \$35,000 per household. To actuate the analysis the American Community Survey (ACS) was used to estimate the households making a low percentage of the median income, typically used as standard thresholds for income definitions for Federal assistance. \$35,000 is less than 36% of the Nassau County Household Median Household of \$97,000. Various Federal organizations define income thresholds in terms of Household Median Income at the 20%, 50%, and 80% thresholds. As this analysis wanted to identify households making below 50% this metric was assumed the most appropriate.
- 22 Local Mitigation Plan Review Guide. Federal Emergency Management Agency, 10/1/2011. pp. 42-43)
- 23 Based on Nassau County GIS land use data and; aerial imagery (Google Earth 2013)
- 24 Identified from aerial Photography, Google Earth, 2013.
- 25 New York Hurricane Superstorm Sandy Grants Information: Funders, Resources

and Grant Writing Tool. (Accessed on 1/2014 <http://www.dhSES.ny.gov/oem/event/sandy/documents/NY-Disaster-Grants-Resources-Guide-2013vs10.pdf>)

- 26 Housing is considered affordable if less than 35% of the household's collective income goes to housing costs.
- 27 In estimating the job-years created by direct government spending, the NYRCR Plan utilizes the simple rule provided by the Office of the President Council of Economic Advisors that \$92,000 creates one job-year. This procedure is somewhat crude and does not take into account the obvious differences in wages and other costs across different types of projects and across different parts of the country. It does, however, take into account the key difference between tax changes or state fiscal relief, and direct government investment spending. The rule's key virtue is its simplicity and conservatism. Because it is derived to be consistent with the macroeconomic jobs estimates, it minimizes discrepancies between the aggregate jobs estimates across the various geographies. Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009, Executive Office of the President Council of Economic Advisors, May 2009.
- 28 Town of Hempstead, Bay Park Road Raising, LOI #721, APP #994
- 29 Significant natural communities are rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and ecological areas. The NYSDEC New York Natural Heritage Program keeps track of significant natural communities because they serve as habitat for a wide range of plants and animals, both rare and common; and because natural communities in good condition provide ecological value and services. <http://www.dec.ny.gov/pubs/42978.html>
- 30 The Census tracts for East Rockaway distributed only in to High and Moderate risk zones.
- 31 The first letter of the asset ID designates the asset category (E = Economic, I = Infrastructure, H=Housing, S = Health and Social Services and V = Socially Vulnerable Populations)

## H. Glossary

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### **Base Flood Elevation (BFE)**

Water surface elevation corresponding to a flood having a one percent probability of being equaled or exceeded in a given year (100-year floodplain).

### **Community Assets**

Identified assets are places or facilities where economic, environmental and social functions occur or are critical infrastructure required to support those functions. These assets were identified by the NYRCR Committee and residents and are grouped into the following categories: Economic, Housing, Health and Social Services, Infrastructure, Natural and Cultural Resources, and Socially Vulnerable Populations.

### **Community Development Block Grant Disaster Recovery (CDBG-DR)**

HUD provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. CDBG-DR is a type of funding appropriated by congress to help rebuild and provide seed money for recovery activities. Further information on CDBG-DR funds and other disaster recovery grants is available at <http://portal.hud.gov/>.

### **Flood Insurance Rate Map (FIRM)**

The official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

### **NYRCR Committee**

The NYRCR Planning Committee is composed of local civically minded residents and was established to help develop a plan that accurately reflect's the Community and its needs. The NYRCR Committee worked closely with the appropriate municipal, non-profit and consultant representatives to identify a vision, goals and objectives for the NYRCR Plan. The Committee actively advised on all aspects of the project and will help shape the overall direction of the NYRCR Plan and the actions that flow from it. The members of the Committee were not paid, and were required to follow a detailed code of ethics provided by New York State.

### **NYRCR Community**

The NYRCR Community planning area follows the Census-designated place boundary for Bay Park and the Village of East Rockaway. This boundary has been reviewed and accepted by the NYRCR Committee.

### **NYRCR Project Categories**

**Proposed Projects:** Projects proposed for funding through the NYRCR Community's allocation of CDBG-DR funding.

**Featured Projects:** Innovative projects where an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding; and regulatory reforms and other programs that do not involve capital expenditures.

**Additional Resiliency Recommendations:** Resiliency projects and actions the NYRCR

Committee would like to highlight for further consideration.

### **Recovery Support Functions**

The Recovery Support Functions (RSFs) comprise the National Disaster Recovery Framework's (NDRF's) coordinating structure for key functional areas of assistance. Their purpose is to support local governments by facilitating problem solving, improving access to resources and by fostering coordination among State and Federal agencies, nongovernmental partners and stakeholders.

The six RSFs are: "Community Planning and Capacity Building," "Economic Development," "Health and Social Services," "Housing," "Infrastructure," and "Natural and Cultural Resources."

### **Risk Reduction Benefits**

A qualitative analysis of reduction in risk to assets that results from implementation of each potential NYRCR project was prepared for each project. Three factors contribute to risk: hazard, exposure and vulnerability. The Coastal Hazard and Risk Assessment Tool was utilized, where applicable, to quantify risk reduction benefits. The Tool was assumed to apply to implementation projects within the theme 'Coastal Protection,' as it is intended to measure the risk for coastal communities and test whether various projects would reduce the risk to those assets. In this case, a snapshot of reduction in the risk score to assets is provided. Where the Coastal Hazard and Risk Assessment Tool do not apply, Risk Reduction benefits were described in terms of the qualitative

mitigation of hazard, exposure and vulnerability.

Risk reduction benefits consider the population positively impacted by the project, either directly or indirectly. This population can be local or regional, ranging from a discrete street to the NYRCR Community or the entire community of Bay Park/East Rockaway. While this plan evaluates the potential risk reduction benefits, actual benefits may vary depending on project design and circumstances arising during implementation; the Final NYRCR Plan does not provide a guarantee of risk reduction, but rather a projected, and intended, benefit to minimizing risk for a given population.

Risk Reduction Benefits resulting from the Proposed Project were qualitatively evaluated using ESRI Community Analyst. Population data was gathered at the census tract or block group level depending on the size of the project. If the project was expected to have very localized effects in an area that was much smaller than a block group, a polygon was drawn manually in ESRI to serve as the study area and the data corresponding to that polygon was used instead. The size of the study area was determined based on the project description. The specific data set used was from the Demographic and Income Profile (DANDI) ESRI Forecasts for 2013 based on US Census Bureau 2010 Census data.

Some projects, such as select capacity building or economic development projects, may not directly reduce risk, however they provide other significant benefits to the Bay Park/East Rockaway Community in the categories below.

Economic Benefits: Economic benefits considered for the purpose of the NYRCR Plan include

estimated permanent and temporary jobs secured or added, contribution to a Regional Economic Development Plan, estimated potential increase in economic activity (as applicable), and net effect on local government expenditures for disaster recovery (such as reduced emergency and recovery costs).

In estimating the job-years created by direct government spending, the NYRCR Plan utilizes the simple rule provided by the Office of the President Council of Economic Advisors<sup>1</sup> that \$92,000 creates one job-year. This procedure is somewhat crude and does not take into account the obvious differences in wages and other costs across different types of projects and across different parts of the country. It does; however, take into account the key difference between tax changes or state fiscal relief, and direct government investment spending. The rule's key virtue is its simplicity and conservatism. Because it is derived to be consistent with the macroeconomic jobs estimates, it minimizes discrepancies between the aggregate jobs estimates across the various geographies.

Environmental Benefits: Environmental Benefits of potential NYRCR projects include the environmental assets secured by the potential project, as well as the environmental remediation or cleanup provided by the project and open space created by the project. Each project was evaluated for its impacts on high-priority habitat defined as a habitat type with unique or significant value to one or more species, threatened and endangered species, migration or habitat connectivity. Benefits to environmental quality were also noted, such as improving air, surface and ground water quality.

Health and Social Benefits: Health and Social Benefits resulting from the Proposed Project were qualitatively evaluated using ESRI Community Analyst. Population data was gathered at the census tract or block group level depending on the size of the project. If the project was expected to have very localized effects in an area that was much smaller than a block group, a polygon was drawn manually in ESRI to serve as the study area and the data corresponding to that polygon was used instead. The size of the study area was determined based on the project description. The specific data set used was from the Demographic and Income Profile (DANDI) ESRI Forecasts for 2013 based on US Census Bureau 2010 Census data.

Projects were evaluated for their health and social services benefits to the community by considering the following benefit types:

"Overall population with improved access to health and social services facilities" was reported as the entire population of the area (census tract, block group or polygon) that would benefit from the Proposed Project. The population was reported regardless of whether the project actually involves a health and social services asset because presumably all projects would improve access to facilities in one form or another.

- "Type and population size of socially vulnerable population secured" was evaluated across four categories of socially vulnerable populations:
- poverty/low income (annual household income less than \$35,000)
- elderly population (over age 65 years)

## Bay Park and Village of East Rockaway

- “Population served by essential health and social services facilities that are secured to provide or continue service during acute events as a result of the action”, was considered to be applicable only if the project itself proposed an action that directly affected/pertained to a health and social services facility. (Health and social services facilities were previously identified/determined during the asset inventory). If the project directly impacted a health and social services facility, that facility (asset) was noted, and the population of the entire area (as reported under the previous criteria) can be considered to be the “population served”.

### **Risk Assessment Map Risk Areas (NYS DOS)**

Extreme Risk Areas: Areas currently at risk of frequent inundation, vulnerable to erosion in the next 40 years, or likely to be inundated in the future due to sea level rise. Extreme Risk Areas include:

- FEMA V zone.
- Shallow Coastal Flooding per National Oceanic and Atmospheric Administration (NOAA) National Weather Service’s (NWS) advisory threshold.
- Natural protective feature areas susceptible to erosion.
- Sea level rise - Added three feet to the mean higher high water (MHHW) level shoreline and extended this elevation inland to point of intersection with ground surface.

### **High Risk Areas:**

Areas outside the Extreme Risk Area that are currently at infrequent risk of inundation or at future risk from sea level rise. High Risk Areas include:

- Area bounded by the 1% annual flood risk zone (FEMA V and A zones). Often referred to as base flood or 100-year flood, this is the area that has a 1% chance of inundation from a flood event in any given year.
- Sea level rise - Added three feet to NOAA NWS coastal flooding advisory threshold and extended this elevation inland to point of intersection with ground surface.

### **Moderate Risk Areas:**

Areas outside the Extreme and High Risk Areas but currently at moderate risk of inundation from infrequent events or at risk in the future from sea level rise. Moderate Risk Areas include:

- Area bounded by the 0.2% annual risk (500 year) flood zone, where available.
- Sea level rise - Added 3 feet to the Base Flood Elevation for the current 1%
- Annual risk flood event and extended this elevation inland to point of intersection with ground surface.
- Area bounded by the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) category 3 hurricane inundation zone (NOAA NWS).

### **Socially Vulnerable Populations**

The NYRCR Program Guidance notes that “Socially vulnerable populations” may be defined by the following criteria: poverty/low income, immigrant status, education level, institutionalization, renter-occupied household status, single senior-citizen household status” (NYRCR Program Guidance to Firms Project Evaluation, 12/30/2013).

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