Barnum Island/Oceanside/ the Village of Island Park/Harbor Isle

NY Rising Community Reconstruction Plan

NY Rising Community Reconstruction Program

March 2014

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Foreword

Introduction

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

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

Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than $650 million planning and implementation process established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between $3 million and $25 million to implement eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.[1]

Forty-five NYRCR Communities, each comprising one or more of the 102 localities, were created and led by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with established local leaders, community organizations, and in some cases municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 500 New Yorkers represent their communities by serving on Planning Committees. More than 400 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's NYRCR Program team to develop community reconstruction plans and identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 125-plus Public Engagement Events attracted thousands of community members, who provided feedback on the NYRCR planning process and proposals. The NYRCR Program's outreach has included communities that are traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the NYRCR Program's website (www.stormrecovery.ny.gov/nyrcr), providing several ways for community members and the public to submit feedback on materials in progress.

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

With the January 2014 announcement of the NYRCR Program's expansion to include 22 new localities, the program comprises over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allocated over $650 million of funding to the program for implementing projects identified in the NYRCR Plans. NYRCR Communities are also eligible for additional funds through the program's NY Rising to the Top Competition, which evaluates NYRCR Communities across eight categories, including best use of technology in the planning process, best approach to resilient economic growth, and best use of green infrastructure to bolster resilience. The winning NYRCR Community in each category will be allocated an additional $3 million of implementation funding. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and create new funding opportunities where none existed before.

The NYRCR Program has successfully coordinated with State and Federal agencies to help guide the development of feasible projects. The program has leveraged the Regional Economic Development Council's State Agency Review Teams (SARTs), comprised of representatives from dozens of State agencies and authorities, for feedback on projects proposed by NYRCR Communities. The SARTs review projects with an eye toward regulatory and permitting needs, policy objectives, and preexisting agency funding sources. The NYRCR Program is continuing to work with the SARTs to streamline the permitting process and ensure shovels are in the ground as quickly as possible.

On the pages that follow, you will see the results of months of thoughtful, diligent work by NYRCR Planning Committees, passionately committed to realizing brighter, more resilient futures for their communities.

The NYRCR Plan

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

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the NYRCR Community's prioritization of these projects and actions. **Proposed Projects** are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. **Featured Projects** are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. **Additional Resiliency Recommendations** are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects

found in this NYRCR Plan were voted for inclusion by official voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

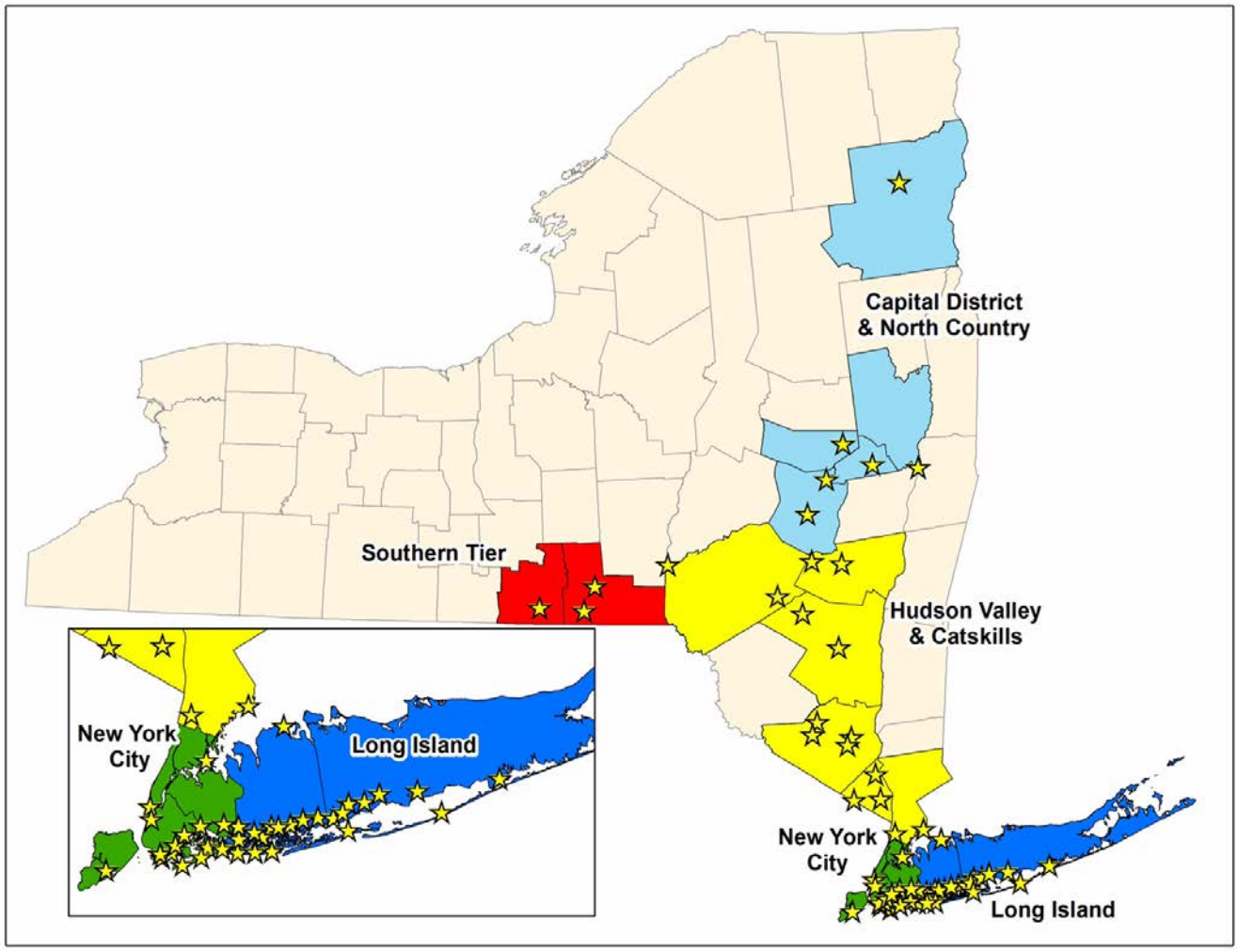
NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor is eligible for up to $36.6 million in CDBG-DR implementation funds.[2]

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

Figure 1: NYRCR Communities



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

Source: NYS DOS

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Source: URS

Executive summary

Executive summary

Barnum Island, Oceanside, the Village of Island Park, and Harbor Isle are neighboring communities in the southern portion of the Town of Hempstead, Nassau County, New York. Island Park is an incorporated village with its own elected government, and Barnum Island, Oceanside, and Harbor Isle are unincorporated hamlets of the Town of Hempstead. Together, they make up the NY Rising Community Reconstruction (NYRCR) Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community (Community).

The Planning Area encompasses the Census-Designated Place (CDP) boundaries of Barnum Island, Oceanside, the Village of Island Park, and Harbor Isle. The Community is a less-than-50-minute train ride from New York City on the Long Beach Branch of the Long Island Rail Road (LIRR). The Community is bounded by Rockville Centre on the north, Freeport and Baldwin Harbor on the east, the City of Long Beach and a barrier island to the south, and Bay Park and East Rockaway on the west.

The Community is eligible for up to $36.6 million in Community Development Block Grant – Disaster Recovery (CDBG-DR) funding through the NYRCR Program. The eligible funds consist of $4 million for Barnum Island, $22.2 million for Oceanside, $7.4 million for the Village of Island Park, and $3 million for Harbor Isle.

Storm impacts

The landfall of Superstorm Sandy on October 29, 2012, devastated the Community. The storm's tidal surge flooded nearly all of Barnum Island, the Village of Island Park, and Harbor Isle, which together occupy the southernmost portion of the Community, and flooded nearly two-thirds of the land area of Oceanside.

The storm hit during a full-moon (i.e. most extreme) high tide. The combination of high tide and storm surge pushed into Reynolds Channel, forcing its way across the Hog Island Channel and Wreck Lead waterfronts and up California Place Canal, Bedell Creek, Grand Canal, Powell Creek, and other inland waterways. Some of the Community's most severe flooding occurred in inland areas as a result of the tidal surge's overbanking of interior waterways.

In Oceanside, the areas south of Waukena Avenue along Hog Island Channel and Parsonage, Bedell, and Powell Creeks were inundated with as much as four-feet of water. Oceanside's Long Beach Road commercial corridor and Lawson Boulevard were under four to six feet of water. Homes and businesses in neighborhoods near Grand Canal and Bedell Creek experienced up to six feet of water as tidal surge worked its way into these inland communities.

In Barnum Island, the worst flooding occurred near the California Place Canal and along Wreck Lead, with six- to eight-feet of water flooding homes and waterfront businesses.

In the Village of Island Park, tidal waters came from the Hog Island Channel (across Little Beach), Wreck Lead, California Place Canal, and Island Park Channel. Almost all areas of the Village received more than two-feet of water, destroying personal belongings, mechanical systems, flooring and walls. The area between Long Beach Road and Nassau Lane experienced six- to eight-feet of floodwater.

In Harbor Isle, water reached up to two-feet in height throughout the community, with the most flooding at the Wreck Lead and Hog Island Channel shorelines, which experience six- to eight-feet of water.

In addition to flooded homes and businesses, the Community experienced major breakdowns in critical transportation systems, power, and sewer infrastructure.

During the storm, the Austin Boulevard, Lawson Boulevard, and Long Beach Road evacuation routes – together with other major streets – were impassable. These closures blocked late evacuation of the Community and Long Beach, preventing escape and complicating emergency response.

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 2: Geographic scope

A nine-foot wall of water washed over the Bay Park Sewage Treatment Plant, knocking out power and causing more than 100 million gallons of raw sewage to flow into adjacent waterways and to back up into the basements of homes in the Community. The plant went offline at approximately 10:00p.m. on October 29, 2012 and remained so for approximately 58 hours. After the implementation of an emergency recovery effort, power was restored and service reestablished at approximately 6:00a.m. on November 1, 2012.

Approximately 8,100 homes in the Community lost power, and it took more than four weeks for service to be fully restored. A break in a natural gas main cut off gas supply, and reestablishing service took up to three weeks. Thus, Community residents suffered through much of November without heat or electricity. Communications systems also failed after the storm, leaving people in the dark, cold, and without a way to communicate their needs.

Firehouses and emergency service facilities were also heavily damaged. The Oceanside Fire Department Hose Company No. 1 and the South Side Hose Company No. 2 were flooded. The Village of Island Park Firehouse flooded, damaging the structure and destroying equipment and five emergency response vehicles.

In Oceanside, Schools 4, 8, 9E, and 9M were flooded. Classes for School 8 were moved to School 6 for several months while repairs were made. Francis X. Hegarty Elementary School in the Village of Island Park was flooded and forced to close for repairs for the remainder of the school year. The Island Park Library flooded and was closed for repairs until July 2013.

Damage to Barnum Island open space and marinas due to Superstorm Sandy
Source: Jim Mooney, East Rockaway, NY

Critical issues

The effects of Superstorm Sandy highlighted a number of ways that the Community can bolster its resilience for future storm events. The NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Planning Committee (Committee) identified improved emergency response capabilities, access to power, and protection from flooding as some of the major needs.

The following critical issues were identified in the planning process:

- Vulnerable public facilities, including schools, municipal buildings, and firehouses. These facilities were hit hard by Superstorm Sandy, and they remain vulnerable to future storm events.
- Limited emergency transportation routes. Barnum Island, the Village of Island Park, and Harbor Isle are all on an island. During a flood, Austin Boulevard and Long Beach Road are the only routes to safety from the island. Oceanside also has limited routes to safety in an emergency, and two of its major egress routes, Lawson Boulevard and Long Beach Road, are subject to flooding.
- Access to power during and after an emergency. Power and natural gas outages were widespread and long lasting during and after Superstorm Sandy.
- The inability of stormwater to drain. Stormwater systems have been damaged in major storms, and about 100 stormwater outfalls are situated below the high-tide line. Tidal water blocks drainage and backs up into the stormwater system, causing flooding during normal rainfall and high-tide events and catastrophic system failures during major storm events.
- Constant threat of flooding due to low elevation. Bay and creek-front shorelines and interior "bowls" that are lower than the surrounding land area are particularly susceptible to flooding during high tides and even ordinary storm events.
- Threatened marshland. The marshes surrounding the Community have been significantly reduced and degraded by development and environmental contamination over the last century. Superstorm Sandy inflicted new damage on these marshes. The remaining marshes and shoreline areas need protection and enhancement to restore their storm buffer capacity and other environmental functions.

Working together to rebuild stronger, smarter, and safer

The NYRCR Plan was developed through a public process that built a shared vision for the Community and reflects the residents' and the Committee's respect for local diversity, pride in the unique location, appreciation of natural assets, and commitment to home-grown businesses. The ultimate goal of the Plan is to rebuild in a manner that increases resilience, sustainability, and offers greater prosperity to ensure the area's long-term success. The Committee, with input from the public, developed the following vision statement:

Enhance the quality of life and chart a course towards the future by creating solutions to rebuild and revitalize two communities that are enriched by the diversity of their residents. Facilitate positive, innovative change that will provide an environment that is SAFE and an infrastructure that is RESILIENT, so that each community can thrive, sustain itself in the face of adversity and preserve its uniqueness and charm.

The Community's vision statement and the NYRCR Plan were shaped in a public engagement process that consisted of nine Planning Committee meetings, three Public Engagement Events, regular subcommittee meetings, and a Community survey.

All nine Planning Committee meetings were open to the public and attended by as many as 40 members of the public.

Due to the large geographic area of the Community, the Committee split into two geographic-based subcommittees to address project details. One subcommittee represented the areas of Barnum Island, the Village of Island Park, and Harbor Isle; the other subcommittee represented Oceanside. Six subcommittee meetings were held during the course of the planning process to facilitate open dialogue about Community-specific needs, risks, strategies, and projects.

Three Public Engagement Events were held to share the work of the Committee with the public and solicit the public's feedback. A fourth Public Engagement Event is scheduled for after the release of the NYRCR Plan to present the Plan to the public.

The first Public Engagement Event, held in October 2013, was a project open house attended by more than 75 residents, who shared their knowledge, experience, and recommendations to help shape the Plan's emerging vision and strategies.

The second Public Engagement Event was held in November 2013 and was attended by more than 180 people. The meeting used small-group facilitated breakout sessions to gain insights into how the Community experienced Superstorm Sandy and provide feedback on the strategies that the Committee had proposed to help the Community become more resilient.

The third Public Engagement Event was held in March 2014 to review the projects and recommendations under consideration for the Plan. Display boards illustrated potential projects, and participants completed project feedback forms so that public input could inform the Committee as the list of projects became further refined.

A public information meeting will be held in Spring 2014 to share the work of the Committee and the NYRCR Plan with the public.

In addition to meetings, the public engagement process included a survey that was available at the Oceanside and Island Park libraries and online at the Community Reconstruction Program website from October 2013 through February 2014.

2nd Public Engagement Event
Source: Sustainable Long Island

3rd Public Engagement Event
Source: Sustainable Long Island

Blueprint for implementation

The Community suffered severe damage during Superstorm Sandy, and to a lesser extent Hurricane Irene, and many parts of the Community experience flooding during both regular high tide and storm events. The planning process identified a set of strategies to reduce the risk of future flooding to enable the Community to rebuild stronger, smarter, and safer. The NYRCR Plan recommends sustainable and resilient approaches to support existing residents and businesses and attract new visitors, residents, and businesses to enjoy the Community's considerable assets. These strategies will be implemented by a set of projects with a goal of reducing the risks of future tidal and storm flooding and address the needs that the Community identified to become more resilient.

The NYRCR Plan includes three categories of projects to address critical Community needs: Proposed Projects, Featured Projects, and Additional resiliency recommendation.

- **Proposed Projects:** Proposed Projects are designed to be fully funded through the NYRCR Program using the Community's allocation of CDBG-DR funding.
- **Featured Projects:** Featured Projects are innovative projects in which an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding, and regulatory reforms that do not involve capital expenditures.
- **Additional resiliency recommendations:** Additional resiliency recommendation are projects and actions that the Committee would like to highlight, would be funded from sources other than CDBG-DR funding, and are not categorized as Proposed or Featured Projects.

All of the projects included in the NYRCR Plan are important to the Community. The following is a list of Proposed and Featured Projects and Additional resiliency recommendation, organized by strategy. The order of appearance is not a reflection of project priority or ranking.

Long Beach Road and Lower Lincoln Avenue
Source: LiRo Group

Table 1: Table of projects

Strategy	Project name	Project category
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	Construct resiliency improvements to schools and emergency response facilities, and expand emergency response resources	Proposed
	Construct a new Village of Island Park Village Hall	Featured
Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides	Install tidal backflow prevention devices	Proposed
	Complete a stormwater drainage system analysis and implement identified high-priority improvements	Proposed
Protect shoreline areas from tidal surge through a combination of structural, nonstructural and hybrid shoreline stabilization techniques	Install a first phase of perimeter flood safeguards along Grand Canal, Bedell Creek, Powell Creek, Wreck Lead, and California Place Canal	Proposed
	Install tidal barriers at public street ends and Landgraf Park in the Village of Island Park	Proposed
	Construct a second phase of perimeter flood safeguards and raise the roadways adjacent to California Place Canal	Featured
Leverage the economic potential of the area's waterfront location and proximity to New York City	Develop a plan to create a waterfront destination revitalization and transit-oriented development zone for downtown Island Park and the Wreck Lead waterfront	Proposed
	Prepare a plan to revitalize the Oceanside industrial waterfront	Featured
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Restore Little Beach, Masone Beach, and Harbor Isle Beach	Proposed
	Improve Oceanside Park and its shoreline	Proposed
	Conduct a marsh restoration study and implement a restoration pilot project for Garrett Marsh east of Barnum Island	Proposed
	Conduct a marsh restoration study for Simmons Hassock Marsh, and complete restoration of Garrett Marsh and Simmons Hassock Marsh	Featured
Implement an emergency response system that engages in emergency planning, response, and communications at the Community level	Create and begin implementation of an emergency transportation lifeline safety plan for Barnum Island, the Village of Island Park, and Harbor Isle	Proposed
	Create and begin implementation of an emergency transportation lifeline safety plan for Oceanside	Featured
	Construct an emergency staging area for Barnum Island, the Village of Island Park, and Harbor Isle	Featured

Source: URS

Section I:
Community overview

I. Community overview

Barnum Island, Oceanside, the Village of Island Park, and Harbor Isle are neighboring communities located in the middle of the southern portion of the Town of Hempstead, Nassau County, New York. Island Park is an incorporated village, and the three adjacent communities are unincorporated hamlets of the Town of Hempstead. Together, they make up the NY Rising Community Reconstruction Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community (Community).

Located immediately north of the barrier island on the south side of Long Island, 11 miles due east of John F. Kennedy International Airport, the Community is less than a 50 minute ride from Penn Station along the Long Island Rail Road's (LIRR) Long Beach branch. Oceanside has a total land area of 5.4 square miles, while collectively, Barnum Island, the Village of Island Park, and Harbor Isle, have an area of 1.9 square miles.

A. Geographic scope and community profile

Planning area

The NYRCR Planning Area encompasses the Census-Designated Place (CDP) boundaries of Barnum Island (which includes undeveloped marshlands), Oceanside, the Village of Island Park, and Harbor Isle (Figure 3). Barnum Island, Oceanside, and Harbor Isle are hamlets of the Town of Hempstead; the Village of Island Park is an incorporated village with its own government administration. The Community is bounded by Rockville Centre on the north, Bay Park and East Rockaway on the west, Freeport and Baldwin Harbor on the east, and the City of Long Beach and the barrier island to the south.

Development history

Home to a combined 44,072 residents,[3] these long-established suburbs are densely populated and highly developed. The area now known as Oceanside was originally known as South Bay. It was established by the English government in 1674. Oyster fishing drove the local economy, and Mott's Landing, at the foot of Mott Street, was a favorite place to buy oysters. The name was changed to "Oceanville" in 1864 to reflect its water-based economy and to "Oceanside" in 1918. The Oceanside Fire Department was established in 1902. Columbia Engine Company No. 1, an old firehouse, still exists, and is located at the southwest corner of the triangle where Lincoln Avenue meets Long Beach Road.[4]

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 3: Geographic scope

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 4: Regional context

Oceanside grew rapidly following World War II. Between 1945 and 1950, the population doubled and grew from approximately 10,000 to about 20,000 residents. Demand was so great that houses were built on garden plots, in back yards, and in other untraditional places. Eventually, modern building codes and new fill techniques made it feasible to build on marshland. Channels were dredged, and marshes were filled to accommodate new development, resulting in the largely built-out hamlet of today.[5]

Barnum Island, the Village of Island Park, and Harbor Isle were originally settled by the Rockaway Native Peoples, who used it for farming and to raise pigs and cattle. Native Americans also fished and clammed in the surrounding marshlands and waters. During the colonial period, English settlers used the land to raise hogs, and the island was named Hog Island, a name that was used until about 1874.[6]

Between 1851 and 1870, a New York clothier named Peter C. Barnum obtained ownership of Hog Island. In 1870, the LIRR laid a single track through the island to serve tourists travelling to popular summer vacation areas in Long Beach. Access to the island by railroad set the stage for future development, and Hog Island was renamed Barnum Island. Plans to develop the island soon followed but were interrupted by World

War I. In 1921, the land was purchased by the Island Park-Long Beach Corporation to be developed as a resort and the island was renamed "Island Park."[7]

In order to provide soil to fill the low-lying marshlands, the Corporation dredged the Island Park Canal and the Island Park Bay. Between 1922 and 1926, a major building boom occurred at the southern end of the island, and the LIRR station was relocated from the northern end of the island to its present southern site. In 1926, Island Park became an incorporated Village but did not include present day Barnum Island and Harbor Isle because of limited residential activity in those areas. At the time of incorporation, there were fewer than 1,000 property owners, most of whom used their properties only during the summer months.[8]

The Village of Island Park continued to develop with additional summer bungalows and year-round homes. Long Beach Road, near the railroad station, developed into a small business district. A volunteer fire department, a small school, and a site for religious observations were erected to serve the growing number of year-round residents.[9]

As the area transitioned to year-round use, development expanded in Barnum Island and Harbor Isle. Barnum Island saw the development of commercial and industrial uses along Austin Boulevard, and residential and maritime uses along its eastern shoreline. Harbor Isle's more isolated location across the Island Park Channel meant that it developed largely as a waterfront residential community, with a few maritime uses including marinas and a now vacant waterfront petroleum terminal at its southern tip.

Governance and public services

Barnum Island, Oceanside, and Harbor Isle are unincorporated hamlets located in the 4th District of the Town of Hempstead. The Town is headed by an elected Supervisor, and each District is represented by a Town Council Member. The Town provides municipal services, managing planning and economic development, building and zoning permits, public safety, sanitation, parks, and conservation programs. With the exception of County roads, it owns, operates, and maintains the local road network and stormwater system.

The Village of Island Park has its own elected government. The Village is headed by an elected Mayor and Deputy Mayor. Three Village Trustees also represent residents. The Village owns and operates Village parks. A building department oversees zoning and building permits; and a public works department operates the road network, stormwater system, and sanitation services. The Village Court enforces all Village ordinances, local laws, zoning ordinances, and New York State traffic regulations.

Oceanside students are served by the Oceanside School District, which provides education from pre-kindergarten through 12th grade in 10 school facilities spread throughout Oceanside. The Island Park School District serves the children of Barnum Island, the Village of Island Park, and Harbor Isle from kindergarten through 8th grade in two schools, Francis X. Hegarty Elementary and Lincoln Orens Middle School. High school students have the option of attending school in the West Hempstead School District or in the neighboring Long Beach Public Schools.

The Oceanside Fire Department provides fire protection and emergency response services for Oceanside. Island Park has its own Fire Department, which provides fire protection and emergency services for the Village of Island Park and Harbor Isle, and emergency services for Barnum Island. Barnum Island has its own fire district and contracts with the Village of Island Park Fire Department for emergency services.

The Water Authority of Western Nassau County provides water for the entire Community. Sewer service is provided by Nassau County through its Bay Park Sewage Treatment Plant, which is located adjacent to the Community in Bay Park, just across the Hog Island Channel from Oceanside.

Population and income[10]

The Community's 2010 population was 44,072, and the median age was 43.2. The population is expected to have a small net decline (1.2%) by 2020.[11] However, there is a significant projected decline of almost 18% for individuals between the ages of 45 and 54 years, and a 31% increase in individuals 65 to 74 years old. These large shifts in the age of the

population will have an impact on the demand for and types of housing and social services needed. Seniors, for example, may decide to relocate outside of the Community, downsize to smaller homes, or live in assisted living communities or nursing homes. Some seniors may also want or need supportive services in order to age in place.

In addition to seniors, other vulnerable populations include veterans, the disabled, limited English speakers, and low-income families. More than 2,330 civilian veterans live in the Community. The disabled account for almost 9% of the population (3,985); with 45% of the disabled population aged 65 years and older.

Nearly 7,200 Community residents speak a language other than English at home. Close to 44% are Spanish-language speakers, 41% speak another Indo-European language, and 9% speak Asian and Pacific Island languages. More than 35% of foreign-language speakers reported that they spoke English "less than very well." Access to housing resources and information, especially as related to disaster planning and evacuation, are particularly challenging for these vulnerable populations.

Median 2012 household income was $91,201, and is above the Nassau County median income of $81,300.[12] However, nearly 41% of households have incomes at or below $74,999, including 1,758 (12% of all households) with incomes of $24,999 or less. This has implications on housing demand, supply, and affordability, which is discussed in the next section.

Housing summary[13]

In 2012, the Community contained a total of 15,840 housing units; 95% were occupied and 5% were vacant. The homeowner vacancy rate was less than 2%, while the rental vacancy rate was slightly more than 6%. Of occupied units, 86% were owner-occupied, and the remaining 14% were rental units. Housing units were primarily in single-family detached homes (77%), two-family homes (10%), and structures with 20 or more units (5%). Four percent of units were single-family attached homes, 2% of units were in structures of 10-19 units, 1% of

Housing awaiting repairs in the Village of Island Park
Source: URS

units in 5-9 unit structures, and another 1% in 3-4 family homes. In addition, 61 mobile homes, boats, and recreational vehicles are part of the Community's housing stock.

Most housing units were built between 1940 and 1969 (62%), and a significant percentage (22%) were built in 1939 or earlier. The age of the housing stock indicates that most homes were built under building codes that did not likely include resiliency measures, which puts a majority of homes at higher risk of storm-related damages.

The average home value of an owner-occupied home in the Community was $467,633 in 2012. Of the 12,925 owner-occupied units in the Community, 55% have values of $300,000 to $499,999, 35% have values of $500,000 to $999,000, 6% have values between $200,000-$299,999, and 1% have values of $1,000,000 and above. About two-thirds of owner-occupied units had mortgages in 2012. The median mortgage amount was $3,076 per month.

Approximately 43% of owners who occupy their units and have mortgages have housing costs that are more than 35% of their incomes. These households have housing expenses above the generally accepted U.S. Department of Housing and Urban Development (U.S. HUD) definition of housing affordability, which states that households should pay no more of 30% of income for housing. Twenty-nine percent of the owners who do not have mortgages, also pay more than 35% of household income for housing, indicating that these owners also have a housing cost burden as defined by U.S. HUD.

High housing expenditures as a percentage of income (cost burden) is problematic for a numerous reasons; including the fact that cost burdened households have less income to pay for other critical needs, such as health care and food. Owners who have to dedicate large portions of their incomes to paying basic housing costs often do not have funds available for repairs and upgrades that can impact the basic conditions and resiliency of their homes. Nearly 85% of the Community's housing stock was built before 1960 and is now more than 50 years old. Resiliency

Housing along Bedell Creek, Oceanside
Source: URS

requirements that may require raising homes will be a particular challenge for cost burdened homeowners.

As of 2012, the Community had 2,061 occupied rental units. The median rent was $1,433; however, more than 42% of units have rents above $1,500; and an estimated 45% of renters (929) have housing costs that are more than 35% of their incomes. These households may also be forced to forego other basic needs and or live in crowded or substandard housing.

Land use and economic development

The Community is highly developed, with nearly 95% of land already developed. Future development will come from infill of scattered vacant parcels and redevelopment of underutilized properties. Land use in the Community is primarily residential (57%). Nearly 12% of the land is dedicated to industrial uses, and 7% is used for commercial development. Commercial recreation and entertainment uses (golf courses, marinas, and other for-profit recreation venues) make up approximately 7% of the land area. Publicly-owned land accounts for almost 10% of land use, as shown in Table 2. Parks and open space make up a 3.5% of the total land area, and less than 2% of land is vacant (without any structures).

The Community's economy is driven by its industrial and commercial corridors, which encompass a little more than 20% of its land area. Nearly 1,400 businesses operate in the various commercial and industrial areas, and they employ more than 13,000 workers with an annual payroll of close to $575 million in 2011.[14] Water-dependent and water-enhanced uses include an industrial area located on the Hog Island Channel in Oceanside that takes advantage of deep water access provided by the Channel, five marinas spread throughout the Community's shoreline, and restaurants located along the Wreck Lead waterfront. All were damaged in Superstorm Sandy, and of the waterfront restaurants, only Pop's Seafood Shack and Grill operates today.

In Oceanside, Long Beach Road is the main commercial corridor, lined with retail and offices uses at the north end and transitioning to larger-scale shopping centers towards the south end. The former Oceanside landfill and Long Island Power Authority/Public Service Electric and Gas (LIPA/PSEG) Long Island substation property sit at the foot of Long Beach Road as it passes into Island Park. Lawson Boulevard is another important corridor in Oceanside. It includes a mix of commercial and light industrial uses and the Oceanside LIRR Station. Other Oceanside commercial corridors include Atlantic

Table 2: Land use

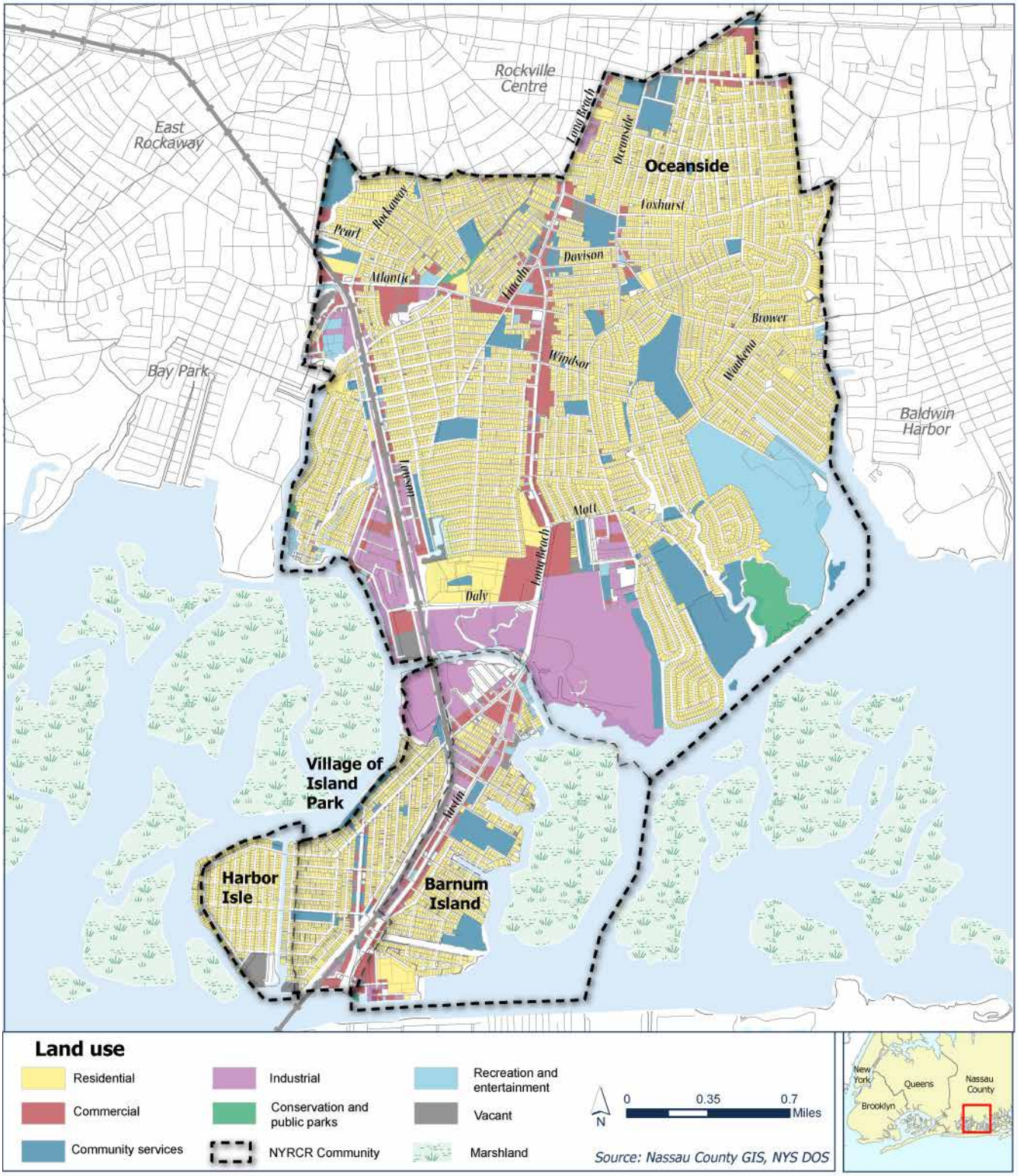
Land use	Total acres	Percent of total
Residential	1,845	57.4%
Industrial	384	11.9%
Community service/publicly owned	315	9.8%
Commercial	223	6.9%
Commercial recreation and entertainment	214	6.7%
Public parks and wildlife conservation	112	3.5%
Other	70	2.2%
Vacant	50	1.6%
TOTAL	**3,213**	**100%**

Source: Nassau County GIS, NYS DOS

*Note that overlapping of parcel data could result in an over count of total land area.

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 5: Land use



Avenue, Merrick Road, Mott Street, and Brower Avenue between Davison Avenue and Foxhurst Road.

Austin Boulevard is Barnum Island's economic corridor. The northern end includes a mix of light industrial and commercial uses including auto and construction related businesses, wholesalers, specialty and some food related uses, motels, and small-scale retail. Further south Austin Boulevard includes a mix of retail strip malls with small businesses. The commercial corridor is anchored by the King Kullen shopping center on Austin Boulevard where Long Beach Road merges with it before crossing the Long Beach Bridge.

The Village of Island Park's commercial uses are concentrated along Long Beach Road after it turns north-south, meeting the LIRR tracks near the Island Park Station. A small downtown commercial district sits near the intersection of Long Beach and Warwick Roads, anchored by the Village Hall, Island Park Library, small restaurants, shops, and offices. Light industrial uses and an indoor tennis facility sit between downtown Island Park and the Wreck Lead waterfront, which includes a marina and Pop's Seafood Shack. Harbor Isle commercial uses include two marinas and a boat repair shop.

Transportation access

The Community enjoys excellent regional transit access via the LIRR Long Beach Line, with stations in Oceanside at Lawson Boulevard and West Windsor Parkway and the Village of Island Park at Long Beach and Warwick Roads. Local bus service is provided by the Nassau Inter-County Express (NICE), with the Number 15 bus linking the Community to Rockville Centre and Garden City to the north and the Long Beach LIRR Station to the south.

Roadway access to the larger south shore Long Island region is limited, which complicated evacuation efforts during Superstorm Sandy. As the northernmost community, Oceanside enjoys the best roadway access to points north, east, and west. Major north/south egress and entry routes include Long Beach Road, Lawson Boulevard, Oceanside Road, and Lincoln Avenue. Atlantic Avenue and Foxhurst Road provide east/west egress and entry.

Because they are located on an island, Barnum Island, the Village of Island Park, and Harbor Isle have only one access point to the north and one to the south. On the north end, Long Beach Road crosses onto the island from Oceanside, splitting into Austin Boulevard in Barnum Island and Long Beach Road in Island Park.

Island Park Canal, the Village of Island Park
Source: URS

The island is connected to the City of Long Beach and the barrier island by the Long Beach Bridge as it crosses the Wreck Lead Channel.

Harbor Isle is the most isolated and secluded of the four communities. Harbor Isle is west of the Village of Island Park, and separated from it by Island Park Channel. It can only be accessed through the Village of Island Park on either Warwick Road or Island Parkway North.

Parks and open space

The Community is served by two large parks, a 52-acre nature preserve, three community beaches, and several small parks. Despite the overall high level of development in the Community, Oceanside's eastern waterfront is largely undeveloped, with a golf course, marine nature study area, park, a single-family residential neighborhood, and former landfill making up the land uses there.

The Town of Hempstead Oceanside Park encompasses 42-acres along West Bay and Bedell Creek at the south east corner of Oceanside. This waterfront park includes play equipment, playing fields, swimming and wading pools, basketball courts, a roller hockey rink, tennis courts, and a trail network. It served as an emergency supply distribution center for Oceanside after Superstorm Sandy.

On the other side of Bedell Creek, the Town of Hempstead Marine Nature Study area is a 52-acre preserve devoted to environmental education and natural history. The area has seven designated observation and study sites that are accessed by elevated boardwalks. Study sites provide information on salt marsh ecology, marine conservation practices, earth science, marine biology, and nature study.

The Town of Hempstead Shell Creek Park is located on the eastern shore of Barnum Island, just north of California Place Canal. The park's 12-acres are regularly used by the residents of Barnum Island, the Village of Island Park, and Harbor Isle. It includes playgrounds, playing fields, trails, basketball and tennis courts, and a fishing pier.

Three beaches provide water access. Little Beach and Masone Beach are located on the western shore of Island Park. Little Beach is badly eroded, and the

Oceanside Park athletic fields
Source: URS

Village of Island Park has been working with the U.S. Army Corps of Engineers to restore it. Masone Beach is larger than Little Beach and includes picnic and recreational facilities. In the summer, it hosts movie nights and the Village's 4th of July fireworks show. Harbor Isle Beach is located in Harbor Isle, just across the Island Park Channel from Little Beach. It includes a gazebo, benches, and tables. Harbor Isle Beach was significantly eroded during Superstorm Sandy.

Other recreation facilities in the Community include Landgraf Park, just above Masone Beach in the Village of Island Park. This waterfront park offers playground equipment and views of beautiful sunsets. Wrights Field at the north end of Bedell Creek in Oceanside includes two playing fields that are regularly used by youth sports organizations.

Finally, the seven-acre former CIBRO petroleum terminal is a significant piece of vacant land in the Community. It is listed in the New York State 2019 Open Space Conservation Plan for possible acquisition and remediation.

B. Description of storm damages

Superstorm Sandy

Superstorm Sandy struck Long Island on October 29, 2012, with tropical storm force winds. It created a storm surge of 9-to 12-feet above tide levels from Kings Point on the western end of Long Island Sound to the Battery on the southern tip of Manhattan.

Superstorm Sandy's effect was devastating, causing widespread damage to lives, homes, businesses, core infrastructure, government property, and an economy just beginning to recover from the Great Recession of 2008. In New York State, the storm caused 53 fatalities,[15] destroyed an estimated 305,000 homes,[16] affected more than 2,000 miles of roads, produced catastrophic flooding in subways and tunnels, and damaged major power transmission systems. Fourteen counties, including Nassau County, were declared Federal disaster areas.[17] Economic losses in New York as a result of Superstorm Sandy were estimated to be between $30 and $50 billion, with an estimated $10 to $20 billion in insured losses.[18] New York Governor Andrew M. Cuomo stated that storm damage would cost the State nearly $42 billion, with the vast majority of damage centered on New York City and Long Island.[19]

On October 28, 2012, Nassau County Executive Edward P. Mangano signed an evacuation order effective for 2:00p.m. on that day, requiring a mandatory evacuation of all residents living in a flood or storm surge zone. The evacuation area was defined as south of Sunrise Highway, from the Queens line to Rockville Centre and South of Merrick Road, from Rockville Centre to the Nassau-Suffolk border.[20]

Despite the evacuation order, many residents chose to shelter in place. They evaluated expected flood elevations based on their experience with Hurricane

Damage to buildings in the Village of Island Park due to Superstorm Sandy

Source: Jim Mooney, East Rockaway, NY

Irene in August 2011. Except in the Village of Island Park, Hurricane Irene flooding was not nearly as widespread as in Superstorm Sandy, creating a false sense of security for those who chose not to evacuate. When evacuation routes flooded during the storm people who failed to evacuate were trapped until water receded. During this time, many were without electricity, gas, and sewer service. Communications were limited, and emergency responders were unable to reach wide swaths of the Community.

The Community was severely damaged by Superstorm Sandy's storm surge. Nearly all of Barnum Island, Island Park, and Harbor Isle and approximately two-thirds of Oceanside were flooded (Figure 6).

Part of what made Superstorm Sandy so damaging for the Community, and all of Long Island, was the timing of its landfall. The eye of the storm struck Long Island at high tide. On top of that, the moon was full, leading to a higher than normal "moon tide," with the storm surge riding on top of this extra high tide. The extraordinary combination of high tide and storm surge swept across beaches, topped bulkheads, and pushed into Reynolds Channel, forcing its way up California Canal, Bedell Creek, Grand Canal, Powell Creek, and other inland waterways. Some of the Community's most severe flooding occurred in inland areas as a result of tidal surge overbanking inland waterways.

Superstorm Sandy devastated all four Community subareas, though the experience in each was unique to the source of tidal flooding and the topography of the area.

In Oceanside, the areas south of Waukena Avenue and along Hog Island Channel and Parsonage, Bedell, and Powell creeks were inundated with as much as four-feet of water. Oceanside's Long Beach Road commercial corridor and Lawson Boulevard were under four-to six-feet of water. Homes and businesses in neighborhoods near Grand Canal and Bedell Creek experienced up to six-feet of water as tidal surge worked its way into these inland communities.

In Barnum Island, the worst flooding occurred near the California Place Canal and along Wreck Lead with up to eight-feet of water entering homes and businesses. Homes and businesses along the three inlets above California Place Canal also received six-to eight-feet of water. Wreck Lead waterfront restaurants in Barnum Island and the Village of Island Park were destroyed. The Austin Boulevard commercial corridor saw four-to six-feet of water entering its businesses, destroying equipment and merchandise and damaging structures. Boats were ripped from their moorings in local marinas and sank or were carried away, sometimes miles from their starting point.

Tidal waters inundated all of the Village of Island Park, coming from Wreck Lead, California Place Canal, Island Park Channel, and across Little Beach from the Hog Island Channel. Almost all of Island Park between Long Beach Road and Nassau Lance were inundated by six to eight feet of water. The Village of Island Park downtown and Long Beach Road commercial district were submerged under six-to eight-feet of water. Flood victims in the Village of Island Park took shelter on the second floor of the Island Park Firehouse, which was itself flooded. During the peak of the storm firefighters were unable to respond to a house fire on Marina Road, which was inaccessible due to flooding. By morning, the Island Park Fire Department had received 300 emergency calls that it was unable to respond to until conditions improved enough to make a safe response possible.

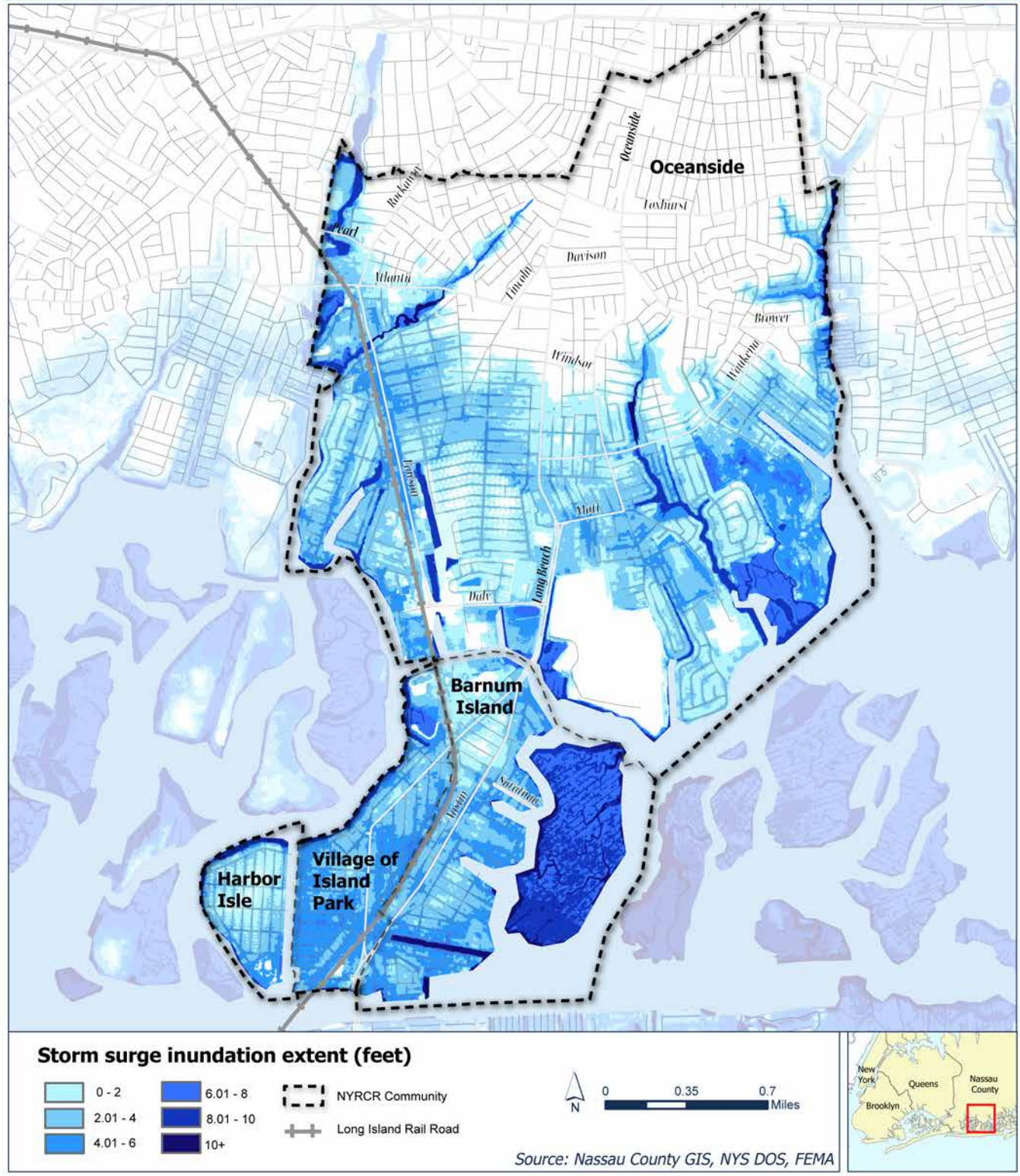
In Harbor Isle, the worst flooding was limited to the Wreck Lead and Hog Island Channel shorelines, with six-to eight-feet of water, though the water reached up to two-feet throughout Harbor Isle. As in Barnum Island and Island Park, marinas were hit hard with boats were ripped from their moorings.

In homes and businesses, flooding destroyed personal belongings, merchandise, electrical and mechanical systems, flooring, and walls. The tidal surge was slow to recede, trapping water in streets, homes, and businesses for up to two days. During this time water infiltrated walls and the insulation behind them, increasing the damage to structures and the cost to restore them.

As of June 2013, there were more than 7,700 Federal Emergency Management Agency (FEMA) Individuals and Households Program (IHP) registrations for disaster relief by homeowners in the Community with reported damages of $132 million. More than 2,500 renters registered with FEMA.[21] In total, more than 50% of the housing stock in Barnum Island,

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 6: Superstorm Sandy storm surge extent



Source: Nassau County GIS, NYS DOS, FEMA

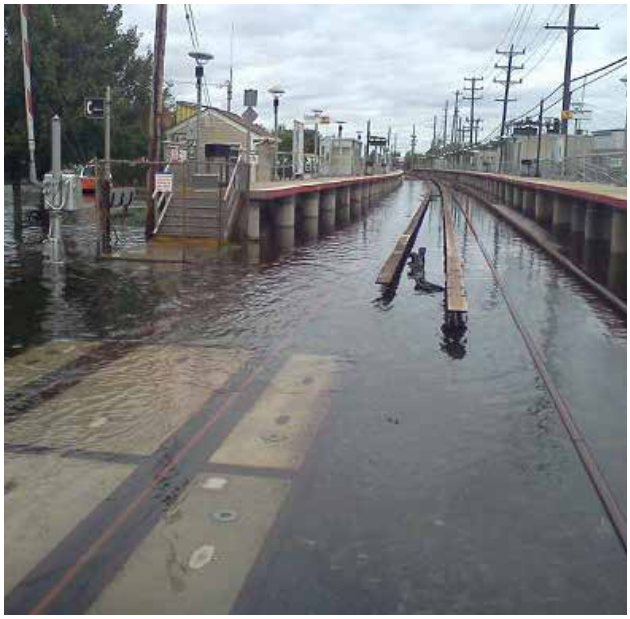
the Village of Island Park, and Harbor Isle suffered substantial flood damage, meaning that the cost to restore the building to its before-damaged condition would equal or exceed 50% of its market value before the damage occurred.

As of December 2013, the U.S. Small Business Administration (SBA) had received a total of 408 applications from businesses within the Community employing more than 2,000 people. Of those seeking U.S. SBA funding for repairs, 42% have been approved, covering only $18.6 million of the $44.2 million in reported damages.[22]

In addition to flooded homes and businesses, the Community experienced a major breakdown of critical transportation systems, power, stormwater drainage, and sanitary sewer infrastructure.

Tidal surge smashed into Community beaches and shoreline parks, eroding Little Beach in Island Park, Harbor Isle Beach in Harbor Isle, and the Oceanside Park shoreline. In Island Park, Masone Beach's seawall provided some protection, but the tide still washed away sand and fixtures.

The surge from Superstorm Sandy caused the Bay Park Sewage Treatment Plant to go offline at 10:00p.m. on October 29, 2012. A nine-foot wall of water washed over the plant, knocking out power and causing more than 100 million gallons of raw sewage to flow into waterways directly west of the Community and to back up into basements of homes in the Oceanside, the Village of Island Park, and Harbor Isle. As Nassau County worked to repair damages, another 2.2 billion gallons of partially treated sewage was released into Reynolds Channel. The plant remained off-line for approximately 58 hours until service was restored at 6:00 a.m. on November 1, 2012.[23]



Flooding at the Island Park Long Island Rail Road Station during Hurricane Irene, August 29,2011
Source: MTA

Approximately 8,100 homes in the Community lost power. It took more than four weeks for service to be fully restored. According to Community residents an uprooted tree in the Village of Island Park led to a major natural gas main break that cut off gas supply to homes that took up to three weeks to repair. Community residents suffered through much of a chilly November without heat or electricity.

Communications systems failed due to down lines and power outages that cut off electricity to cellular towers, leaving people in the dark, cold, and without a way to communicate their needs. Fed up with the situation, the Oceanside community came together to rally for the restoration of power service 12 days after the storm, when the failure of LIPA's E.F. Bartlett Power Station continued to leave many homes dark and powerless.[24]

Lawson Boulevard, Austin Boulevard, and Long Beach Road, which are Nassau County-designated evacuation routes, and other major streets were impassable during the storm as were local streets that feed into the evacuation routes. These closures blocked late evacuation for Community and Long Beach residents, preventing escape and complicating emergency response.

Firehouses and emergency service facilities were heavily damaged during the storm. The Oceanside Fire Department Hose Company No. 1 and South Side Hose Company No. 2 were flooded. The Island Park Firehouse flooded, destroying compressed air equipment and five emergency response vehicles, including an engine, ambulance, two chiefs' vehicles, and a heavy rescue vehicle, with a replacement

cost of up to $1.5 million. The firehouse sustained $500,000 in damage to electrical and mechanical systems and may also have suffered structural damage. A structural assessment of the building is pending. Island Park Village Hall was destroyed, and it is operating from temporary trailers while awaiting reconstruction. The Island Park Library was flooded and closed until July 29, 2013.[25]

Several schools sat directly in Superstorm Sandy's path and suffered major damage. In Oceanside, Schools 4, 8, 9E, and 9M were damaged. Classes for School 8 were moved to School 6 while repairs were made. Oceanside School District damages are estimated at $5 million. Francis X. Hegarty Elementary School in the Village Island Park had four- to six-feet of water, forcing it to close.[26] The Island Park School District consolidated all of its classes in the middle school while repairs were completed, and Hegarty School did not reopen until the next school year in September 2013. Just south of the Community, Long Beach Hospital was seriously damaged and remains closed. Although not located in the Community, it is the nearest hospital for many residents, and the Community relied on it for medical services.

Superstorm Sandy created untold amounts of debris, including large items such as boats, cars, heating fuel tanks, and building materials that were removed by herculean efforts of volunteers and emergency responders in the weeks after the storm, and are still being removed from area waterways and marshes today by public agencies and volunteer groups. More insidious even than this large debris has been the sand and other small debris that made its way into stormwater systems, impeding their function. This has increased nuisance flooding during high tides and small storms that have occurred since Superstorm Sandy.

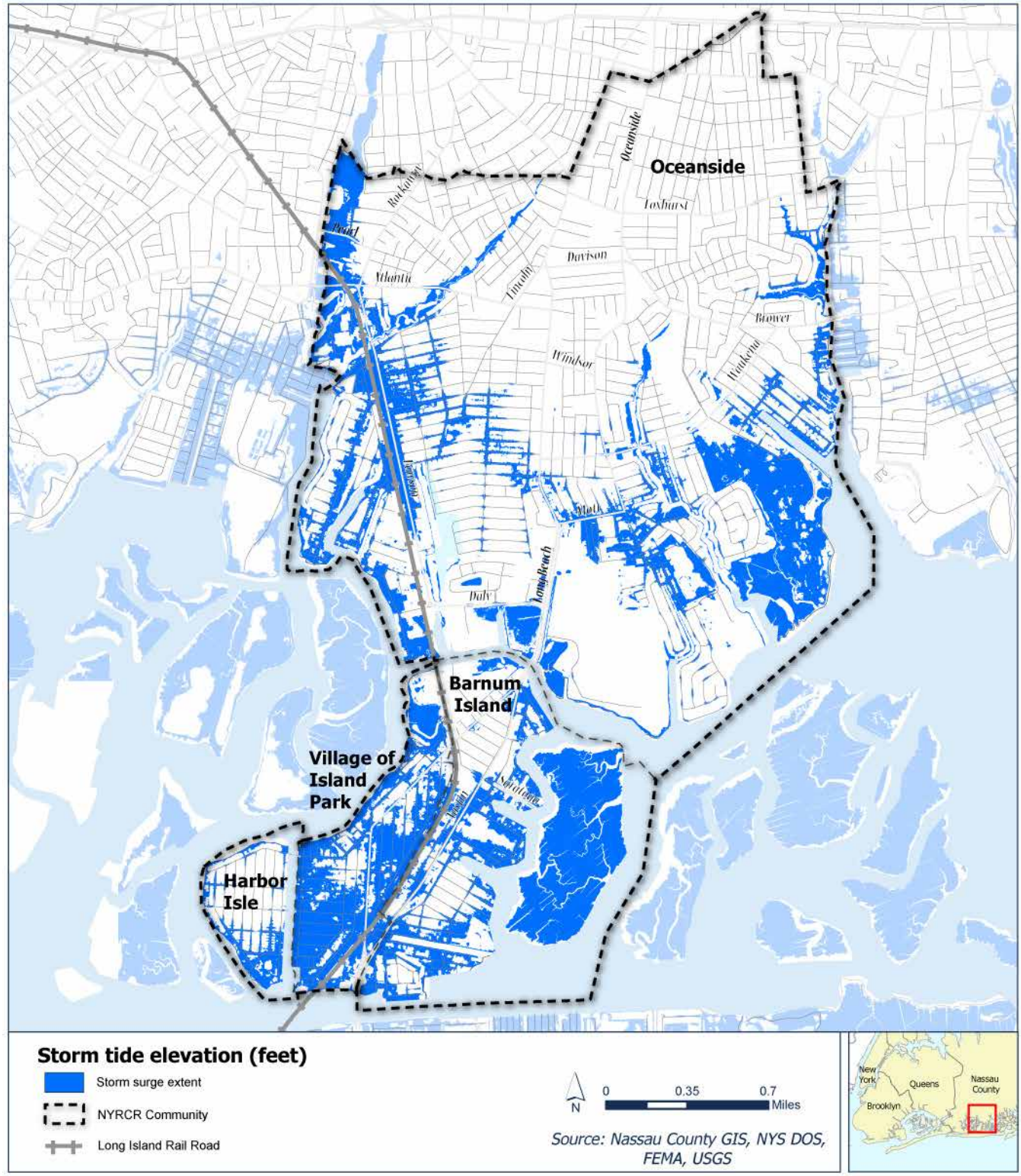
Hurricane Irene

The eye of Hurricane Irene crossed Long Island on August 28, 2011, and caused flooding to the Community, although not to nearly the same extent as Superstorm Sandy. A National Weather Service report states that a storm surge of three-to six-feet caused hundreds of millions of dollars in property damage in New York City and Long Island.[27] Figure 7 shows the approximate flood inundation extent of Hurricane Irene.

Superstorm Sandy damage to Barnum Island businesses
Source: Jim Mooney, East Rockaway, NY

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 7: Hurricane Irene peak storm tide elevation



In Oceanside, Lawson Boulevard was submerged by up to three-feet of water. Reed Channel overflowed its banks, flooding the residential neighborhood located on its western shore. Bedell Creek also flooded though to a far lesser extent than in Superstorm Sandy. The streets and homes just north of Oceanside Park also flooded.

About 25% of the land area in Barnum Island flooded during Hurricane Irene. As in Superstorm Sandy, the Wreck Lead waterfront and California Place Canal were the most severely flooded.

About 75% of Island Park was flooded, with water coming from Wreck Lead, Island Park Channel, and Hog Island Channel. Downtown Island Park streets, businesses, and the Island Park LIRR Station were inundated. The Island Park Firehouse and Village Hall were damaged.

Much of Harbor Isle escaped flooding during Hurricane Irene, though homes and businesses along the shoreline south of Brighton Boulevard received up to two-feet of water.

Second Public Engagement Event
Source: Sustainable Long Island

C. Critical issues

Superstorm Sandy highlighted a number of areas where the Community can bolster its resilience to future storm events. The NYRCR planning process included an asset inventory and needs and opportunities analysis (detailed in Section II) designed to help identify ways to make the Community more resilient. Results of the inventory and analysis were validated by the Committee in its meetings as well the public at two subsequent Public Engagement Events. Resident safety, emergency response capabilities, access to power, and protection from flooding were identified as the greatest Community needs.

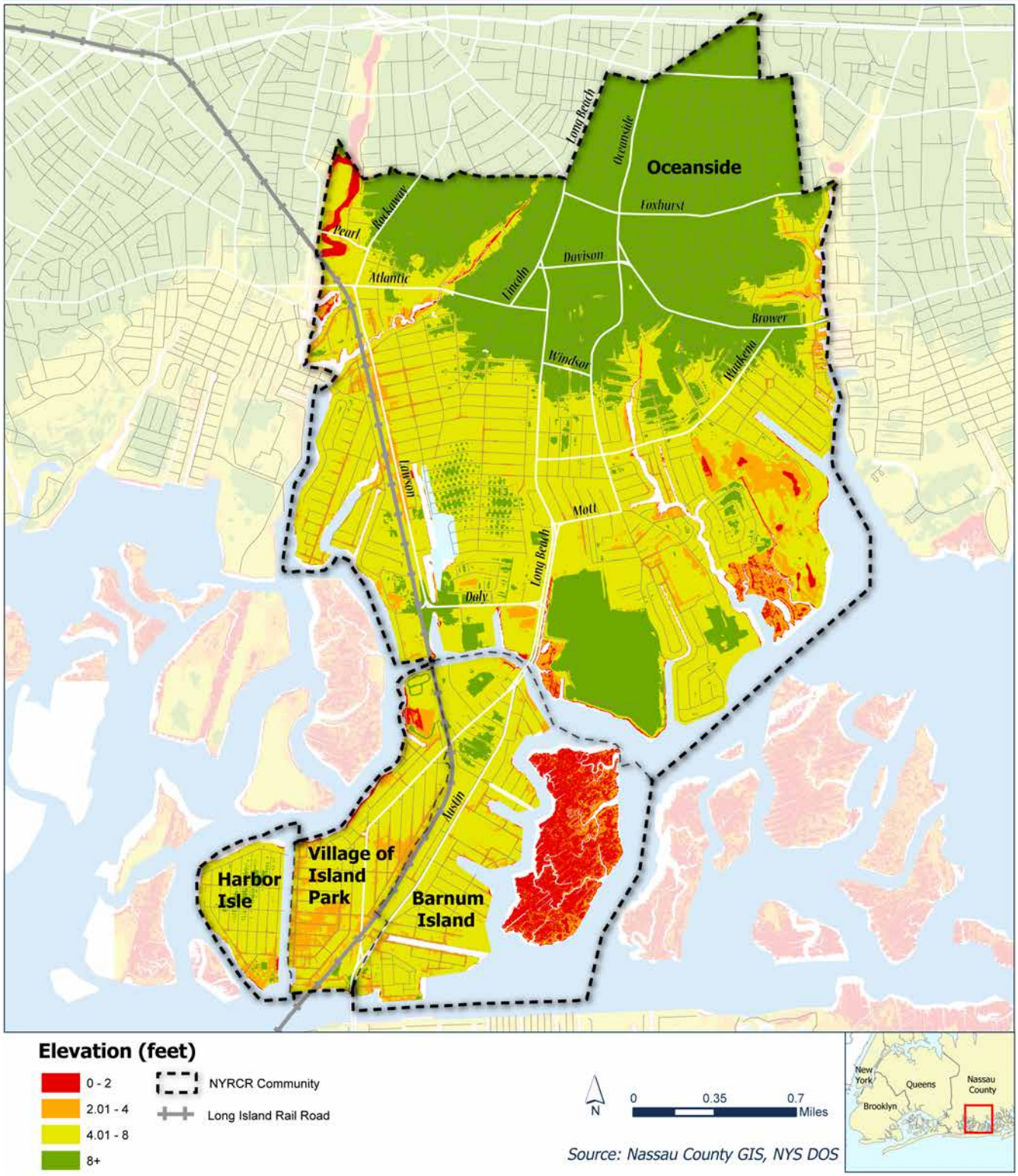
Since Superstorm Sandy, fire departments and emergency responders throughout the Community have been working to rebuild and expand emergency response facilities and to increase their capacity to respond effectively to future emergencies. This has included reconstructing Fire Headquarters in Oceanside, increasing resiliency of other emergency response facilities, expanding communication systems, and planning for future needs. There is an opportunity to build on those planning efforts by constructing resilient emergency response facilities and facilities to serve out-of-area emergency responders and by purchasing generators, cellular towers and other communications equipment, and rescue vehicles.

Access to power during and after an emergency was identified as a critical Community issue. Power and natural gas outages were widespread during and after Superstorm Sandy. Residents and businesses went as long as four weeks without electricity and three weeks without natural gas. Even those with generators could not power them because gas to run the generators was not available, either because gas stations did not have power to pump it or because of delivery interruptions.

The area's low elevation makes flooding a constant concern. As is shown on Figure 8, nearly all of the Community is below eight feet in elevation. Lower-lying bay and creek front shorelines and interior "bowls" that are lower than surrounding land area are

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 8: Elevation and topography



Source: Nassau County GIS, NYS DOS

particularly susceptible to flooding during high tides and even ordinary rain and snow events.

Superstorm Sandy had a severe impact on Community businesses. Based on U.S. SBA data, business losses amounted to more than $44 million, although total approved loans only covered 42% of these losses.[28] This indicates that businesses affected by flooding may still be struggling to recover from Superstorm Sandy.

Public facilities, including schools, municipal buildings, and firehouses were hard hit by Superstorm Sandy and remain vulnerable to future storm events. A majority of the schools, municipal buildings, and firehouses in the Community serve many purposes. In the aftermath of Superstorm Sandy, many were used as feeding and supply distribution stations. Since the storm, representatives from the Oceanside School District and Fire Department have been planning to formalize the role of Oceanside schools as staging areas, emergency supply distribution centers, and feeding stations in emergency recovery efforts.

The Community includes eight senior facilities, including housing, nursing homes, and residential rehabilitation facilities. While these facilities are evacuated prior to storm events, each needs to be made more resilient to future storm events to speed the return of vulnerable populations to their homes and supportive services as soon as is safe following an emergency.

The marshes surrounding the Community have been significantly reduced and degraded by land development, filling and dredging activities, and environmental contamination over the last century. Superstorm Sandy swept over the marshland and expedited the uprooting of many of the grasses and decreasing the natural sponge-effect typical of healthy marsh systems. Much of the existing shoreline is made up of infill land built on the site of historic marshes. The remaining marshes and shoreline areas need protection and enhancement to restore their storm buffer capacity and other environmental functions.

The inability of stormwater to drain is a major issue for the Community. The Community's stormwater systems have been damaged in major storm events, including Superstorm Sandy and Hurricane Irene. Surge waters carried debris and sediment into the system. It is suspected that the floodwaters damaged tidal flow devices and undermined catch basins, drainage culverts, and other infrastructure. The system capacity appears to have decreased since the two storms, as evidenced by increased nuisance flooding during high tide and moderate storm events.

About 100 stormwater outfalls are located below the high-tide line so that tidal water blocks drainage and backs up into the stormwater system, resulting in flooding during normal rainfalls and high-tide events and causing catastrophic system failures during major storm events. Municipal staff, Committee members, and Community members cited instances of tidal backflow into the system, with water coming out of stormwater catch basins and flooding roadways during high-tide events and surges. During Superstorm Sandy, the combination of tidal surge and runoff completely shut down the stormwater infrastructure, causing widespread flooding.

Further discussion of these critical issues is provided in the needs and opportunities in Section II.

D. Community vision

This section describes the Committee's vision statement for the NYRCR Plan to rebuild stronger, smarter, and safer. The Committee facilitated a public process (detailed in Section V) that resulted in a shared vision for the Community reflective of residents' respect for local diversity, pride in the unique location, natural assets, and commitment to home-grown businesses. The Committee, with input from the public, developed the following vision statement:

Enhance the quality of life and chart a course towards the future by creating solutions to rebuild and revitalize two communities that are enriched by the diversity of their residents. Facilitate positive, innovative change that will provide an environment that is SAFE and an infrastructure that is RESILIENT, so that each community can thrive, sustain itself in the face of adversity and preserve its uniqueness and charm.

Rebuild stronger, smarter, and safer

The ultimate goal for NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle is to rebuild in a manner that addresses resilience, sustainability, and greater prosperity to ensure the area's long-term success. Overall the Community seeks to:

- Increase protection from both coastal and stormwater flooding;
- Increase housing resilience and expand housing options;
- Rebuild in a better, smarter manner using sustainable and resilient approaches that support and accommodate existing residents and businesses while addressing affordable housing and growing desirable new businesses; and,
- Address multiple needs at once when replacing or redeveloping infrastructure, (e.g., combine updating and modifying of underground utilities, such as stormwater and sewer lines during road construction).

In addition to Community-wide goals, the vision also includes a series of site-specific strategies that celebrate the many physical assets and focal points of these places:

- Implement a transit-oriented development in the Village of Island Park to revitalize its downtown and waterfront;
- Invest in schools and senior centers to minimize flood damage;
- Revitalize the Oceanside waterfront industrial area;
- Protect and enhance Oceanside Park;
- Construct a new building for the Island Park Village Hall, built to withstand future weather events;
- Restore beloved beaches, including Little Beach, Harbor Isle Beach, and Masone Beach; and,
- Create new opportunities for recreational and open space.

A comprehensive review of Community reconstruction and resiliency strategies is available in Section III. A detailed explanation of public engagement activities is available in Section V.

E. Relationship to regional plans

This NYRCR Plan includes four subareas, Barnum Island, Oceanside and Harbor Isle, which are unincorporated hamlets in the Town of Hempstead, and the Village of Island Park. The Community recognizes the importance of reaching across traditional community and jurisdictional boundaries to solve local and shared problems; and recognizes the importance of coordinating issues as a part of a broader south shore and Long Island region.

Strong Island – The story of a region's recovery and resurgence

The Community is located within the planning area of the Long Island Regional Economic Development Council (LIREDC). The LIREDC has prepared plans that address critical issues post-Superstorm Sandy, including their 2013 update entitled: *Strong Island - The Story of a Region's Recovery and Resurgence*. Key regional priorities relevant to the NYRCR Plan include:

- **Bay Park Sewage Treatment Plant:** Improvements to the Bay Park Sewage Treatment Plan to increase its resiliency and consolidate with the Long Beach wastewater treatment, is being considered. Mitigation measures and additional changes, including creating an ocean outfall to prevent future contamination of Reynolds Channel, Hempstead Bay, etc., are being discussed. *On February 11, 2014, Governor Cuomo announced the commitment of $810 million for the comprehensive rehabilitation and mitigation of the Bay Park Sewage Treatment Plant, including the construction of a protective 500-year storm barrier around the plant (which will take into account sea level rise), elevating and hardening the electrical plant distribution system, and elevating and/or hardening 57 pump stations serving the plant.*[29]
- **Reynolds Channel shoreline stabilization:** The regional plan discusses stabilizing the Reynolds Channel shoreline to provide a barrier to prevent tidal flooding. *This effort is*

Bay Park Sewage Treatment Plant
Source: URS

considered a priority in order to reduce tidal flooding from Reynolds Channel and Wreck Lead.

- **Infrastructure to support additional rental housing:** Historically, rental vacancies have been low on Long Island, and post-Sandy fewer rental properties are available. Construction of rental housing and associated infrastructure (sewer, wastewater treatment plants, roads, and transit lines) is encouraged**.** *The community is considering the addition of rental housing in mixed-use redevelopment of the Wreck Lead waterfront, downtown Island Park, and the Oceanside industrial area.*

Cleaner Greener Long Island Regional Sustainability Plan

The *Cleaner Greener Long Island Regional Sustainability Plan* from April 2013 also includes a number of goals that are relevant to the NYRCR planning process. Key regional priorities from this sustainability plan include:

- Advancing Superstorm Sandy recovery and rebuilding by providing incentives for greener and more resilient developments, encouraging relocation locally outside the floodplain, and encouraging rapid restoration of the electric grid. *The NYRCR Plan is proposing greener and more resilient redevelopment options for the Community*.
- Improving energy efficiency. *The NYRCR Plan recommends exploring alternative energy generation and distribution systems for the Community.*
- Improving transportation options. *The NYRCR Plan proposes transportation network safety improvements and a "complete streets" pilot project for Long Beach Road in Oceanside.*
- Increasing the development of green infrastructure to control flooding and decrease pollution from stormwater runoff. *The NYRCR Plan proposes green stormwater infrastructure as a tool to improve stormwater drainage.*
- Encouraging regional coordination of sustainability planning and its implementation.

Additionally, the *Sustainability Plan* includes recommended strategies to address climate change, such as updating comprehensive plans to address sea level rise, flooding, and storm surges; updating building codes; adopting protection and mitigation measures to protect infrastructure; and updating emergency management plans. *The Community is considering mitigation measures to protect key facilities as part of the NYRCR process.*

Many of the recommendations found in this NYRCR Plan align with the strategies set forth in the previously mentioned regional plans. Reconstruction and Resiliency Strategies are detailed in Section III.

Regional perspectives

In addition to considering the elements from the above plans, mitigating the risk of damage from future storms to increase resiliency will require regional as well as local actions. The Community receives municipal services from the Town of Hempstead and the Village of Island Park. It is also dependent on other entities, including utility companies (e.g., power and natural gas) and the LIRR, for services. In some cases, it is also in the Community's best interest to collaborate with each other and neighboring municipalities and jurisdictions to develop projects and coordinate resources. Some issues discussed in the NYRCR Plan cross political jurisdictions and need to be coordinated regionally. For this Community, the greater region to consider includes the City of Long Beach and the entire barrier island, Nassau County, as well as greater Long Island.

On December 5, 2013, representatives from the NYRCR the Village of Atlantic Beach/East Atlantic Beach, NYRCR City of Long Beach, NYRCR Lido Beach/Point Lookout, and NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Communities assembled to discuss issues of regional interest and concern. These issues included coastal protection (both for the bayfront and oceanfront), stormwater management, green infrastructure, complete streets, water/wastewater, and microgrid systems. The purpose of the workshop was to provide an educational context for the NYRCR Communities to discuss the benefits and applicability of different resilient and protective measures and provide examples of models that have worked well in other areas.

Coordination with each other and the barrier island communities may help provide economies of scale to obtain necessary resources for regional projects like larger regional storm barrier projects, improving established evacuation routes, complete streets and stormwater improvements, microgrids, a shoreline improvement district to help deal with common issues like need for bulkheading, emergency services, transportation connectivity, and potential alternative power generation. Intergovernmental disaster response agreements with these communities may also be beneficial.

Coordination with other communities to promote the development of green infrastructure including permeable pavement, bioswales, rain gardens, and gray water reclamation would be beneficial. In addition, the Village of Island Park, the Town of Hempstead, and Nassau County can coordinate on issues like wastewater treatment, evacuation routes, and restoring marsh and wetland areas already affected by storms.

Coordination with National Grid and LIPA/PSEG is necessary to secure backup power sources and protect transmission and distribution facilities that are still vulnerable. In addition, the Community can work with LIPA/PSEG to install smart meters on homes and businesses to better monitor energy usage and to build a smart grid.

The LIRR is a vital link for residents to New York City and the rest of Long Island. The Community should coordinate with the LIRR to ensure that train service remains operational. In addition, there is an opportunity to protect the Oceanside and Island Park LIRR stations, electric substation, and track. In January 2014, the State announced that contracts have been awarded to repair and elevate two of the three damaged electrical substations along the LIRR Long Beach Branch.[30]

Communication systems warrant regional coordination as well and should be coordinated with Nassau County Office of Emergency management (OEM). The Community should further discuss coordination with cell phone carriers on implementing a plan to ensure uninterrupted service and better response when signals are lost during a storm or emergency. The potential of developing a regional emergency radio broadcast or crowdsourcing system to facilitate communication with residents when telecommunications and traditional media outlets are unavailable should be explored in discussions with Nassau County OEM.

Oceanside LIRR station
Source: URS

Source: URS

Section II:
Assessment of risk and needs

II. Assessment of risk and needs

This section describes the identification of community assets and the risk assessment in the NY Rising Community Reconstruction (NYRCR) Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community. The planning process used current conditions and future goals and strategies, to assess the impact of hazards on assets and performed a risk analysis to understand the level of risk to each asset. This process helped the Community document methods to mitigate future risk situations. The NYS Department of State (NYS DOS) prepared coastal and riverine risk assessment maps with assistance from the National Oceanic and Atmospheric Administration Coastal Services Center (NOAA-CSC) and the Federal Emergency Management Agency (FEMA). As Superstorm Sandy demonstrated, areas well inland can be affected, so risk assessment mapping included sources such as the FEMA 0.2% annual risk ("500-year") flood zone and the National Hurricane Center's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) zones. The mapping also assumes a three-foot rise in sea level by 2100. The risk assessment map for the Community is shown in Figure 9.

A. Description of community assets and assessment of risk

Description of community assets

The purpose of the Community Asset Inventory is to highlight the types of classes of community assets (including critical facilities) that, if impaired as a result of hazard events, would compromise the essential social, economic, or environmental functions of the community. Critical facilities are defined as facilities, such as shelters, fire and police stations, health facilities, and vital infrastructure assets that are crucial to emergency response functions following natural disasters. Community assets and systems are resources, such as individual housing and transportation components, schools, hospitals, treatment plants, parks, natural areas, and commercial areas, as well as community-wide systems, such as transportation networks, telecommunications, stormwater, and others, as identified by the NYRCR Planning Committee (Committee).

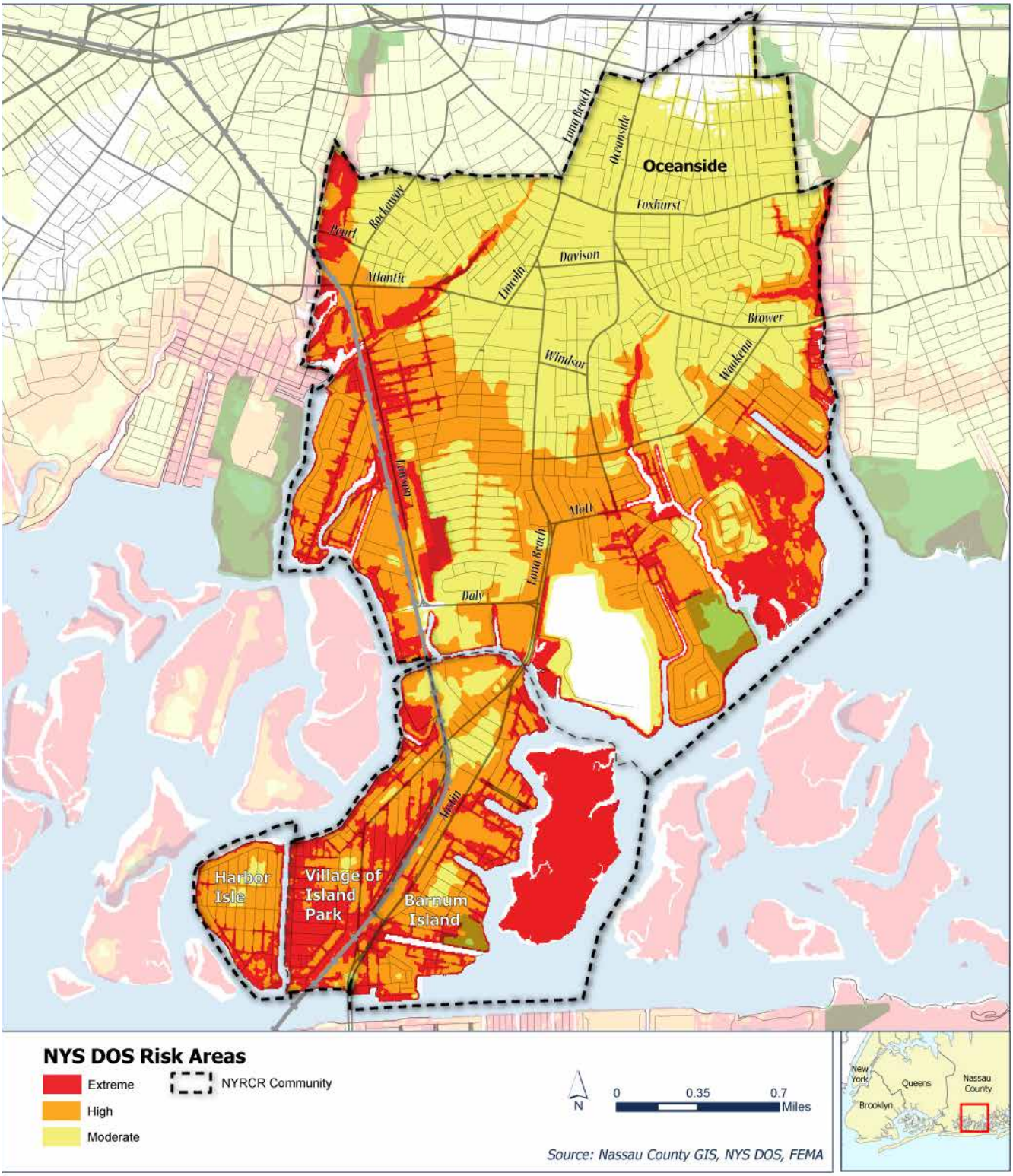
Table 3: New York State Department of State Risk Areas

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

Source: New York State Department of State
FEMA = Federal Emergency Management Agency
NWS = National Weather Service
SLOSH = Sea, lake, and overland surge from hurricanes

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 9: New York coastal inundation risk assessment



One component of the NYRCR planning process is to ensure that both reconstructed assets and newly constructed assets are more resilient in the face of future storms. Communities have a variety of assets such as housing, transportation, schools, hospitals, treatment plants, parks, natural areas, and commercial areas. The Committee identified Community assets that are important to retain and protect during storm events. Asset locations were mapped using Geographic Information Systems (GIS).

The Committee then analyzed assets through the filter of the six recovery support functions established by President Barack Obama in 2011 throughout the National Disaster Recovery Framework. They are: Community Planning and Capacity Building; Economic Development; Health and Social Services; Housing; Infrastructure; and Natural and Cultural Resources. A description of types of assets in each Recovery Support Function is listed below in Table 4.

The Asset Inventory Map shows the locations of the Community assets included in the inventory (Figure 10). The asset inventory is in Table 5. Figures 11 through 14 are close-up maps showing asset locations in more detail.

The Community Asset Inventory was completed based on Committee input and public feedback. The initial asset inventory identified 136 assets through assessment of existing conditions and issues identified by the Committee. Following feedback from the Committee and through the first Public Engagement Event, that list was refined and narrowed to 112 assets, including system assets. The Committee finalized the Community Asset Inventory following the December 18, 2013, Planning Committee Meeting.

The following list summarizes Community and system assets:

- **Economic:** Major economic development opportunities exist in the planning area in three major categories: marinas, industrial areas, and commercial business areas. Five marinas are located along the edges of the NYRCR Planning Area and provide opportunities for water-based

Table 4: Recovery support functions

Recovery support functions
Community Planning and Capacity Building: This strategy addresses how the community will restore or enhance its ability to organize, plan, manage, and implement its recovery.
Economic Development: This strategy addresses how the community will restore economic and business activities and develop new economic opportunities.
Health and Social Services: This strategy addresses how the community will restore and improve essential health and social services, including vulnerable populations.
Housing: This strategy addresses how the community will meet the demand for affordable housing (and promotion of affordable housing), address post-disaster housing needs, and encourage disaster-resistant housing for all income groups.
Infrastructure: This strategy addresses how the community will restore, repair, and manage essential infrastructure services.
Natural and Cultural Resources: This strategy addresses how the community will approach natural and cultural resource management from a risk reduction and economic development context.

Source: Guidance for New York Rising Community Reconstruction Plans: A Planning Toolkit for NYRCR Planning Committees

recreation and business development. Major industrial services are located along Lawson Boulevard and Hampton Road in Oceanside and along Austin Boulevard in Barnum Island. Commercial storefronts and community businesses are concentrated in the Long Beach Road corridor through both Oceanside and the Village of Island Park. Commercial land use is also distributed throughout the Lawson Boulevard corridor in Oceanside.

- **Health and social services:** Twenty-eight assets in the community were classified in this category, including post offices, emergency response resources, schools, public works departments, and healthcare facilities. Many of the critical services currently provided by the four communities are carried out through the facilities in this list, including fire stations and the Village of Island Park Village Hall (first responder coordination), schools (central gathering locations), and public works departments (disaster response and cleanup).
- **Housing:** Multiple housing assets have been identified throughout the Community for their importance because of density of residential population, senior living options, or because they house other vulnerable populations.
- **Infrastructure:** Infrastructure assets located in the Community include the Long Island Power Authority/Public Service Electric and Gas Company (LIPA/PSEG) Long Island Power Station, Long Island Rail Road (LIRR) tracks, stations, and electrical substation, and multiple gas stations. Each of these facilities provides services that Community residents and businesses depend on for normal operations. Operation and functionality of these utilities are critical to the health and well-being of the community at all times. Gas stations were highlighted by residents as assets that were severely diminished during Superstorm Sandy. Bulkheading can also be considered an asset for the community due to the importance of flood protection and the need to identify those areas where deterioration and uneven protection heights can lead to additional flooding. In addition to these assets, the Bay Park Sewage Treatment Plant, located in adjacent Bay Park, is listed as an asset because of its overarching impact on the resiliency of the Community.
- **Natural and cultural resources:** Thirty-five natural and cultural resources assets were identified in the Community. These assets include houses of worship, beaches, parks, and community meeting houses. These assets represent facilities and places that have cultural significance to the community.
- **System assets:** These groups of assets include priority areas important to the entire Community. They include single-family housing, road systems, stormwater facilities, water systems, and telecommunications.

Once the list of assets was finalized, detailed information about each asset, landscape attributes in the vicinity of the asset, and the vulnerability of the asset to flood damage was collected for the Community Asset Inventory. The risk areas defined by NYS DOS and discussed above were then applied to determine which risk area each individual or system asset is located.

Assets were then prioritized based on factors such as importance to the Committee, the probability of being affected by flooding, and restoration time. The Committee identified all the assets as having a high community value as everything in the Community is an asset worth protecting. The assets identified and numbered in Table 5 are shown on the asset maps listed by the reference numbers in Table 5.

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 10: Community assets

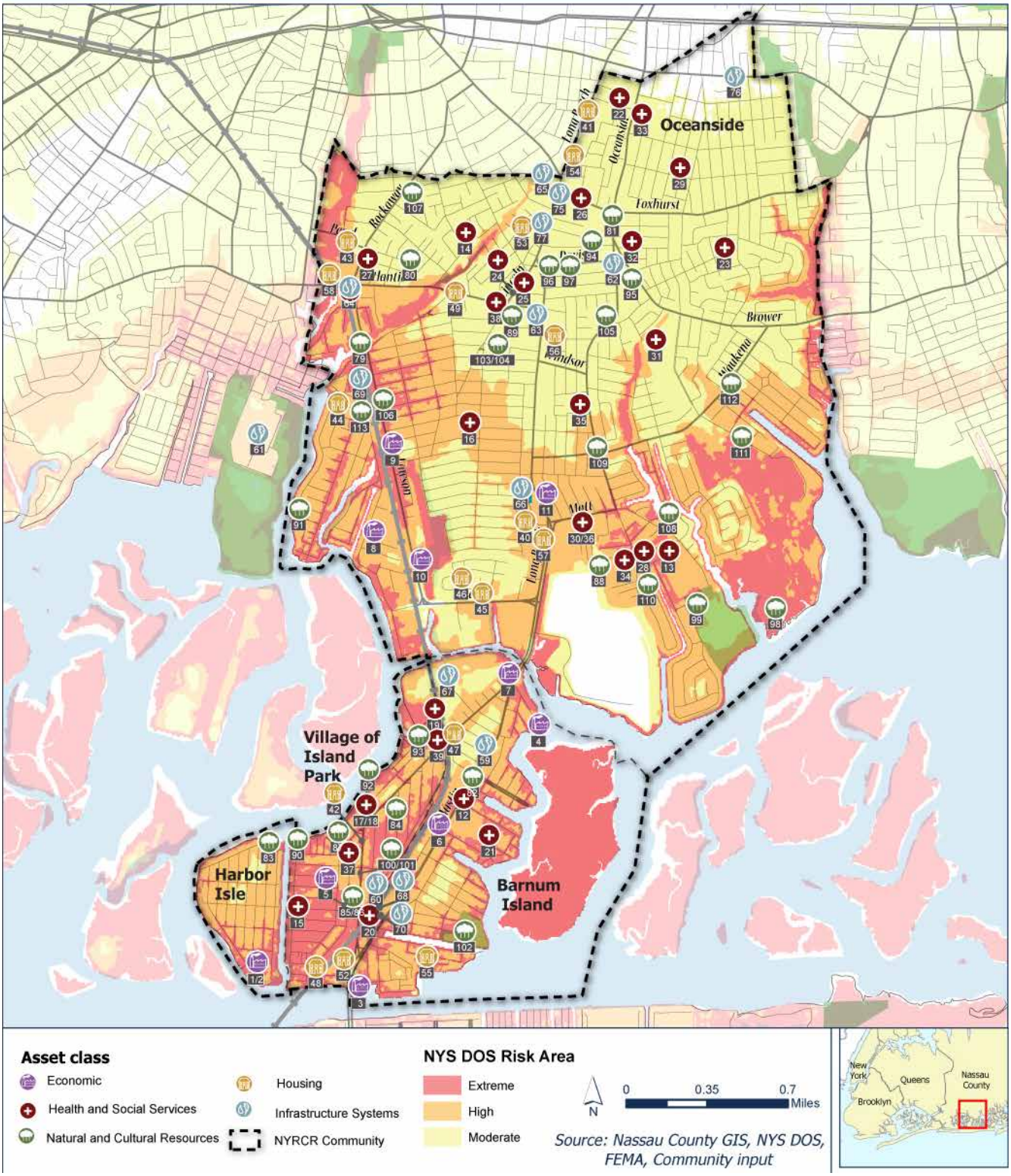


Table 5: Community asset inventory

	Economic			
	Asset name	**Location**	**Risk Area**	**Community value**
1	Aero Marine	Harbor Isle	Extreme	High
2	Andy's Marina	Harbor Isle	Extreme	High
3	Bridgeview Yacht Club	Barnum Island	Extreme	High
4	Empire Point Marina	Village of Island Park	Extreme	High
5	Island Park Business District	Village of Island Park	Extreme	High
6	Island Park Industrial District	Barnum Island	High	High
7	K&K Marina	Barnum Island	Extreme	High
8	Oceanside Hampton Rd Industrial District	Oceanside	Extreme	High
9	Oceanside Lawson Blvd Economic Corridor	Oceanside	Extreme	High
10	Oceanside Lawson Blvd Industrial District	Oceanside	Extreme	High
11	Oceanside Long Beach Rd Economic Corridor	Oceanside	Extreme	High
	Health and Social Services			
	Asset name	**Location**	**Risk Area**	**Community value**
12	Barnum Island Fire District	Barnum Island	High	High
13	Oceanside Schools #9E and #9M	Oceanside	High	High
14	Florence Smith School #2	Oceanside	Moderate	High
15	Francis Hegarty Elementary School	Village of Island Park	High	High
16	Fulton Avenue School #8	Oceanside	High	High
17	Island Park Fire Department (FD) Exempts Hall	Village of Island Park	High	High
18	Island Park Fire Department Headquarters	Village of Island Park	High	High
19	Island Park Fire Department Training Facility	Village of Island Park	High	High
20	Island Park Village Hall	Village of Island Park	Extreme	High
21	Lincoln Orens Middle School	Barnum Island	High	High
22	North Oceanside School #5	Oceanside	Moderate	High
23	Oaks School #3	Oceanside	Moderate	High
24	Oceanside Care Center Inc.	Oceanside	Moderate	High
25	Oceanside FD Engine 1	Oceanside	High	High
26	Oceanside FD Headquarters	Oceanside	Moderate	High
27	Oceanside FD Hose 1	Oceanside	Moderate	High
28	Oceanside FD Hose 2	Oceanside	High	High
29	Oceanside FD Hose 3	Oceanside	Moderate	High

*** Denotes system asset**

Table 5: Community asset inventory, continued

	Health and Social Services			
	Asset name	**Location**	**Risk Area**	**Community value**
30	Oceanside FD Maintenance Bldg	Oceanside	High	High
31	Oceanside High School #7	Oceanside	Moderate	High
32	Oceanside High School Castleton #6	Oceanside	Moderate	High
33	South Nassau Communities Hospital	Oceanside	Moderate	High
34	South Nassau Dialysis Center	Oceanside	High	High
35	South Oceanside School #4	Oceanside	High	High
36	Town of Hempstead Sanitation District 7	Oceanside	High	High
37	U S Post Office Island Park	Village of Island Park	Extreme	High
38	U S Post Office Oceanside	Oceanside	Moderate	High
39	Village of Island Park Department of Public Works	Village of Island Park	High	High
	Housing			
	Asset name	**Location**	**Risk Area**	**Community value**
40	Alhambra Condominiums	Oceanside	High	High
41	Bishop Kellenberg Garden Apts	Oceanside	Moderate	High
42	Island Park Senior Housing	Village of Island Park	High	High
43	Mill River Gardens Apartments	Oceanside	High	High
44	Ocean Harbor Apartments	Oceanside	High	High
45	Oceanside Cove Co-ops	Oceanside	High	High
46	Oceanside Knolls Apartments	Oceanside	Moderate	High
47	PSCH Island House	Village of Island Park	High	High
48	Regency Apartments	Village of Island Park	Extreme	High
49	Sherwood Townhouse Apartments	Oceanside	Moderate	High
50*	Single-Family Housing Village of Island Park, Barnum Island, Harbor Isle	Village of Island Park, Barnum Island, Harbor Isle	Extreme	High
51*	Single-Family Housing Oceanside	Oceanside	High	High
52	South Point Plaza Nursing and Rehabilitation Center	Village of Island Park	High	High
53	Summit Apartments	Oceanside	Moderate	High
54	The Glen Apartments	Oceanside	Moderate	High
55	The Yacht Club	Barnum Island	Extreme	High
56	Theresa Gardens Apartments	Oceanside	Moderate	High
57	Valley Town House Apartments	Oceanside	Moderate	High
58	Woodcrest Apartments	Oceanside	High	High

*** Denotes system asset**

Table 5: Community asset inventory, continued

	Infrastructure			
	Asset name	**Location**	**Risk Area**	**Community value**
59	Austin Boulevard evacuation route	All	Extreme	High
60	Auto Spa	Barnum Island	High	High
61	Bay Park Sewage Treatment Plant and Pump Stations	All	Extreme	High
62	BP Gas Station	Oceanside	Moderate	High
63	Gulf Oceanside Gas Station	Oceanside	Moderate	High
64	Hess Gas Station	Oceanside	High	High
65	Hess Gas Station	Oceanside	Moderate	High
66	Kings Oceanside C Store Gas Station	Oceanside	High	High
67	LIPA/PSEG E.F. Barrett Power Station	Barnum Island, Oceanside	Extreme	High
68	LIRR Island Park Station	Village of Island Park	Extreme	High
69	LIRR Oceanside Station	Oceanside	Extreme	High
70	LIRR electric substation	Village of Island Park, Barnum Island	Extreme	High
71*	Multi-community roadways	All	High	High
72*	Sanitary sewage systems	All	Extreme	High
73*	Storm drainage systems	All	Extreme	High
74*	Telecommunications	All	Extreme	High
75	USA Gasoline Gas Station	Oceanside	Moderate	High
76	USA Gasoline Gas Station	Oceanside	Moderate	High
77	Valero Gas Station	Oceanside	Moderate	High
78*	Water systems	All	High	High

*** Denotes system asset**

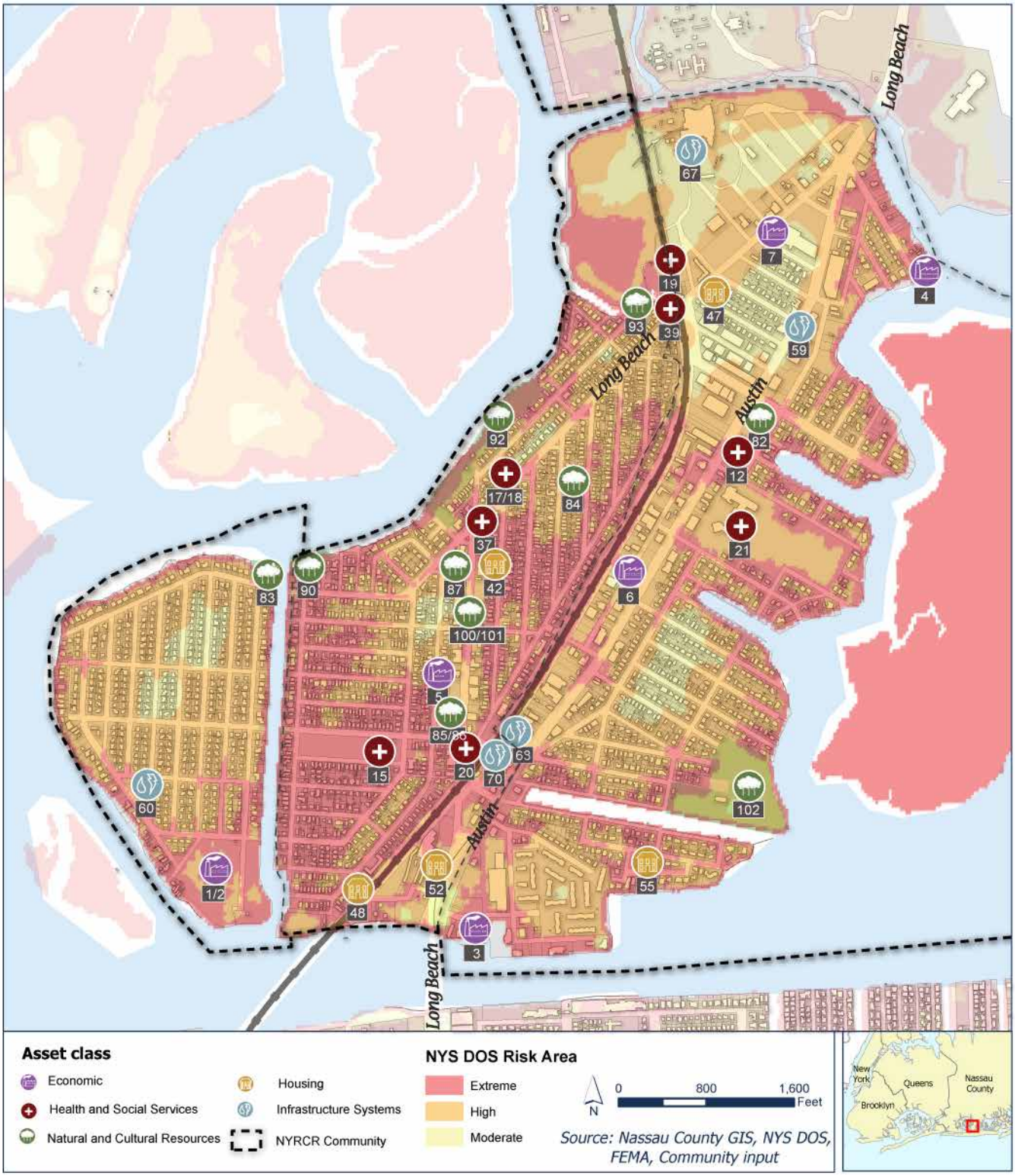
Table 5: Community asset inventory, continued

	Natural and Cultural Resources			
	Asset name	**Location**	**Risk Area**	**Community value**
79	American Legion Post 1246	Oceanside	Extreme	High
80	First Methodist Church	Oceanside	Moderate	High
81	First Presbyterian Church	Oceanside	Moderate	High
82	Full Gospel Church	Barnum Island	High	High
83	Harbor Isle Beach	Harbor Isle	Extreme	High
84	Island Park Greek Orthodox Church	Village of Island Park	High	High
85	Island Park Jewish Center / Soul Stirring Church	Village of Island Park	High	High
86	Island Park Library	Village of Island Park	High	High
87	Island Park United Methodist Church	Village of Island Park	High	High
88	Jewish Community Center (JCC)	Oceanside	High	High
89	Knights Of Columbus	Oceanside	Moderate	High
90	Little Beach	Village of Island Park	Extreme	High
91	Margie Street Park	Oceanside	Extreme	High
92	Masone Beach	Village of Island Park	Extreme	High
93	Mayor Landgraf Park	Village of Island Park	Extreme	High
94	Oceanside Community Center	Oceanside	Moderate	High
95	Oceanside Jewish Center	Oceanside	Moderate	High
96	Oceanside Library	Oceanside	Moderate	High
97	Oceanside Lutheran Church	Oceanside	Moderate	High
98	Town of Hempstead Oceanside Marine Nature Study Area	Oceanside	Extreme	High
99	Town of Hempstead Oceanside Park	Oceanside	Extreme	High
100	Sacred Heart Parish Center	Village of Island Park	High	High
101	Sacred Heart Roman Catholic Church & Rectory	Village of Island Park	High	High
102	Shell Creek Park	Barnum Island	High	High
103	St Andrews Episcopal Church	Oceanside	Moderate	High
104	St Anthonys Church	Oceanside	Moderate	High
105	Temple Avodah	Oceanside	Moderate	High
106	VFW Post 5199	Oceanside	Extreme	High
107	Windsor Avenue Bible Church	Oceanside	Moderate	High
108	Wrights Field	Oceanside	Extreme	High
109	Young Israel of Oceanside	Oceanside	Extreme	High
110	Chabad Center of Oceanside	Oceanside	High	High
111	Shaar Hashamayin	Oceanside	High	High
112	Congregation Darchai Noam	Oceanside	Moderate	High
113	Arca de Salvación	Oceanside	High	High

*** Denotes system asset**

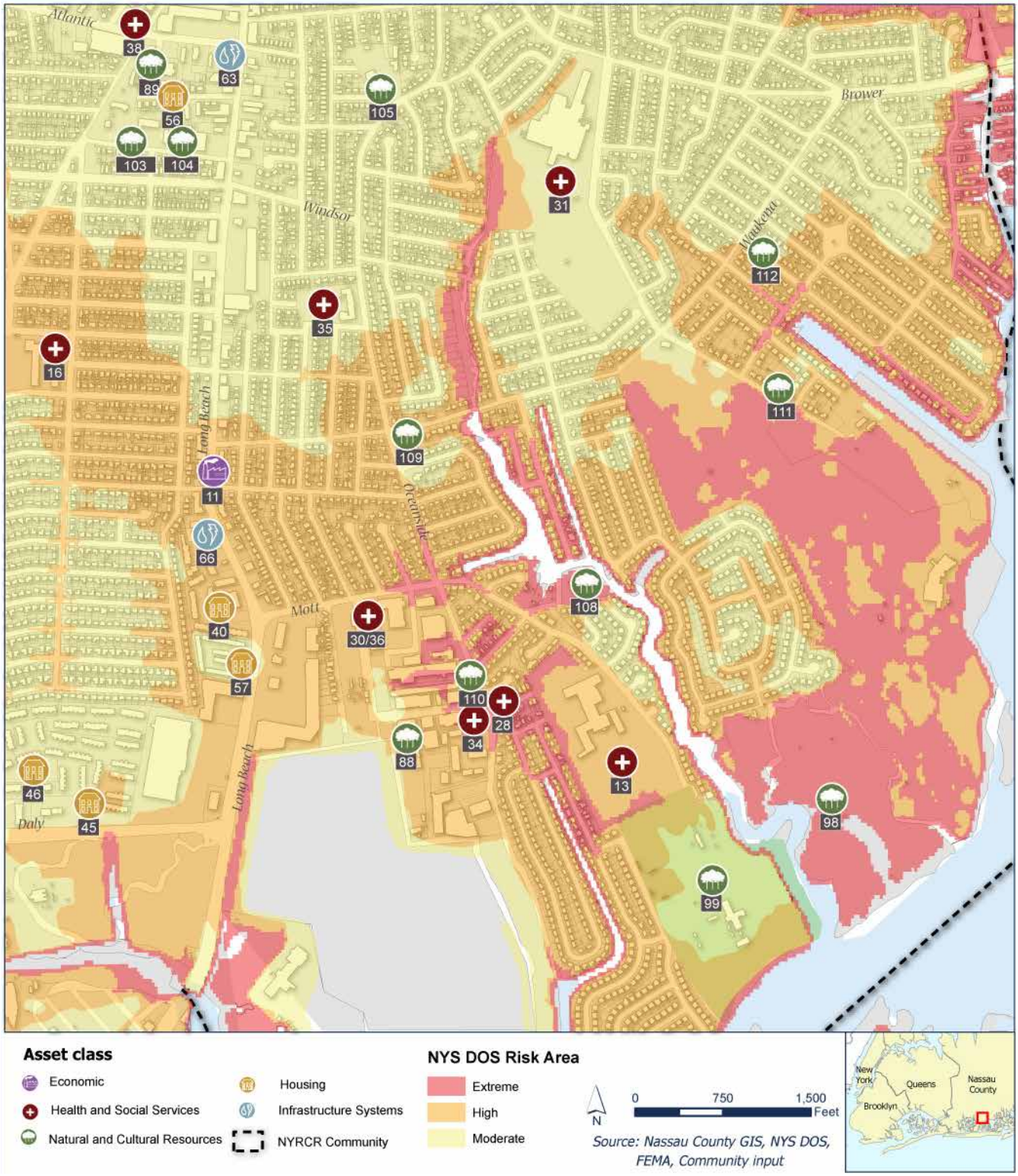
Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 11: Barnum Island, the Village of Island Park, and Harbor Isle asset map detail



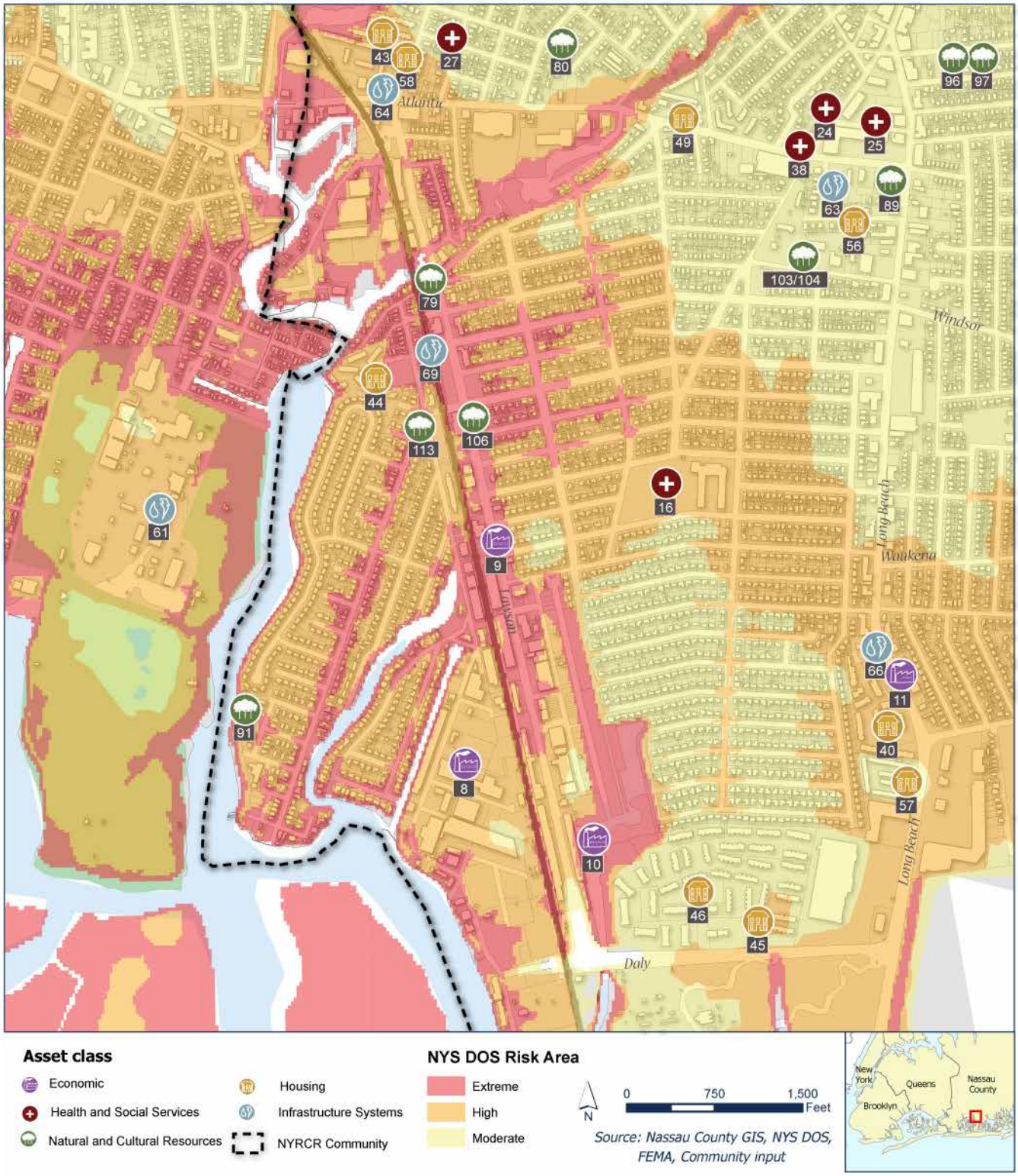
Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 12: East Oceanside asset map detail



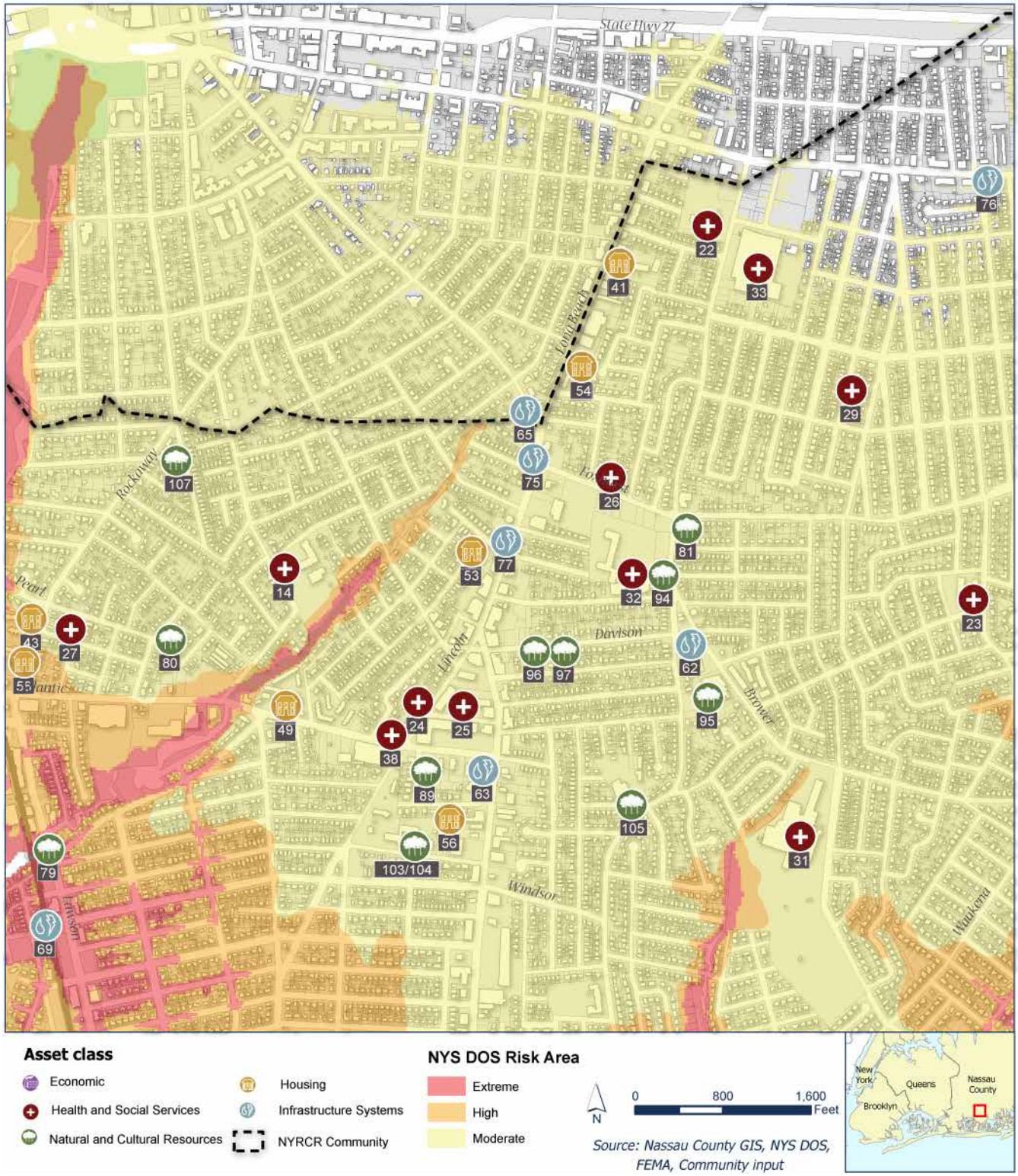
Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 13: West Oceanside asset map detail



Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 14: North Oceanside asset map detail



Source: Nassau County GIS, NYS DOS, FEMA, Community input

Assessment of risk to assets and systems

Assets identified by the Committee face a risk of flooding not only from future storm events on the scale of Superstorm Sandy, but from normal lunar cycle moon tides and small rain events. Many areas in Barnum Island, the Village of Island Park, Harbor Isle, and southern Oceanside are near sea level and the drainage systems in those areas function below capacity during storm events. Any additional inundation causes these systems to fail and stormwater to rise through the streets, neighborhoods, and business districts.

The drainage issues are a foundational component of past impacts to assets; other exposure and vulnerability issues combine to add layers to the problem. The geographic orientation of the four communities opens them up to storm surges and flooding from three directions, but particularly from the east to the west. California Place Canal directly impacts central Barnum Island and the Village of Island Park due to a funneling effect for high water flows and failures of the stormwater system to protect assets west of the canal. Grand Canal and Bedell Creek directly affect Oceanside assets both inland and along the shoreline. Tidal surge and storm runoff are not able to drain with any regularity from inland locations.

Many Community concerns dealt with the vulnerability of the assets, namely the ability of the assets to recover from normal storm events as well as major storms. Community assets, such as schools, emergency response facilities, and government buildings, in addition to system assets, such as business areas and telecommunications networks, have failed structurally in past storm events from poor floodproofing, an exposed location, and low elevation.

The NYS DOS risk areas defined in Table 3 were used to evaluate risk to assets in the Community. The risk assessment map (see Figure 9) shows that most of Barnum Island, the Village of Island Park, Harbor Isle, and areas south of Windsor Parkway in Oceanside are in an extreme or high-risk flooding area. These risk areas, identified through a partnership with the NOAA-CSC, are intended to illustrate the areas that are most at risk for future storms.

A risk assessment to determine the potential impact of hazards on Community assets was conducted. The results helped to guide the selection of proposed strategies, such as infrastructure improvements and changes in the building environment. The risk assessment helped the Community choose mitigation options to reduce future risk. Input from the Committee, with extensive input from the public on areas with the highest risk of flooding, was used to supplement the risk assessment map.

Risk assessment methods

Quantifying risk: To quantify risk to vulnerable assets within the Community, a risk assessment tool developed by NYS DOS was used to evaluate risk based on construction of mitigation projects. The three factors used to assess risk were hazards, exposure, and vulnerability[31].

Asset grouping: The Community has a large number of assets, and many of the assets share functional commonalities that put them into the same risk categories. These categories have been identified to obtain a good representation of risk and the effectiveness of management measures based on a subset of assets, rather than to show a very long list of assets with comparable outcomes.

In the interest of efficiency and clarity, similar or related components are grouped as a single asset as much as possible because they experience the same effects from storm events and have similar vulnerabilities. For example, resources with similar uses and geographic locations are grouped as a single asset instead of listing each resource individually.

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

Exposure scores were calculated as an expression of the local topographic and shoreline conditions that tend to increase or decrease the effects of coastal hazards on assets. More exposed assets suffer storm effects to a greater degree than assets located at a higher elevation. A series of landscape attributes were used to calculate a total landscape attribute score, which includes the following quantifiers of the landscape for each asset:

- Does the asset have an erosion rate greater than or equal to one-foot per year or unknown?
- Is the waterline frequently at shore defense or upland vegetation?
- Are shore defenses absent, not constructed to anticipated conditions, or deteriorating?
- Is protective vegetation between asset and flood source absent?
- Are dunes absent, below base flood elevation, eroding; bluff slope unstable, little vegetation?
- Is the asset on coastal barrier island or filled wetland?

Vulnerability scores are an expression of the capacity of an asset to return to service after a storm. Assets that can quickly recover have a low vulnerability score.

The risk assessment tool calculated a risk score using the formula:

Hazard x Exposure x Vulnerability = Risk

The tool generated a risk score, which represents the relative risk of Community assets to one another. The scores can range from 1.5 (negligible) to 75 (severe).

Risk assessment results

An initial risk assessment was completed on the at-risk assets identified during the asset inventory. Using the risk assessment tool, risk scores were calculated for each of the assets.

Table 6 (Asset Groups) and Figure 15 show the results of the initial risk assessment.

Full details and all information, including address and community, for the asset inventory are contained in Section V. Table 6 identifies the asset groups established to represent the 109 assets contained in the inventory.

Table 7 shows asset risk scores. The total risk scores for NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle range from 18 to 67.5. The Bay Park Sewage Treatment Plant, PSEG Long Island Power Station, and all marinas received the highest risk scores.

The majority of assets with the highest risk scores are the assets that were most affected by Superstorm Sandy because of their location within an extreme risk area and high vulnerability. These assets include those listed above plus the Village of Island Park Public Works, parks and beaches, commercial and industrial areas, Island Park Village Hall, Oceanside Schools 9E and 9M, Francis X. Hegarty Elementary School, Lincoln Orens Middle School, and the Long Island Rail Road (LIRR) electrical substation.

Those assets with the highest risk scores, in the severe category, are in the most jeopardy of damage from future storm events. As projects were evaluated, the impacts to assets by the individual projects were gauged through the risk tool to evaluate the reduction in risk and subsequent increase in resiliency as a result of the project development. A summary of the

risk reduction findings for each project is included in the project descriptions in Section IV.

The assets with the largest community impacts, in terms of future risk, tend to fall in two key categories: infrastructure and economic development districts. Bay Park Sewage Treatment Plant and the LIPA/PSEG Long Island Power Station had the highest risk scores for the Community, placing them in the severe category. Other assets in the severe category include the LIRR electrical substation, the Hampton Road and Lawson Boulevard Industrial Districts, all Community marinas, single-family housing in Barnum Island, the Village of Island Park, and Harbor Isle, and system assets for sanitary sewer and stormwater drainage systems. Many of these assets are FEMA critical facilities and were the first to fail during Superstorm Sandy. A combination of Bay Park Sewage Treatment Plant, power plant, and sanitary sewer and stormwater systems failures have been attributed by local leaders to be the primary cause for subsequent failures to other assets through surface flooding (Island Park bowl and Grand Canal) and loss of power.

Many other assets had risk scores in the high category, which ranges in risk score from 24 to 53. Risk scores in this category are indicative of conditions that could lead to significant negative outcomes from a storm. Assets in the high category included all beaches, business districts in Oceanside and the Village of Island Park (Lawson Boulevard and Long Beach Road), Village of Island Park government services, libraries and post offices, community facilities, emergency response facilities, multi-family housing south of Windsor Parkway, all schools, all parks and recreation facilities, Village of Island Park Senior Housing, both LIRR stations, and system assets for roadways, water systems, and single-family housing in Oceanside. Out of a total 109 identified assets, 73 were categorized as high or severe risk.

Long Beach Road, the Village of Island Park
Source: URS

Table 6: Asset groups

Asset	Risk Area	Risk Score
Assisted living, PSCH Island House and South Point Plaza Nursing & Rehab	High	**High**
Beaches	Extreme	**High**
Economic / commercial districts – Island Park, Long Beach Rd, Lawson Blvd	Extreme	**High**
Economic / industrial districts – Hampton Rd, Lawson Blvd, Island Park	Extreme	**Severe**
Government / civic – Village Hall, IP FD Exempts Hall, libraries, post offices	Extreme	**High**
Community organizations – American Legion, community centers, Knights of Columbus, VFW 5199, Sacred Heart Parish Center	Extreme	**High**
Emergency response - Island Park, Barnum Island, Harbor Isle – BI Fire, IP FDHQ, IP FD Training	High	**High**
Emergency response Oceanside – Maintenance, Engine 1, HQ, Hose 1-3	High	**High**
Fueling stations	High	**Moderate**
Healthcare – South Nassau Communities Hospital, Dialysis Center	Moderate	**Moderate**
Apartments & condominiums	Extreme	**High**
Marinas	Extreme	**Severe**
Schools	High	**High**
Sanitary sewer & stormwater drainage – Bay Park STP, TOH Sanitation D7, IP Public Works, system-wide sanitation and storm sewer	Extreme	**Severe**
System-wide telecommunications	Extreme	**High**
System-wide water systems	High	**High**
Power – LIPA/PSEG and LIRR electrical substations	Extreme	**Severe**
Parks & recreation	Extreme	**High**
Religious organizations	High	**Moderate**
Senior housing	High	**High**
Senior services – Oceanside Care Center	Moderate	**Moderate**
Transportation system – Austin Blvd evacuation route, LIRR IP and Oceanside, system-wide roadways	Extreme	**High**
Single-family housing Oceanside	High	**High**
Single-family housing Island Park, Barnum Island, Harbor Isle	Extreme	**Severe**

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 15: Community asset risk scores

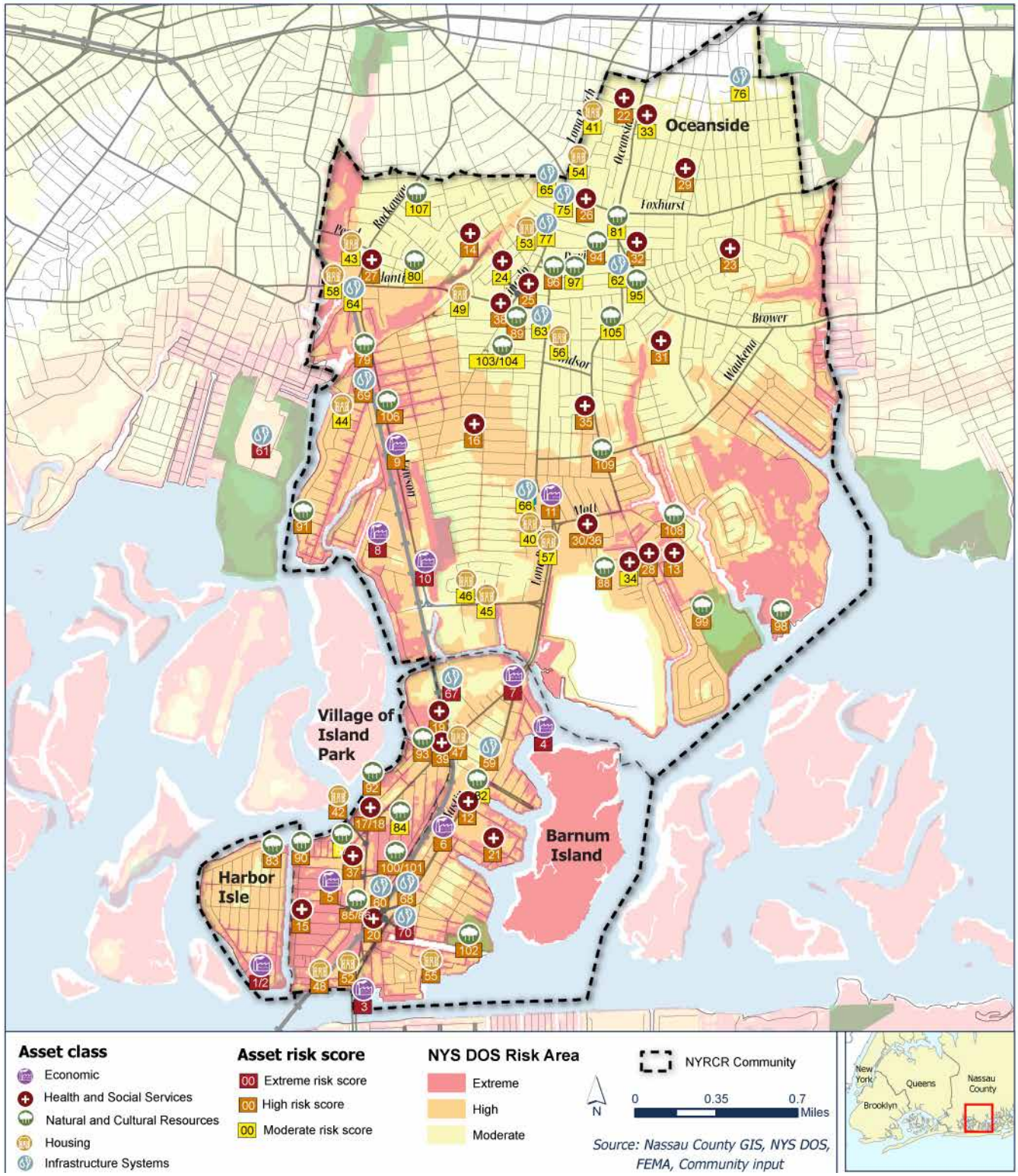


Table 7: Community asset risk scores

	Economic		
	Asset name	**Risk Area**	**Risk score**
1	Aero Marine	Extreme	**Severe**
2	Andy's Marina	Extreme	**Severe**
3	Bridgeview Yacht Club	Extreme	**Severe**
4	Empire Point Marina	Extreme	**Severe**
5	Island Park Business District	Extreme	**High**
6	Island Park Industrial District	High	**High**
7	K&K Marina	Extreme	**Severe**
8	Oceanside Hampton Rd industrial district	Extreme	**Severe**
9	Oceanside Lawson Blvd economic corridor	Extreme	**High**
10	Oceanside Lawson Blvd industrial district	Extreme	**Severe**
11	Oceanside Long Beach Rd economic corridor	Extreme	**High**
	Health and Social Services		
	Asset name	**Risk Area**	**Risk score**
12	Barnum Island Fire District	High	**High**
13	Oceanside Schools #9E and #9M	High	**High**
14	Florence Smith School #2	Moderate	**High**
15	Francis Hegarty Elementary School	High	**High**
16	Fulton Avenue School #8	High	**High**
17	Island Park FD Exempts Hall	High	**High**
18	Island Park FD Headquarters	High	**High**
19	Island Park Fire Department Training Facility	High	**High**
20	Island Park Village Hall	Extreme	**High**
21	Lincoln Orens Middle School	High	**High**
22	North Oceanside School #5	Moderate	**High**
23	Oaks School #3	Moderate	**High**
24	Oceanside Care Center Inc.	Moderate	**Moderate**
25	Oceanside FD Engine 1	High	**High**
26	Oceanside FD Headquarters	Moderate	**High**
27	Oceanside FD Hose 1	Moderate	**High**
28	Oceanside FD Hose 2	High	**High**
29	Oceanside FD Hose 3	Moderate	**High**
30	Oceanside FD Maintenance Bldg	High	**High**
31	Oceanside High School #7	Moderate	**High**

*** Denotes System Asset**

Table 7: Community asset risk scores, continued

	Health and Social Services		
	Asset name	**Risk Area**	**Risk score**
32	Oceanside High School Castleton #6	Moderate	**High**
33	South Nassau Communities Hospital	Moderate	**Moderate**
34	South Nassau Dialysis Center	High	**Moderate**
35	South Oceanside School #4	High	**High**
36	TOH Sanitation District 7	High	**High**
37	U S Post Office Island Park	Extreme	**High**
38	U S Post Office Oceanside	Moderate	**High**
39	Village of Island Park Department of Public Works	High	**High**
	Housing		
	Asset name	**Risk Area**	**Risk score**
40	Alhambra Condos	High	**Moderate**
41	Bishop Kellenberg Garden Apts	Moderate	**Moderate**
42	Island Park Senior Housing	High	**High**
43	Mill River Gardens Apartments	High	**Moderate**
44	Ocean Harbor Apartments	High	**Moderate**
45	Oceanside Cove Co-ops	High	**Moderate**
46	Oceanside Knolls Apartments	Moderate	**Moderate**
47	PSCH Island House	High	**High**
48	Regency Apartments	Extreme	**High**
49	Sherwood Townhouse Apartments	Moderate	**Moderate**
50*	**Single-Family Housing Island Park, Barnum Island, Harbor Isle**	**Extreme**	**Severe**
51*	**Single-Family Housing Oceanside**	**High**	**High**
52	South Point Plaza Nursing and Rehabilitation Center	High	**High**
53	Summit Apartments	Moderate	**High**
54	The Glen Apartments	Moderate	**High**
55	The Yacht Club	Extreme	**High**
56	Theresa Gardens Apartments	Moderate	**High**
57	Valley Town House Apartments	Moderate	**High**
58	Woodcrest Apartments	High	**High**

*** Denotes System Asset**

Table 7: Community asset risk scores, continued

	Infrastructure Systems		
	Asset name	**Risk Area**	**Risk score**
59	Austin Boulevard evacuation route	Extreme	**High**
60	Auto Spa	High	**High**
61	Bay Park Sewage Treatment Plant and pump stations	Extreme	**Severe**
62	BP Gas Station	Moderate	**Moderate**
63	Gulf Oceanside Gas Station	Moderate	**Moderate**
64	Hess Gas Station	High	**Moderate**
65	Hess Gas Station	Moderate	**Moderate**
66	Kings Oceanside C Store Gas Station	High	**Moderate**
67	LIPA/PSEG E.F. Barrett Power Station	Extreme	**Severe**
68	LIRR Island Park Station	Extreme	**High**
69	LIRR Oceanside Station	Extreme	**High**
70	LIRR electrical substation	Extreme	**Severe**
71*	**Multi-community roadways**	**High**	**High**
72*	**Sanitary sewer systems**	**Extreme**	**Severe**
73*	**Storm sewer systems**	**Extreme**	**Severe**
74*	**Telecommunications**	**Extreme**	**Severe**
75	USA Gasoline Gas Station	Moderate	**Moderate**
76	USA Gasoline Gas Station	Moderate	**Moderate**
77	Valero Gas Station	Moderate	**Moderate**
78*	**Water systems**	**High**	**High**

*** Denotes System Asset**

Table 7: Community asset risk scores, continued

	Natural and Cultural Resources		
	Asset name	**Risk area**	**Risk score**
79	American Legion Post 1246	Extreme	**High**
80	First Methodist Church	Moderate	**Moderate**
81	First Presbyterian Church	Moderate	**Moderate**
82	Full Gospel Church	High	**Moderate**
83	Harbor Isle Beach	Extreme	**High**
84	Island Park Greek Orthodox Church	High	**Moderate**
85	Island Park Jewish Center / Soul Stirring Church	High	**Moderate**
86	Island Park Library	High	**High**
87	Island Park United Methodist Church	High	**Moderate**
88	JCC	High	**High**
89	Knights Of Columbus	Moderate	**High**
90	Little Beach	Extreme	**High**
91	Margie Street Park	Extreme	**High**
92	Masone Beach	Extreme	**High**
93	Mayor Landgraf Park	Extreme	**High**
94	Oceanside Community Center	Moderate	**High**
95	Oceanside Jewish Center	Moderate	**Moderate**
96	Oceanside Library	Moderate	**High**
97	Oceanside Lutheran Church	Moderate	**Moderate**
98	Oceanside Marine Nature Study Area	Extreme	**High**
99	Oceanside Park	Extreme	**High**
100	Sacred Heart Parish Center	High	**High**
101	Sacred Heart Roman Catholic Church & Rectory	High	**Moderate**
102	Shell Creek Park	High	**High**
103	St Andrews Episcopal Church	Moderate	**Moderate**
104	St Anthonys Church	Moderate	**Moderate**
105	Temple Avodah	Moderate	**Moderate**
106	VFW Post 5199	Extreme	**High**
107	Windsor Avenue Bible Church	Moderate	**Moderate**
108	Wrights Field	Extreme	**High**
109	Young Israel of Oceanside	Extreme	**High**

*** Denotes System Asset**

Assessment of risk to systems

NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle system assets have been identified as individual assets. Refer to the risk assessment results section above and Figure 13, the map of asset risk scores, for context on how the system assets fit into the overall Community.

Systems assets are shown in Table 8 and summarized below.

- **Sanitary sewer and stormwater drainage:** The risk score for this system, which is located both within and outside the Community boundaries, is severe. As discussed in the asset risk section, the Community is low-lying and assets, such as the Bay Park Sewage Treatment Plant, sanitation areas, and public works departments, are prone to extreme risk in the event of a high-magnitude storm. The sanitary sewer and stormwater drainage systems in all four communities include catch basins, pipes, inlets, outfalls, pumps, and associated infrastructure. The identification of this system as at severe risk recognizes the need for an assessment to determine capital improvements needed to restore the system to pre-Irene conditions and improve its capacity to address sea level rise and extreme weather events. Until improvements are made the Community remains vulnerable at this time as facilities are below grade and cannot be discharged when they are below the tide.
- **Telecommunications:** The risk score for this system, which is located both within and outside the Community boundaries, is high. This system comprises telephone lines, poles, cellular towers and antennas, specialized emergency services communications radios, and other associated infrastructure. The telecommunications systems in the Community did not perform at a desired level during and after Superstorm Sandy as they are located in extreme risk areas and the lack of a coordinated effort between the communities to maintain a viable line of communication. Until improvements are made, telecommunications assets along major roadways, the LIRR, and in low-lying areas, are at risk for extended outages without adequate equipment, training, and personnel.
- **Water systems:** The risk score for this system, which is located both within and outside the Community boundaries, is high. This system comprises pipes, pumps, and other associated

Table 8: Risk assessment results for systems asset groups

System Name	Risk Area	Asset Type	Risk Score
Sanitary sewer & stormwater drainage – Bay Park STP, TOH Sanitation D7, IP Public Works, system-wide stormwater drainage	Extreme	Wastewater	**Severe**
System-wide telecommunications	Extreme	Telecommunications	**High**
System-wide water systems	High	Water Supply	**High**
Transportation system – Austin Blvd evacuation route, LIRR IP and Oceanside, system-wide roadways	Extreme	Transportation	**High**
Single-family housing Oceanside	High	Single-Family Residence	**High**
Single-family housing Island Park, Barnum Island, Harbor Isle	Extreme	Single-Family Residence	**Severe**

infrastructure related to delivery of water. Water systems in the Community are comparable to stormwater systems with respect to potential risk and similar coverage area through each of the four communities. Locations for the water infrastructure, while at high risk, are not in risk areas as severe as stormwater facilities and the functional capabilities of these systems are not affected as much by storm events.

- **Transportation:** The risk score for this system, which is located both within and outside the Community boundaries, is high. This system comprises roadways, rail roads, buses, water-based travel ways, bicycle and pedestrian facilities, and associated open space required for safe and efficient travel through the Community. Transportation systems play a critical role in the viability of the Community, especially in Barnum Island, the Village of Island Park, and Harbor Isle. The main evacuation corridor for the region is Austin Boulevard, which bisects the Community. The vulnerability score is not as high as other systems as transportation facilities tend to recover faster as a result of their community priority and connection to so many resources and assets. The extreme risk areas of these four communities have a number of important roadways that are low-lying and prone to flooding.
- **Single-family housing:** Single-family housing was defined as a high priority for this Community and the Committee decided to split the system into two sections—one that includes Oceanside and one that includes the three southern communities. The risk scores for these two systems, which are located within the Community boundaries, are high and severe, respectively. The Oceanside system has a number of vulnerable areas interspersed with higher-elevation areas that have a lower probability of storm damage. The southern communities' system is located primarily in a bowl that has inadequate drainage, improper access, and remains in poor condition after both severe storm conditions and normal tidal events.

Bay Park Yacht Harbor, Oceanside
Source: URS

B. Assessment of needs and opportunities

Superstorm Sandy, Hurricane Irene, and previous storm events highlighted a number of areas where the Community can make improvements to bolster its resiliency against future storm events.

The primary focus of identifying these needs and related opportunities is to make the Community better prepared for future storm events. Opportunities identified in this section emerged from the Committee meetings and the public process (documented in Section V of this plan) and were broadly supported by both the Committee and the public.

Community planning and capacity building

The Community Planning and Capacity Building Recovery Support Function addresses the Community's ability to implement storm recovery activities and to plan to mitigate the effects of future storms.

Community planning and capacity building needs

Emergency response capabilities and access to power are the Community's greatest needs.

Emergency response

Effective emergency response, particularly in the first 96 hours following an emergency, has been identified by the Committee as a critical need. The Island Park Fire Department experienced many challenges to achieving this emergency response effectiveness following Superstorm Sandy, including a lack of centralized communications, staging areas, and other components of a coordinated response protocol. Key elements of the need include a base of operations for emergency personnel, centralized locations to provide support and distribute emergency supplies to residents, and a comprehensive radio and cellular communications system.

Some Oceanside fire stations were not physically able to withstand floodwaters during Superstorm Sandy. Buildings flooded and equipment was damaged. Volunteer emergency responders came from outside the area to provide assistance, but Oceanside lacked

Second Public Engagement Event
Source: Sustainable Long Island

facilities to support their activities.

The Village of Island Park Firehouse sustained substantial damage during Superstorm Sandy. The building flooded, causing damage to the electrical and mechanical systems and several vehicles were lost. The foundation may have suffered structural damage, although a structural analysis has not yet been completed. There were 150 fire fighters from outside the area that came to help in Island Park, and there was not adequate space to house the volunteers.

Key resiliency needs for this facility include:

- Conditions assessment and a structural analysis to determine the serviceability of the building to undergo upgrades or replacement;
- Relocation of interior and exterior mechanical and electrical equipment above projected flood heights;
- Installation of flood protection measures to limit infiltration and protect the building and equipment;
- Installation of facilities to serve out-of-area emergency responders; and,
- Elevated staging areas near the firehouse for firefighting and rescue vehicles.

The Village of Island Park former Village Hall

Source: URS

Access to power and fuel

Continuous access to electrical power and natural gas during and after an emergency is a critical issue. Power outages were widespread during and after Superstorm Sandy. Residents and businesses went without electricity for up to four weeks and without natural gas for up to three weeks. Even those with generators went without power because fuel to run the generators was not available, either because gas stations did not have power to pump the fuel or because of fuel delivery interruptions.

Resilient structures

Structures occupied by emergency response groups throughout the Community are built at elevations below the 100-year floodplain, also called the base flood elevation, and are subject to frequent flooding. Superstorm Sandy highlighted these deficiencies and made residents aware of the need for better planning. Zoning and building codes must require that new construction and reconstruction of existing structures be storm-resistant.

Community coordination

Superstorm Sandy demonstrated the need for designated neighborhood community centers and other facilities such as schools, fire stations, and government centers to act as community assistance centers for residents in times of crisis.

Communications

Continuous access to communications systems, such as cellular networks and a community-wide wireless network, are vital for Community residents during emergencies.

Government coordination

Bayfront protection, revitalization, and waterfront usage is an important community planning issue to help the Community rebuild better and stronger. Future efforts will require coordination with the Town of Hempstead.

Community planning and capacity building opportunities

Emergency response

Fire departments and emergency responders throughout the Community are rebuilding and expanding emergency response facilities as well as increasing their capacity to respond effectively to future emergencies. Remaining gaps should be filled by the construction of resilient emergency response facilities; purchase of equipment, including generators; development of communications infrastructure; construction of facilities to serve out-of-area emergency responders; and purchase of emergency response vehicles.

The Community could utilize a current resource for increasing awareness about emergency preparedness at the household level. The Citizen Preparedness Corps Training Program is a short training to provide citizens with the tools and resources to prepare for emergencies and disasters, respond accordingly, and recover as quickly as possible. Governor Cuomo attended a Citizen Corps training event in Nassau County on February 22, 2014 that was attended by more than 500 residents.[32]

Governor Cuomo also recently announced the launch of a new website, NYS Prepare (www.prepare.ny.gov), to serve as the digital home for the Citizen Preparedness Corps community. The website will offer information about additional trainings, disaster preparedness tips, and ways to volunteer in the event of a disaster. Another program to consider is the Nassau County Community Emergency Response Team (CERT), which is a federally funded, community-based program that provides training and ongoing education to better prepare communities and individuals to respond to emergency situations. When an emergency or disaster happens, CERT members can give critical support to first responders and provide immediate assistance to their community within a coordinated, collaborative, and organized effort.

Power supply

When LIPA's E.F. Barrett Power Station failed during Superstorm Sandy, New York State recognized that the management and operation of power utilities on Long Island required reform. In response, the State reformed LIPA, and shifted operations from the National Grid to PSEG Long Island effective January 1, 2014.[33]

LIPA/PSEG Long Island Terminal
Source: URS

In October 2013, Governor Cuomo announced $72 million in Federal funding to elevate electrical substations on Long Island, including the E.F Barrett Substation.[34] In February 2014, Governor Cuomo announced $1.4 billion in Federal Emergency Management Agency (FEMA) funds for upgrades and repairs to make Long Island's electrical infrastructure more resilient to future extreme weather events. Roughly half of the FEMA funds, $705 million, will go to repairing damage to the electrical grid. The remaining $730 million will be used to protect the grid from future storms.[35]

In addition to working with New York State and PSEG Long Island to address power failures in the electric grid, the Community supports exploring alternative energy generation and distribution models to decrease reliance on centralized power generation facilities during emergencies. The former Oceanside Landfill could be a potential location for alternative power generation. The currently vacant former CIBRO

petroleum terminal in Harbor Isle may also present an opportunity to support alternative power generation as an interim use.

Access to fuel

To address access to gasoline, New York State passed the Fuel NY Initiative in October 2013, requiring gas stations within one-half mile of a highway exit or hurricane evacuation route to deploy and install a generator within 24 hours of losing power during an emergency.[36]

To protect residents and businesses from future storms, zoning and building codes for the Town of Hempstead and the Village of Island Park could be amended to support more resilient reconstruction methods for residential, commercial, and public structures, including gas stations and fuel storage tanks. Techniques should include:

- Elevating the structure above the base flood elevation;
- Designing the building foundation and any portions subject to flooding to withstand flood conditions and flood loads;
- Using flood-damage-resistant materials for any portions of the building below the base flood elevation; and,
- Floodproofing the structure to seal water out or to allow water to flow through lower level(s) without damaging the structure.

Economic development

The economy of Barnum Island, Oceanside, the Village of Island Park, and Harbor Isle is driven by its numerous industrial and commercial corridors, which encompass more than 20% of the land area in this Community. Local businesses are a significant economic driver, with nearly 1,400 establishments that employ over 13,000 workers, with an annual payroll of close to $575 million in 2011.[37]

Economic development needs

Recovery

Superstorm Sandy had a severe impact on local businesses. Based on Small Business Administration data, business losses amounted to more than $44 million in the Community, although total approved loans only covered 42% of these losses.[38] This may mean that businesses affected by flooding are still struggling to recover from Superstorm Sandy, and many businesses throughout the Community were destroyed and may not be rebuilt.

Continuity

Businesses need to develop backup power systems and plans for continuing operations in the period following major events where business is affected.

Connections

Developing a transit-oriented walkable neighborhood focused around downtown Island Park, the LIRR station, and Austin Boulevard would provide local business with options for connecting to patrons and create linkages between neighborhoods and that waterfront that have been previously separated.

Economic development opportunities

New development

Opportunities for new development are numerous. They include developing underutilized properties zoned for business and industrial uses along major corridors, as well as redeveloping several large parcels in Oceanside and Island Park (Figure 16).

Reconstruction

Opportunities for reconstruction include protecting of the Community's economic assets and actively supporting small businesses to reopen and grow. As expressed by the Committee and local residents, supporting economic development will require improving infrastructure assets and systems to protect them from flooding and rebuilding to resilient standards.

Business growth

Improving the aesthetics and resiliency of commercial corridors will support the local economy. Attracting new businesses on vacant or underutilized parcels that are currently zoned for business uses can support existing businesses by creating more cohesive, clustered business corridors and districts that attract additional economic activity to the Community.

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 16: Community economic development areas

Specific opportunities identified by the Committee include:

- Expand water-dependent and water-related industrial, commercial, residential, and mixed-use development in the Oceanside industrial area along Lawson Boulevard and Hampton Road.
- Implement a Main Street Revitalization Program along the Long Beach Road downtown corridor in Island Park.
- Develop water-dependent and water-related residential, commercial, and mixed-use development along Wreck Lead. Provide pedestrian, bicycle, and vehicular connections to downtown Island Park and the Island Park LIRR station area to expand the economic health of the Village of Island Park.

Health and social services

Health and social services needs

Public facilities, including schools, municipal buildings, and firehouses were hard hit by Superstorm Sandy and remain vulnerable to future storm events.

Several schools in the Community, including Francis X. Hegarty School and Oceanside Schools 4, 8, 9E and 9M, were impacted by the flooding because of their vicinity to open water and poorly functioning stormwater drainage systems. Following Superstorm Sandy, the Island Park Firehouse and Francis X. Hegarty School were used for emergency staging. In Oceanside, one school was a used as a feeding and warming station and three firehouses were emergency staging areas. The Community is formalizing the role of its schools as feeding stations and emergency supply distribution centers in emergency recovery efforts.

Generators

Resources are needed to continue relocating emergency generators to upper floors in critical facilities to maintain power and functionality during future hazard events.

Relocation

Storage and/or relocation of equipment and apparatus above the level where flooding typically occurs, is needed so the fire department can use its equipment during emergency situations.

Francis X. Hegarty School, the Village of Island Park

Source: URS

Resiliency

Superstorm Sandy rendered many emergency response facilities inoperable. While emergency responders performed admirably given the loss of important facilities and equipment, it is clear that additional resiliency efforts are needed to maintain emergency response functions in future events.

The Community includes eight senior facilities, including housing, nursing homes, and residential rehabilitation facilities, including:

- PSCH (Promoting Specialized Care and Health) Island House;
- South Point Plaza Nursing and Rehabilitation Center;
- Island Park senior housing;
- Oceanside Knolls Apartments;
- Mill River Gardens Apartments;
- Bishop Kellenberg Garden Apartments;
- Theresa Gardens Apartments; and,
- Oceanside Care Center, Inc.

These facilities are typically evacuated prior to storm events to protect vulnerable residents. Where needed, these facilities should be made more resilient to future storm events to speed the return of vulnerable populations to their homes and supportive services as soon as is safe following an emergency.

Health and social services opportunities

Rebuilding offers opportunities to protect critical facilities so their functions can be maintained during storm events.

Floodproofing

Community centers should be floodproofed and protected from wind damage. Fire stations and Island Park Village Hall should be floodproofed and protected from wind damage to ensure that these facilities remain operational during emergencies.

Special needs

Special needs registrations should be established so that socially vulnerable populations (elderly, disabled, and low-income residents) can identify themselves

Oceanside Care Center, Oceanside

Source: LiRo Group

and receive needed services during emergencies, including assistance with evacuation, transportation to inland hospitals if on a respirator, etc. Coordination with special needs registration efforts could be coordinated with Nassau County OEM.

Housing

Although housing conditions in the Community were relatively strong prior to Superstorm Sandy, the devastation created by the storm continues to have an impact on residents, homeowners and renters alike, and especially those in vulnerable populations, including low- and moderate-income families, seniors, and the disabled, who face additional challenges during reconstruction.

Housing needs

According to the U.S. Census, there were a total of 15,840 housing units in the NYRCR Community in 2012. Of these 14,986 were occupied, 12,925 by owners and 2,061 by renters.[39] According to FEMA, more than 7,700 housing units in the Community were heavily damaged during Superstorm Sandy.[40] These numbers imply that more than half of homes throughout the Community were damaged.

Resiliency advice

Homeowners and renters need guidance on how best to protect their homes from future damage and maintain eligibility for financial assistance to rebuild.

Special needs

As housing is rehabilitated, it should be made more accommodating to seniors and those with disabilities.

Tax base

Where appropriate, additional housing types, including multi-family and mixed-use options, should be evaluated to help increase the tax base and attract young professionals.

Housing opportunities

Opportunities include implementing resilient construction methods, as identified in the Community Planning and Capacity Building section, to increase emergency response capacity and return residents to their homes sooner after future flooding events.

Accessibility

Publicly funded reconstruction is required to comply with the provisions of the Americans with Disabilities Act (ADA), which means that the resulting projects will increase the number of accessible housing units, commercial buildings, and community facilities. Senior and public housing developments should have flood and wind protection so that residents can return as quickly as possible to their homes when evacuations are needed.

Financial resources

Identifying and creating access to as many housing-related financial resources as possible and distributing critical information to the public is an important goal.

Agency coordination

Coordination with State and Federal agencies could occur to simplify the grant application process by having a single application or a clearinghouse for all government grant programs.

Sustainability

Building owners and homeowners should be encouraged to seek opportunities to increase energy efficiencies and sustainability as buildings and homes are rebuilt.

Infrastructure

Infrastructure needs

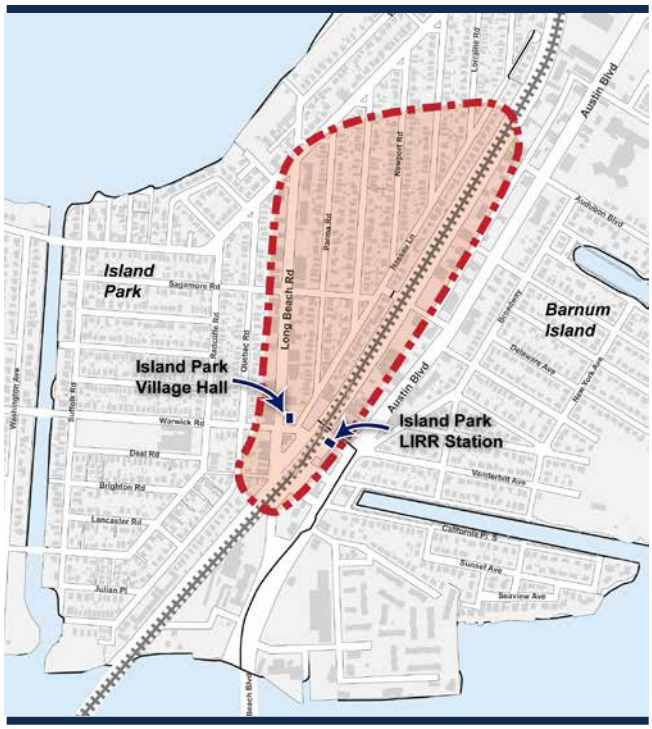
The Committee identified the most significant need as protection from flooding, both tidal flooding caused by tidal surges and storm flooding caused by storm events. Repairs and improvements to the Bay Park Sewage Treatment Plant and area roadways were also identified as important to the long-term health and resiliency of the Community.

Stormwater and tidal flooding

The inability of stormwater to drain is a major issue for the Community. Many outfalls are located below the high-tide line so that tidal water blocks drainage and backs up into the stormwater system, resulting in flooding during normal heavy rainfalls and high tide events and catastrophic system failures during major storm events.

The Community's stormwater systems were damaged during Superstorm Sandy and Hurricane Irene.

Figure 17: The Village of Island Park "bowl"



The Village of Island Park "bowl" area prone to flooding

The system's capacity and structural integrity has been compromised due to the volume of debris and sediment remaining from floodwaters and the potential undermining of drainage structures. Locations throughout the systems where sand and debris block drainage of runoff were identified during field visits completed by the Consultant Team during the planning process as well as through conversations with municipal staff and community members.

Municipal staff, Committee Members, and Community members cited instances of tidal backflow into the system, with sea water coming up out of stormwater catch basins during high-tide events, surges, and flooding. During Superstorm Sandy, the combination of tidal surge and a high volume of runoff completely shut down the stormwater infrastructure, causing widespread flooding.

The Village of Island Park has installed backflow preventers on most village outfall pipes, but they have not been installed in most of Barnum Island, Oceanside, and Harbor Isle. Storm backflow preventers are needed throughout the Community to prevent tidal flooding of the stormwater system.

The central core of the Village of Island Park between Austin Boulevard and Long Beach Road, identified in Figure 17, is at a lower elevation than the surrounding area. This has created what is locally described as a "bowl" that regularly floods from high tides and normal storm events. This area was inundated with six- to eight-feet of sea water during Superstorm Sandy.

Tidal waters breach shorelines and back up into area streams to cause flooding throughout the Community during high tide events and moderate storms. Specific trouble areas in the Community include the southern tip of Harbor Isle, Bedell Creek, Grand Canal, California Place Canal, Hog Island Channel, Wreck Lead, Shell Harbor, and Island Park Canal (Figure 18).

Portions of the Community, Barnum Island, Island Park, Harbor Isle, and Oceanside south of Windsor Parkway, contain extended low-lying areas where no simple or obvious solution to tidal flooding exists.

Inadequate height and deteriorated condition of bulkheads, as well as the naturally low elevations, was demonstrated during Superstorm Sandy. Bulkheads along the shore, especially on the western edge of Harbor Isle and the eastern edge of Barnum Island,

are discontinuous and have variable elevations. New bulkheads, bulkhead improvements, and similar types of protection measures are needed on the hardened shoreline.

Sanitary sewer

The Bay Park and Long Beach Sewage Treatment Plants failed and were heavily damaged during Superstorm Sandy. The Bay Park Sewage Treatment Plant serves 40% of Nassau County,[41] including the Community, and is located adjacent to it in Bay Park. The City of Long Beach's Sewage Treatment Plant is located on the bay shore across Reynolds Channel from Harbor Isle.

Nassau County is planning sewage treatment improvements in the region to improve service operations and water quality. The proposed approach includes combining the Bay Park and Long Beach plants. Under the proposed improvements, the existing Long Beach Plant would be used as a pump station to transfer waste water to Bay Park, where it would be treated. The Community is concerned about Bay Park Sewage Treatment Plant deficiencies and how vulnerable it is against future storms. During normal operations, the plant discharges into Reynolds Channel, degrading water quality and damaging marshland.

Road network

The Community has four north/south thoroughfares, providing access and egress on a daily basis and during emergencies; they include Long Beach Road, Lawson Boulevard, Austin Boulevard, and Oceanside Road. Each experiences flooding during even moderate storm events (Figure 19). As mentioned for stormwater systems, the drainage in these communities cannot accommodate a Superstorm Sandy-equivalent event. During Superstorm Sandy, the transportation network failed as there was no place for the water to go except the travel corridors. Important east/west streets that experience flooding include Waukena Avenue in Oceanside, Empire and Kingston Boulevards in Barnum Island, and Warwick Road in the Village of Island Park and Harbor Isle. Improved stormwater drainage on these roadways is needed.

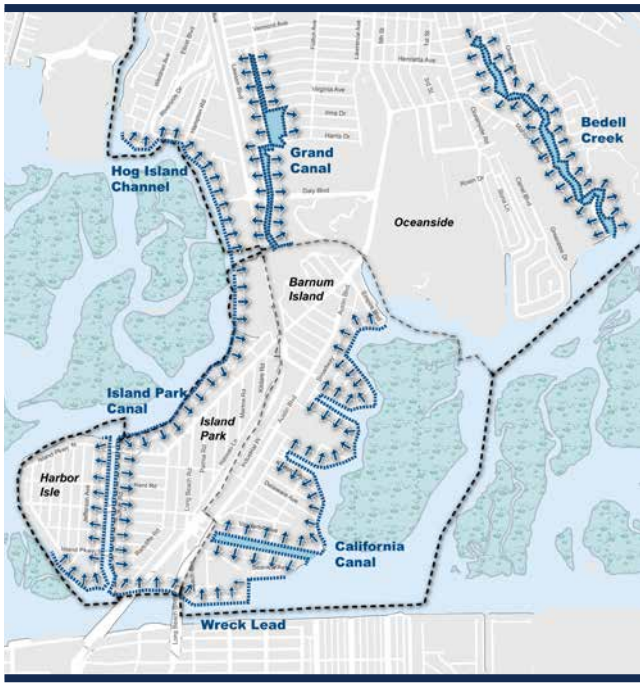
In addition to roadway drainage needs, Barnum Island, the Village of Island Park, and Harbor Isle need an improved internal east-to-west connection. Downtown Island Park functions as the civic center for all three communities, and Barnum Island contains many of the communities' schools and parks. However, Barnum Island is cut off from its neighbors to the west by Austin Boulevard and the Island Park LIRR tracks. New multi-modal street connections and streetscape enhancements are needed to improve east/west access for all modes of transportation and to enhance pedestrian and bicycle accessibility and safety.

Infrastructure opportunities

Stormwater and tidal flooding

The Community's stormwater system failed during Superstorm Sandy. A comprehensive stormwater management plan is needed to identify solutions specific to geographic areas of flooding and for the Community as a whole. The plan will identify best management practices to control runoff, identify important tidal barriers, and integrate potential solutions into a broader regional context that

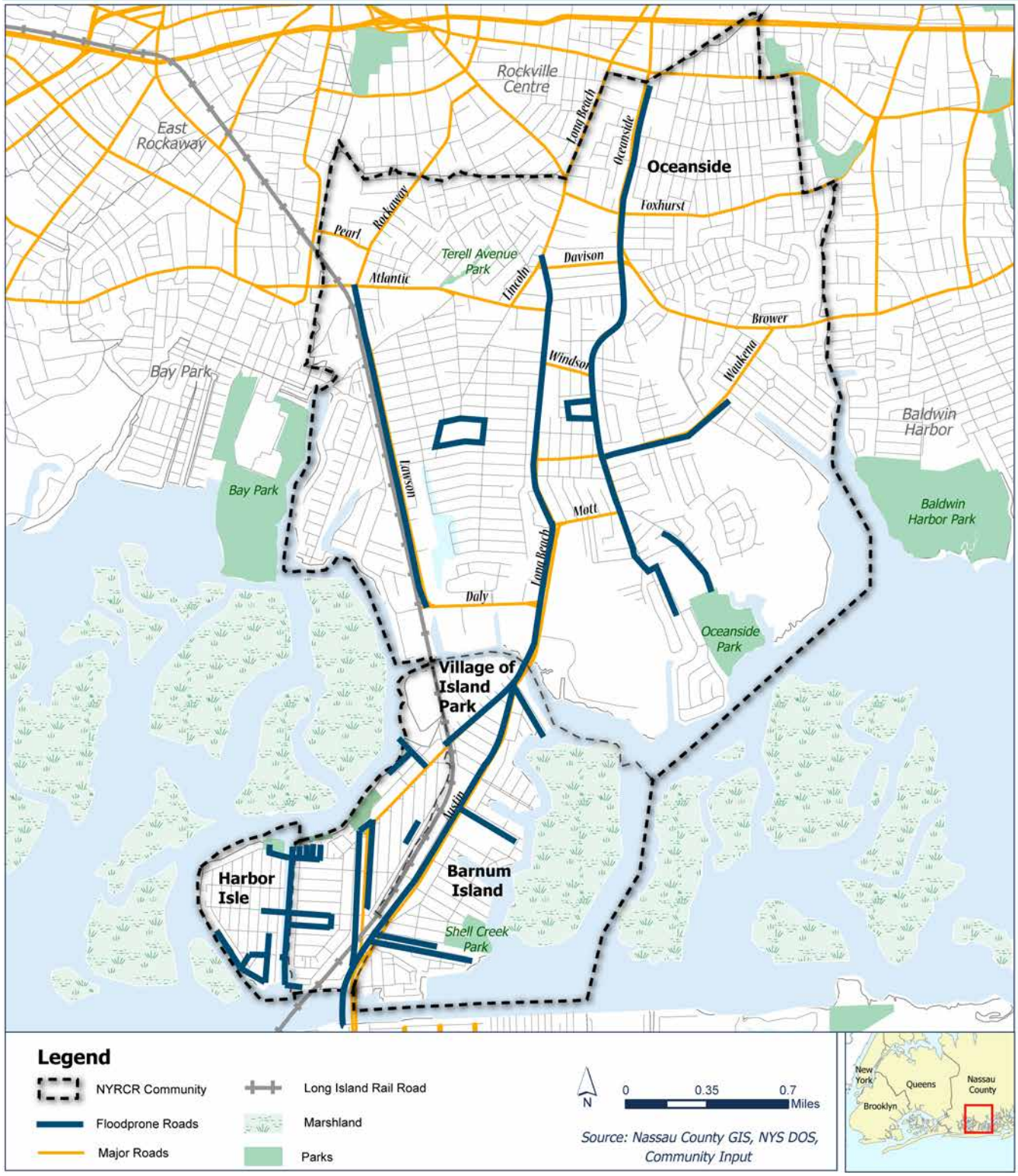
Figure 18: Vulnerable shorelines



Vulnerable shorelines
NYRCR Community

Barnum Island/Oceanside/the Village of Island Park/Harbor Isle

Figure 19: Community roadways



considers the planned actions by Nassau County, the Town of Hempstead, and adjacent communities.

Repairs and reconstruction after Superstorm Sandy offer the opportunity for the Community to implement stormwater best management practices and introduce green infrastructure, such as bioswales, porous paving, and rain gardens to assist with stormwater management.

Periodic inspection of storm drains and outfalls, bulkheads, and backflow prevention devices is an opportunity to make sure the system remains fully functional.

Wastewater

The Bay Park Sewage Treatment Plant was overwhelmed by Superstorm Sandy, was offline for more than two days, and not yet fully recovered. Discharges from the plant were released directly into Hog Island Channel. There have been numerous discussions on regional cooperation to find a better solution to the sanitary sewer issue. Nassau County received $810 million in FEMA funding to repair Superstorm Sandy damage and fortify the Bay Park Sewage Treatment Plant against future storms.[43] The County has also applied for Federal funding to reconfigure the Bay Park and Long Beach Sewage Treatment Plants and to extend the outfall into the Atlantic Ocean to improve bay water quality. This project is expected to include installation of a force main under Austin Boulevard, a project that could be combined with drainage improvements along this critical transportation and economic corridor.[44]

Road network

Austin Boulevard, a regional evacuation route, plus many other key transportation corridors, were impassable immediately following Superstorm Sandy as a result of high water. Comprehensive transportation options can be implemented through coordination between agencies and by identifying common approaches that will address drainage and stormwater solutions. Nassau County is planning streetscape, parking, and traffic management improvements to Austin Boulevard. The planned project does not include drainage improvements; however, the project presents an opportunity to combine local and Nassau County resources to make upgrades to the stormwater system and other roadway/utility improvements during reconstruction.

Power supply

Opportunities to implement a smart grid infrastructure and relocate utilities to enhance the resiliency of the power grid should be explored.

Large-scale flood protection

Resources should be sought to conduct an in-depth study of large-scale future flood protection measures, such as a storm surge barrier system.

Natural and cultural resources

The Community was historically characterized by the presence of marshlands and wetlands, but fill for development and contamination from point and non-point sources has significantly degraded many of these assets.

Natural and cultural resources needs

Habitat protection and restoration

Shoreline and marsh habitats need restoration, enhancement and protection. The marshes surrounding the Community have been significantly reduced and degraded by infilling for development, dredging activities, and environmental contamination due to point and non-point source discharges over the last century. Superstorm Sandy compromised area wetlands when tidal surge submerged nearby marshland and expedited the uprooting of many of the grasses, reducing the natural sponge effect typical of a healthy wetland system. Much of the existing shoreline is made up of erosion control structures used to retain fill that has been placed to expand land area for development. Existing area marshes and natural shoreline areas need protection, restoration and enhancement to restore their storm buffer capacity and other natural environmental functions. When the Bay Park Sewage Treatment Plant failed after Superstorm Sandy, discharge washed down Hog Island Channel and inundated the marshlands in its path with pollutants and further compromised the marsh habitat.

Water quality

Due to storm surge and tidal inundation, water associated with Superstorm Sandy was not able to enter the stormwater system and instead washed through streets, yards, and businesses, collecting debris and detritus to deposit across the Community and throughout the natural systems. Improved stormwater treatment is needed throughout the Community to protect water quality and marine habitats. Stormwater runoff contains contaminants picked up in streets, parking lots, and yards, including trash, road salt, oil, grit, pet wastes, and other contaminants. The current stormwater infrastructure lacks treatment systems that remove debris and pollutants from stormwater prior to its discharge.

Waterfront parks and beaches

Superstorm Sandy and Hurricane Irene overwhelmed many of the waterfront parks and beaches, washing away many of the over-taxed structural protections that have struggled to withstand normal tides and regular flooding over the years. The elevation of Little Beach in the Village of Island Park is very low; as a result, the beach has been experiencing erosion both as a result of the presence of bulkheads and also because of their poor condition. Beachfront properties and adjacent residential areas flood regularly as a result. Wright's Field in Oceanside is located on Bedell Creek and also experiences frequent flooding.

Natural and cultural resources opportunities

Habitat protection and restoration

A shoreline and marsh protection plan would provide the opportunity to address the stabilization, habitat protection, and restoration needs of marine and coastal areas surrounding the Community.

Water quality

Stormwater quality treatment systems should be installed as a part of the overall stormwater management upgrades. Also, as described in the Infrastructure Needs section above, Nassau County has applied for Federal funding to reconfigure the Bay Park and Long Beach Sewage Treatment Plants to extend the outfall into the Atlantic Ocean to improve bay water quality.

Waterside parks and beaches

The Village of Island Park has been working with the U.S. Army Corps of Engineers to develop a solution for flooding at Little Beach. The Corps completed the planning and design phases for a project to install bulkheads and fill to raise the elevation of the shoreline at Little Beach to improve recreational access and reduce flooding of adjacent neighborhoods.

Harbor Isle Beach, Harbor Isle
Source: URS

Source: URS

Section III:
Reconstruction and resiliency strategies

III. Reconstruction and resiliency strategies

The NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) identified strategies for inclusion in the NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Plan (NYRCR Plan) using knowledge gained from a community visioning process, data collected from the community asset inventory, information gleaned through the review of relevant plans and studies, Consultant Team research, a needs and opportunities assessment, and a risk assessment. The Committee, with input from the greater Community, selected the strategies according to agreed-upon metrics, such as cost, timeframe, and others as identified through the planning process.

A. Reconstruction and resiliency strategies

Mitigating the risk of damage from future storms to increase resilience of NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community (Community) will require Federal, State, regional, and local action. Development of the NYRCR Plan included identifying local and regional issues and further identifying local issues that could be addressed more effectively on a regional level.

The strategies presented in this section are described in terms of how they contribute to the Community's vision of building back better, how they fulfill one or more of the recovery support functions (RSF), address risks, meet needs, make the best use of Community assets, capitalize on opportunities, resolve critical issues, and, if applicable, address vulnerable populations.

The strategy descriptions are followed by a brief summary of the projects that implement the strategy, in Tables 9 through 15. Projects are categorized as either Proposed or Featured Projects. Further detail on Proposed and Featured Projects is provided in Section IV. Each strategy description also mentions if Additional Resiliency Recommendations have been identified to support implementation of the strategy. Additional Resiliency Recommendations are projects and actions the Committee would like to highlight but has not categorized as Proposed or Featured Projects.

Oceanside School 8, Oceanside
Source: URS

Strategy: Implement an emergency response system that engages in emergency planning, response, and communications at the Community level.

The Community understands its vulnerability to hazards and therefore has made it a priority to enhance emergency management capabilities to be ready for and respond to future disasters. In addition to upgrades for equipment and infrastructure for fire departments, response teams, and communication dispatchers, this strategy also consists of making improvements to the transportation network for pre-event safe evacuations and post-event returns.

Superstorm Sandy highlighted the need for coordinated emergency operations and communication. Much of the area is low-lying, limiting places to store and stage emergency vehicles and store supplies. Oceanside used an informal combination of schools and firehouses, a system the Fire Department and School District have worked to formalize since Superstorm Sandy. Barnum Island, the Village of Island Park, and Harbor Isle have not yet secured a central site to house an emergency operations center and accommodate a staging area for emergency vehicles, equipment, and supplies.

Improving emergency management response capabilities to address risk and emergency communication, preparedness, and response operations would reduce the risk to all Community residents in future disasters, including vulnerable populations. This strategy fulfills the Infrastructure RSF in addition to the Community Planning and Capacity Building RSF.

Table 9: Projects that implement the strategy to enhance emergency planning, response, and communications

Strategy: Implement an emergency response system that engages in emergency planning, response, and communications at the Community level.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Emergency transportation "lifeline" safety plan & initial implementation	Prepare a public safety plan that identifies a "lifeline" road network and improvements to help them function better before, during, and after emergencies. Implement initial improvements, including independently powered streetlights and vehicle message signs.	$960,000 $1.44 million	Proposed in Barnum Island, the Village of Island Park, and Harbor Isle Featured in Oceanside	N
Emergency staging area feasibility study & implementation	Identify a site for and construct an emergency operations center and storage location for emergency response equipment and supplies before, during, and after a crisis for Barnum Island, the Village of Island Park, and Harbor Isle.	$2.49 million	Featured	N

Strategy: Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations.

As described in the Sections I and II, public facilities including schools, municipal buildings, and firehouses were hard hit by Superstorm Sandy and remain vulnerable to future storm events. This strategy includes risk reduction to emergency service facilities and critical facilities that serve vulnerable populations, such as schools and senior facilities.

This strategy will increase resilience of emergency facilities in order to support overall response capabilities. Their ability to remain functional during and after a disaster directly determines their effectiveness in emergencies. Resilient reconstruction of key facilities capitalizes on the opportunity to build back stronger.

For instance, the Village of Island Park Firehouse is in need of repairs, improvements, and new equipment as it experienced extensive damage during Superstorm Sandy and Hurricane Irene. The firehouse building had approximately six-feet of water, suffered mechanical and electrical damage, and is suspected to have suffered structural damage.

A structural assessment is needed to determine the feasibility of making improvements to the structure. The first phase of Village of Island Park critical facilities resiliency project would conduct a structural assessment of the Firehouse to determine needed structural needs. A second phase would construct structural and resiliency improvements to make the building safe, more resilient to flood damage, and enhance local emergency response capabilities.

The Village Hall was destroyed by Superstorm Sandy and needs to be rebuilt with flood resilient techniques, such as elevating utilities, floodproofing the building envelope, and installing generators. This is an important strategic facility that needs to be able to function during an emergency. A Featured Project would reconstruct Village Hall to create a facility that is able to function during emergencies and effectively serve Village residents during disaster recovery.

Oceanside School 4, Oceanside
Source: URS

Oceanside needs a new fire station to replace Engine No. 1 and Hose No. 1. Engine No. 1 is outdated and Hose No. 1 flooded during Superstorm Sandy, rendering it unusable during the emergency. A Featured Project would identify and acquire a site for a new fire station, and then design and construct the fire station to include a community center and small park.

In addition to improving emergency response facilities, this strategy aims to provide critical life-safety features where they are needed most, for vulnerable populations located in schools, senior housing facilities, nursing homes, and residential rehabilitation facilities. The current rebuilding process offers opportunities to protect these facilities and help expedite the return of normalcy to the lives of these vulnerable populations, by making their facilities more flood resistant.

Many schools, including Francis X. Hegarty School and Oceanside Schools 9E and 9M, were severely damaged by the flooding from Superstorm Sandy. School damage from Superstorm Sandy flooding caused major long-term disruptions in the life of

Community residents. Two Proposed Projects would create more resilient school buildings (floodproofing measures to building envelopes, installing generators, elevating utilities, etc.) that will provide access to evacuate children when there is a flooding incident, reduce flood damage to schools, and enable them to be used for storing and distributing emergency supplies and other community functions as needed during and after emergency events.

In addition to the Proposed and Featured Projects, the NYRCR Plan includes an Additional Resiliency Recommendation to install generators in senior facilities and emergency response centers in the Village of Island Park.

As these projects are implemented, the Community needs to provide a clear message to residents and business that the improvements to critical facilities focus on enabling life-safety and emergency functions, and offer limited protection. Stronger infrastructure should not be permitted to create a false sense of security. Residents and workers must evacuate when instructed to do so.

This strategy fulfills the Community Planning and Capacity Building, Infrastructure, and Health and Social Services RSFs by enhancing emergency response capabilities and serving vulnerable populations.

Table 10: Projects that implement the strategy to reduce risk of flooding to critical facilities

Strategy: Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, and schools and other facilities that serve vulnerable populations.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Expand Community critical facility resiliency and emergency response resources	Reduce flood damage potential of critical facilities, including firehouses and schools. Improvements to buildings include perimeter floodwalls, flood door protection and generators. Purchase, install, and construct emergency response equipment, including communication towers, radios, and rescue boats.	$11.39 million	Proposed	N
Critical facility resiliency: Island Park Village Hall reconstruction	Construct a new building for the Village Hall in Island Park using resilient techniques, such as elevating utilities, floodproofing the building envelope, and installing generators.	$1.43 million	Featured	N
Critical facility resiliency: new Oceanside fire station	Construct a new fire station to replace Hose No. 1 and Engine No. 1. Project includes a small community center and park to serve an area that currently lacks recreation facilities.	$20 million	Featured	N

Strategy: Leverage the economic potential of the area's waterfront location and proximity to New York City.

This strategy is vital to preserving and further developing the unique attributes of the Community that make it a great place to live and work. Residents want their Community to be attractive to residents, businesses, and visitors alike.

Downtown Island Park consistently floods, and many businesses along Long Beach Road were severely damaged by Superstorm Sandy. To maintain and increase economic viability, this NYRCR Plan recommends the preparation of a downtown and waterfront revitalization plan for the Village of Island Park. The plan would identify necessary improvements for the Village of Island Park business district and the Wreck Lead waterfront; develop a strategy to create transit-oriented development, including mixed-aged housing and mixed-use (residential/retail/office) development; retain a local disaster recovery manager to manage programs, and pursue additional funding; and, implement identified improvements to create a walkable downtown and new connections to the Wreck Lead waterfront, beaches, and Shell Creek Park.

A Featured Project would prepare a revitalization plan for the Oceanside industrial area along Lawson Boulevard. The plan would identify improvements needed to support the industrial and related commercial uses and evaluate opportunities to establish new water-dependent and water-enhanced businesses.

This strategy fulfills the Economic Development RSF, and the projects implementing this strategy also address the Housing RSF by increasing mixed-use, senior, and mixed-income housing options.

This strategy is further supported by Additional Resiliency Recommendations described in Section V, which include installation Harbor Isle gateway signage on Warwick Road and Island Parkway Bridge; landscaping of Harbor Isle streets to retain existing and continue to attract new residents, and installation of flood resistant measures for existing waterfront economic assets, including marinas.

Table 11: Projects that implement the strategy to leverage the economic potential of the area

Strategy: Leverage the economic potential of the area's waterfront location and proximity to New York City.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Destination revitalization and transit-oriented development	Create and implement a mixed-use, transit-oriented development plan to revitalize Island Park's downtown and the Wreck Lead waterfront.	$250,000	Proposed	N
Oceanside waterfront revitalization	Prepare a plan for the long-term revitalization of the Oceanside waterfront industrial area, considering economic development opportunities to support new water-dependent and water-enhanced business and mixed-use development, including senior housing.	$150,000	Featured	N

Strategy: Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment.

The Community greatly values the natural systems located in and surrounding it. These natural systems need improvements to support their diverse recreational and community uses, and to provide natural flood protection functions. This strategy fulfills the Natural and Cultural Resources RSF, and implementation of it entails a four-pronged approach described below:

- Restore local beaches, including Little Beach and Masone Beach in the Village of Island Park and Harbor Isle Beach in Harbor Isle, which have been diminished by Hurricane Irene and Superstorm Sandy. Restoration would protect them from further erosion and protect adjacent residential neighborhoods from flooding.
- Replenish marshlands to support their functions as a habitat, flood protection, tidal surge barrier, and water quality enhancement. Marsh restoration is included as a Proposed and a Featured Project in this NYRCR Plan. The Proposed Project includes a marsh restoration study and pilot restoration project for Garrett Marsh, adjacent to Barnum Island. The Featured Project is a continuation of this work. It includes a restoration study and restoration of Simmons Hassock Marsh, adjacent to Harbor Isle, and completes the Garrett Marsh restoration work begun in the Proposed Project.
- Restore the Oceanside Park shoreline to increase its resiliency and protect Schools 9E and 9M from flooding. Oceanside Park is important to the community and was used to distribute emergency supplies after Superstorm Sandy. This project would be completed in conjunction with the Town of Hempstead's $25 million capital improvement plan for Oceanside Park.
- Consider acquisition and development of additional usable open space. This NYRCR Plan includes an Additional Resiliency Recommendation to investigate the feasibility of securing sites and developing them into usable open space.

This strategy is further supported by an Additional Resiliency Recommendation to restore and enhance parks in Barnum Island and the Village of Island Park, including Shell Creek Park, and construction of improvements for Wrights Field in Oceanside.

Table 12: Projects that implement the strategy to restore, enhance, and improve natural areas

Strategy: Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Shoreline and beach restoration and environmental enhancements	Restore local beaches; Little Beach (in conjunction with an existing U.S. Army Corps of Engineers project), Harbor Isle Beach, and Masone Beach. Improve the recreational capacity of Oceanside Park and restore the Park's shoreline to protect adjacent schools and neighborhoods from flooding.	$5.95 million	Proposed	N
Marsh restoration: phase 1	Conduct a marsh restoration study and implement a restoration pilot project for Garrett Marsh east of Barnum Island.	$600,000	Proposed	N
Marsh restoration: phase 2	Complete restoration of Garrett Marsh, conduct a marsh restoration study for Simmons Hassock Marsh west of Harbor Isle, and conduct restoration of Simmons Hassock Marsh.	$2 million	Featured	N

Strategy: Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides.

Stormwater infrastructure analysis, repairs, and upgrades are high priorities for the Community. According to the risk assessment, sanitary sewer/stormwater drainage systems received the highest risk score because the Community is low-lying and their assets are at extreme risk in future high-magnitude storms. The risk assessment recognizes the need for a complete assessment and overhaul of the stormwater drainage system.

This strategy fulfills the Infrastructure RSF and includes several phased projects to address specific problem locations in the short term and entire Community stormwater system in the long term:

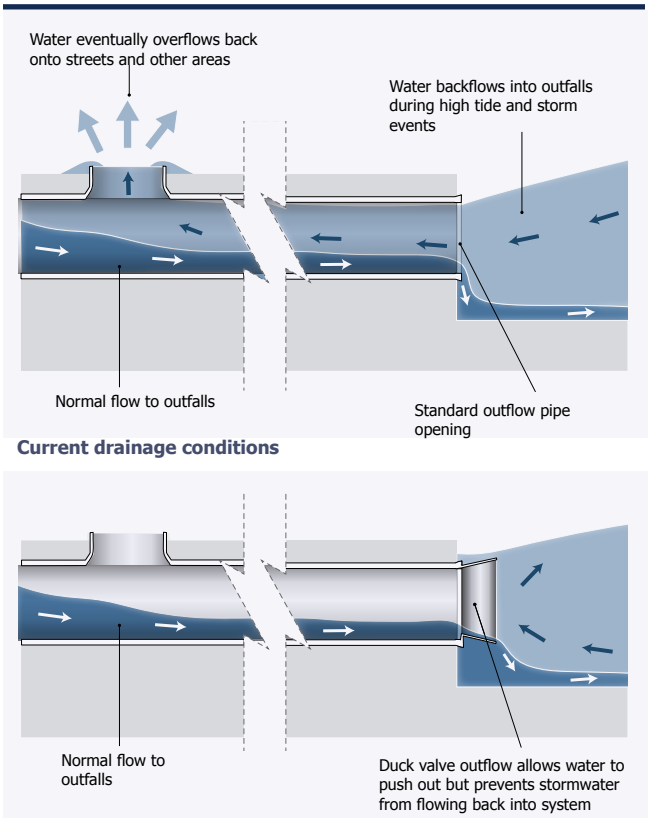
- Drainage improvements: Streets and vital intersections flood because the stormwater system cannot handle the combined stormwater runoff and tidal infiltration during storm events. The proposed drainage project includes a comprehensive analysis of the stormwater drainage, followed by systematic improvements using a combination of green infrastructure (e.g., permeable surfaces, rain gardens), pump stations at particularly low-lying areas (e.g., Island Park "bowl"), recharge basins, roadways elevations where feasible, and a Complete Streets pilot project on Long Beach Road in Oceanside to improve stormwater drainage and create amenities to support new economic investment.

Flooding on Waterview Road, Barnum Island
Source: URS

- Tidal backflow prevention: Blocked stormwater drains and tidal backflows are major sources of flooding in low-lying areas. This is due to stormwater outfalls that are blocked because they are partially or fully under water during high tides and storms. The proposed tidal backflow prevention project would install tidal water backflow devices to prevent tidal water from entering the stormwater system and flooding low-lying areas.

This strategy is further supported by an Additional Resiliency Recommendation that recommends implementation of drainage improvements (in accordance with the comprehensive drainage analysis) to reduce flooding in Empire Boulevard, and Louisiana, Georgia, Florida, Carolina and Alabama Avenues.

Figure 20: Tidal backflow prevention



Source: URS

Table 13: Projects that implement the strategy to employ progressive stormwater management systems and infrastructure upgrades

Strategy: Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Drainage improvements	Conduct a comprehensive analysis of the stormwater drainage system and implement systematic improvements, using a combination of green infrastructure, pump stations at priority locations, recharge basins, and roadway elevations where feasible.	$20.23 million	Proposed	N
Tidal backflow prevention	Install tidal backflow devices to prevent tidal water from entering the stormwater system and flooding low-lying areas.	$2.39 million	Proposed	N

Strategy: Protect shoreline areas from tidal surge through a combination of structural, nonstructural, and hybrid shoreline stabilization techniques.

Tidal flooding is a problem for the Community, even in minor rainfall or high-tide events. Existing bulkheads were severely damaged by Superstorm Sandy. The Community recognizes that bulkheads offer erosion protection but only offer limited protection from tidal floodwaters; therefore, a comprehensive set of solutions will be needed to address Community needs.

The low-lying areas along California Place Canal, Wreck Lead, Bedell Creek, and Grand Canal flood regularly during high tide. Because of a lack of high ground to tie into, a single flood barrier system would be ineffective against tidal surges. The proposed perimeter flood safeguards projects would take a comprehensive approach.

The first step in this project will be the completion of a shoreline conditions analysis and improvement strategy to assess conditions and analyze potential solutions to restore shorelines to pre-Hurricane Irene and Superstorm Sandy conditions. It will consider hard infrastructure, such as bulkheads, levees, and sea walls; natural solutions, such as marsh restoration and wetland construction; hybrid solutions, which combine hard infrastructure with natural approaches; and wave attenuation methods, such as reefs and sea grass beds, to slow down the water.

This analysis is expected to recommend a system of barriers and natural flood protection improvements, including installing flood barrier systems adjacent to water bodies where feasible and constructing a "second line of protection" along the LIRR tracks to protect downtown Island Park.

This strategy fulfills the Infrastructure RSF. An early action item for the perimeter protection system will be the protection of street ends in Barnum Island, the Village of Island Park, and Harbor Isle. This project will also include protections at Landgraf Park in the Village of Island Park to protect adjacent properties. The Town of Hempstead has no active project to mitigate this. Several street ends are unprotected and at much lower elevation than abutting properties, so water flows up the street and floods bulkheaded private properties.

Table 14: Projects that implement the strategy to protect shoreline areas from tidal surge

Strategy: Protect shoreline areas from tidal surge through a combination of structural, nonstructural, and hybrid shoreline stabilization techniques.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Perimeter flood safeguards: California Place Canal and Wreck Lead: Phase I	Complete a comprehensive shoreline conditions analysis and improvement strategy to design a system of flood barriers and natural flood protection improvements. Implement high-priority projects identified in the study.	$4 million	Proposed	N
Perimeter flood safeguards: California Place Canal Phase II	This project builds on phase I perimeter flood safeguards to construct additional barrier systems and natural improvements to protect against flooding from California Place Canal.	$2.1 million	Featured	N
Perimeter flood safeguards: Oceanside	Create a system of barriers and natural shoreline improvements to reduce flooding from Oceanside waterways, including but not limited to, Bedell Creek, Powell Creek, and Grand Canal.	$6.45 million	Proposed	N
Tidal protection at street ends and Landgraf Park	Install barriers at public street ends and Landgraf park to protect adjacent neighborhoods from tidal flooding.	$1. 01 million	Proposed	N

Strategy: Expand housing stock to meet the needs of seniors and young adults, and identify financial resources for homeowners and renters impacted by Superstorm Sandy.

This strategy is needed to support continued rebuilding of the Community and to continue to retain existing and attract new residents. It is also consistent with the Long Island Region Economic Development Corporation goal of strengthening, protecting, and expanding the housing stock.[44]

As noted in the Section II, approximately half of all housing units in the Community were damaged in Superstorm Sandy, impacting homeowners and renters, especially vulnerable populations, including low- and moderate-income families, seniors, and the disabled, who face additional challenges during reconstruction. This strategy helps to address the needs of residents whose homes were damaged by Superstorm Sandy, and also considers housing needs not fully met by the current housing stock.

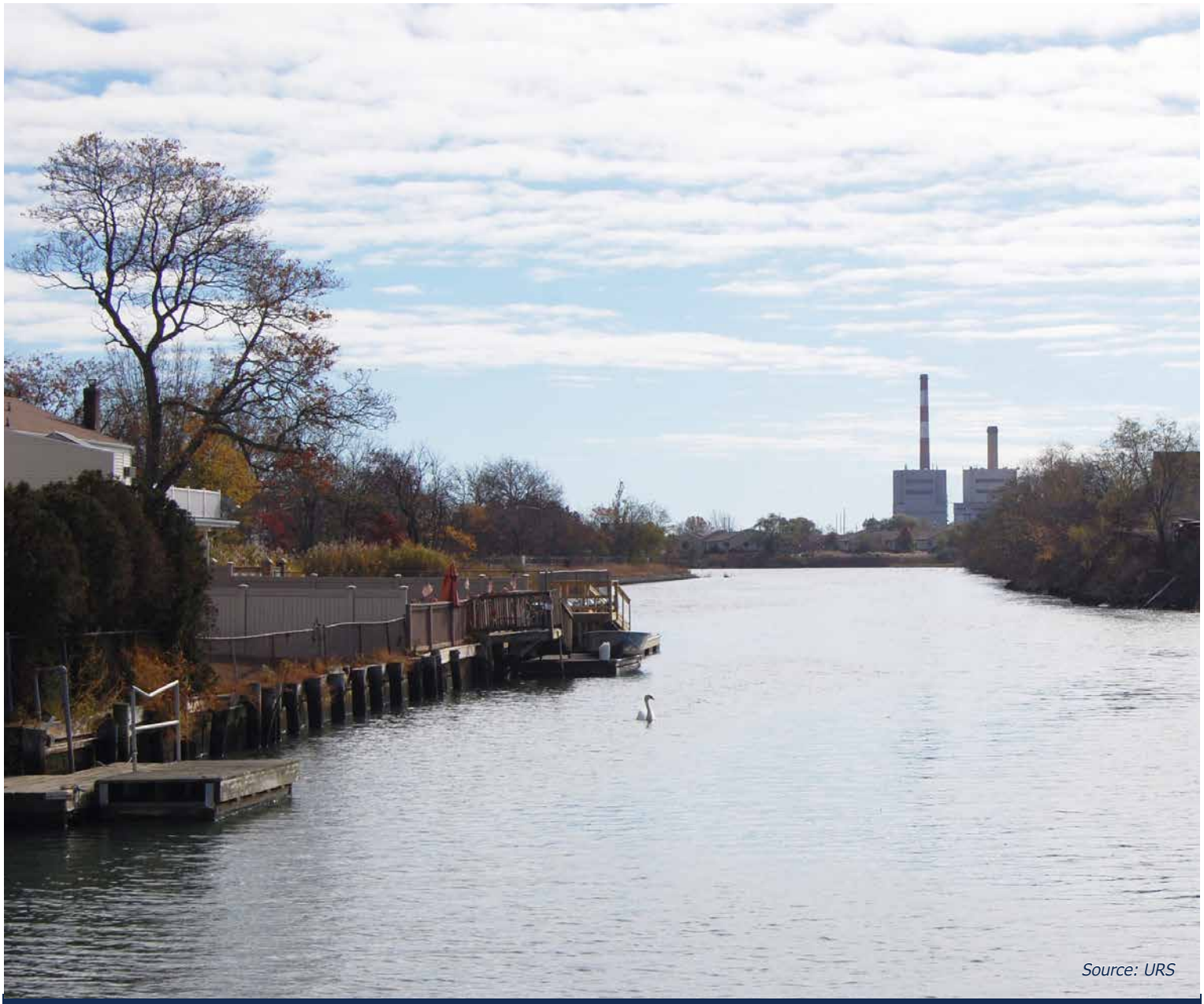
The destination revitalization and transit-oriented development project and Oceanside waterfront revitalization project listed in Table 11 are repeated below in Table 15. These projects help to implement this strategy and fulfill the Housing RSF by creating senior and mixed-age, multi-family, and mixed-use housing options to supplement the predominant single-family housing stock in the Community.

Strategy: Support solutions for regional and local power generation, sewage treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection.

This strategy commits the Community's support and participation in resolving issues that impacted all of Long Island after Superstorm Sandy. The Committee did not identify any Proposed or Featured projects for this strategy; actions to address each separate issue of power, tidal flooding, and sewage treatment upgrades are included as Additional Resiliency Recommendations in this NYRCR Plan.

Table 15: Projects that implement the strategy to expand housing stock

Strategy: Expand housing stock to meet the needs of seniors and young adults, and identify financial resources for homeowners and renters impacted by Superstorm Sandy.				
Project name	**Short project description**	**Estimated cost**	**Proposed or Featured Project**	**Regional project (Y/N)**
Destination revitalization and transit-oriented development	Create and implement a mixed-use, transit-oriented development plan to revitalize Island Park's downtown and the Wreck Lead waterfront.	$250,000	Proposed	N
Oceanside waterfront revitalization	Prepare a plan for the long-term revitalization of the Oceanside waterfront industrial area, considering economic development opportunities to support new water-dependent and water-enhanced business and mixed-use development, including senior housing.	$150,000	Featured	N



Source: URS

Section IV:
Implementation - Project profiles

IV: Proposed and featured project profiles

The NYRCR Program has allocated to the NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community (Community) up to $36.6 million (Barnum Island: $4 million; Oceanside: $22.2 million; the Village of Island Park: $7.4 million; and Harbor Isle: $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 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 prioritization 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. Additional Resiliency Recommendations (see Section V) 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, U.S. 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.

This section provides a project profile for each Proposed and Featured Project identified by the NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Planning Committee (Committee) and Community. The Proposed and Featured Projects were identified, selected and advanced as a response to the risks, needs, and opportunities described in Section II of the NYRCR Plan and are implementation mechanisms for the Reconstruction and Resiliency Strategies in Section III. These projects represent actions that are expected to be implemented in the next four years to build resiliency and fulfill other important community goals.

In addition to providing a description of each project, the profiles include information on two important elements used by the Committee to evaluate the value of each project, a cost-benefit analysis and a risk reduction analysis. The benefits were presented with qualitative descriptions that demonstrate how the projects will assist the NYRCR Community in economic, environmental, and health and social services terms. Before proceeding to the projects themselves, it is important to understand these two analytical elements of the Project Profiles.

Cost-benefit analysis

A cost-benefit analysis (CBA) is a tool used to compare the benefits and costs associated with a project. The CBA provides decision-makers with a framework for comparing different projects (i.e., anticipated cost of implementation against total expected benefits), and determining whether the benefits of a particular project outweigh the costs. More specifically, the value of the CBA is two-fold: (1) to inform the NYRCR Planning Committees as they formulate reconstruction measures; and (2) to help provide information needed to prepare grant applications for funds.

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

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

Project costs

Project Profiles include a cost estimate for project implementation. The CBA cannot forecast costs or benefits with complete certainty. It does provide the community with a practical understanding of the potential estimated costs of project implementation and the potential benefits accrued to the community with the particular project in place.

The cost of implementing a project is just one aspect of the justification for funding these Proposed Projects. Conversely, another important variable is the future costs of not implementing these Proposed Projects. Inaction has the potential to negatively impact the long-term viability of Barnum Island, Oceanside, the Village of Island Park and Harbor Isle. While these "lost opportunity costs" of not implementing the projects do not always lend themselves to quantification, they are important to the analysis, and are therefore addressed qualitatively. These costs include:

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

Project benefits

The types of benefits considered in the CBA include:

- **Risk reduction:** The extent to which a project reduces the risk of damage to a community asset from a future storm event (discussed further below under "risk reduction analysis").
- **Economic:** The project's potential to help minimize economic costs and reduce the time it takes for the local economy to rebound from a storm event.
- **Health and social services:** Qualitative information was provided on the overall population benefits of improved access to health and social service facilities including public safety services and degree to which essential health and social service facilities are able to provide services to a community during a future storm or weather event as a result of the project.
- **Environmental protection:** Benefits include the protection of crucial environmental assets or high-priority habitat, threatened and endangered species, migration or habitat connectivity; any clean-up resulting from the action; creation of open space or a new recreational asset.

Risk-reduction analysis

A risk reduction analysis estimates the extent to which Proposed and Featured Projects will lower the flood risk to identified community critical assets and population when the project is in place. The risk reduction analysis uses information from the Risk Assessment in Section II to determine the risk of an asset before the project implementation.

Figure 21: Guide for understanding proposed and featured project profiles

Project key:

Project category — Proposed — **Recovery support function**

Oceanside — **Location**

Recovery support function symbols:

- **Community planning and capacity building**
- **Economic development**
- **Health and social services**
- **Housing**
- **Infrastructure**
- **Natural and cultural resources**

Color coding by location:

Oceanside

Barnum Island
The Village of Island Park
Harbor Isle

Proposed projects

Critical facility resiliency and emergency response resources	The Village of Island Park
Critical facility resiliency and emergency response resources	Oceanside
Tidal backflow prevention	Barnum Island, the Village of Island Park, and Harbor Isle
Tidal backflow prevention	Oceanside
Drainage improvements	Barnum Island, the Village of Island Park, and Harbor Isle
Drainage improvements	Oceanside
Perimeter flood safeguards - California Place Canal and Wreck Lead: Phase 1	Barnum Island and the Village of Island Park
Perimeter flood safeguards	Oceanside
Destination revitalization and transit-oriented development	The Village of Island Park
Tidal protection at street ends and at Landgraf Park	Barnum Island, the Village of Island Park, and Harbor Isle
Shoreline and beach restoration and environmental enhancements	Barnum Island, the Village of Island Park, and Harbor Isle
Shoreline and open space preservation	Oceanside
Marsh restoration: Phase 1	Barnum Island
Emergency transportation lifeline safety plan and initial implementation	Barnum Island, the Village of Island Park, and Harbor Isle

Featured projects

Emergency transportation lifeline safety plan and initial implementation	Oceanside	
Marsh restoration: Phase 2	Barnum Island and Harbor Isle	
Emergency staging area feasibility study and implementation	Barnum Island, the Village of Island Park, and Harbor Isle	
Perimeter flood safeguards - California Place Canal: Phase 2	Barnum Island and the Village of Island Park	
Critical facility resiliency - Island Park Village Hall reconstruction	The Village of Island Park	
Oceanside industrial waterfront revitalization	Oceanside	
Critical facility resiliency: Oceanside Fire Station	Oceanside	

Critical facility resiliency and emergency response resources

Proposed

The Village of Island Park

During Superstorm Sandy, the Village of Island Park Firehouse and Francis X. Hegarty School were severely damaged by flooding. The Hegarty School was closed for the remainder of the school year, creating serious disruptions for students. The extent of structural damages to the Firehouse is still unknown.

Description

This project would make Francis X. Hegarty School and Island Park Firehouse more resistant to flood damage. This project would mitigate flood risk to these critical facilities, enable schools to reopen more quickly after an emergency, and reduce flood damage to these important facilities.

Implementation steps would include:

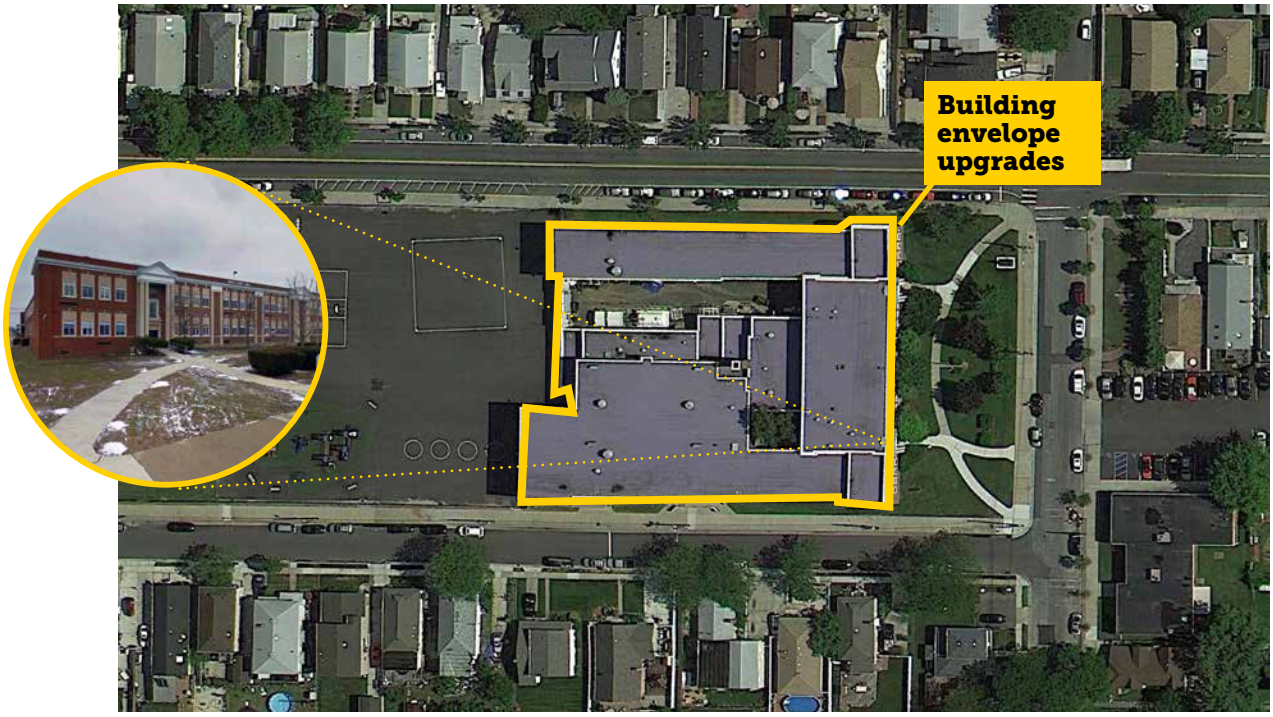
- Conduct a structural assessment of the Village of Island Park Firehouse;
- Design and implement Firehouse improvements and flood mitigation;
- Design and construct perimeter floodwall protection around the Firehouse;
- Relocate interior and exterior mechanical and electrical equipment above projected flood heights;
- Install flood protection at Francis X. Hegarty School;
- Install multi-fuel generators to maintain power for emergency functions at Francis X. Hegarty School and the Firehouse;
- Install facilities in the Firehouse to serve out of area emergency responders; and,
- Acquire rescue boat(s) for emergency preparedness and response.

Cost estimate:

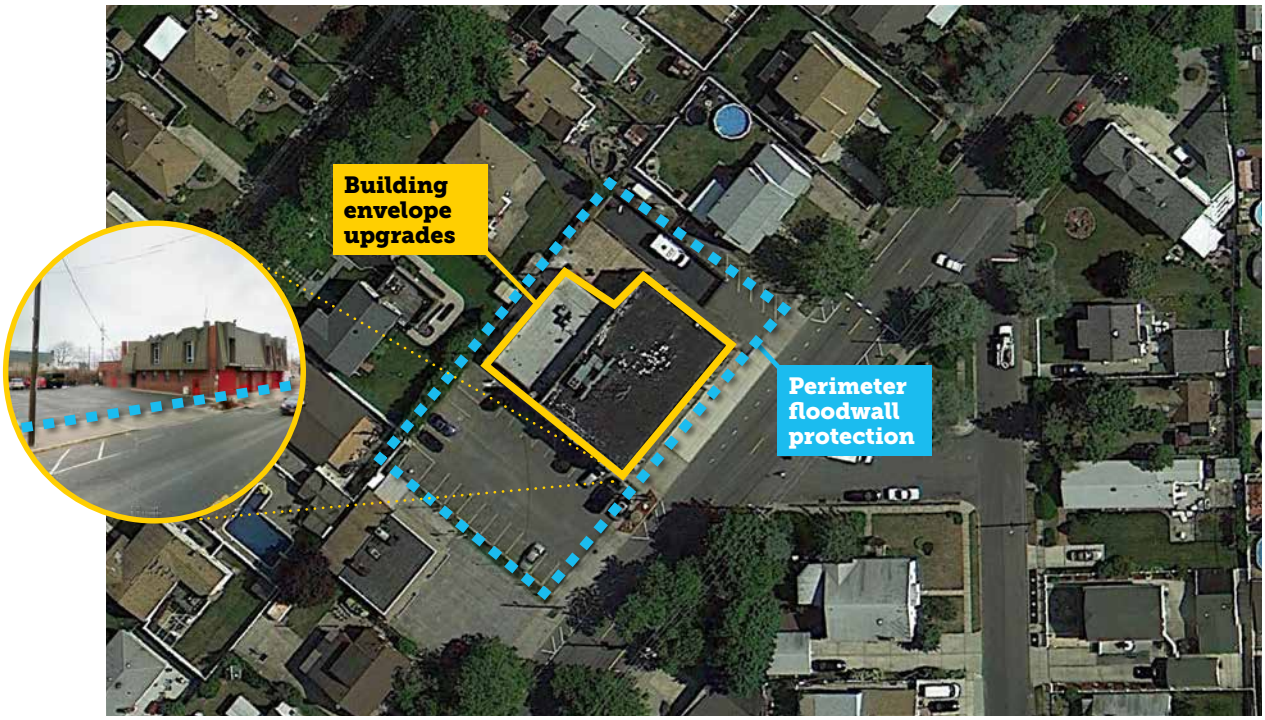
Cost estimate includes the study, improvements to the Francis X. Hegarty School and the Firehouse, as well as the purchase of a rescue boat.

Firehouse structural assessment and improvements:	$580,000
School improvements:	$1,970,000
Rescue boat(s):	$140,000
Total Cost Estimate:	**$2,690,000**

Figure 22: Potential improvements to critical facilities



Francis X. Hegarty School



Island Park Firehouse

Source: Google Earth

Benefits

Local benefits include direct improvements to the Frances X. Hegarty School and the Village of Island Park Firehouse. Area benefits include improved facilities for hosting additional emergency responders. The school improvements would decrease the future likelihood of having to reconstruct damaged schools, and/or the need move children to other locations.

Economic Benefits

Improved protection of the Village of Island Park commercial districts would aid in increasing recovery functions after a storm. This more rapid recovery reduces the chance that the area businesses would reduce services and lay off employees. In addition, the presence of the protected school and Island Park Firehouse would provide support to resident and business owners looking to move back to Barnum Island, the Village of Island Park, and Harbor Isle.

This project would indirectly help the local economy as it would serve as a resource to residents to help them recover more rapidly, which would help maintain the customer base needed for many local businesses. This project would help reduce post-disaster emergency and recovery costs by protecting the facilities. It can also accelerate the recovery by providing early recovery centers to assist residents in providing information and assistance needed post-disaster.

Environmental Benefits

This project can reduce some contamination associated with buildings being flooded and chemicals that end up in floodwaters.

Health and Social Benefits

Protection of Hegarty School would reduce the threat of damages in future storms and speed the return of children to school after a flood, reducing disruptions and stress. Flood protection would provide additional space for essential health and social services facilities to help keep them operational or to quickly recover from storm events and would help provide space for improved access to health and social services facilities after storm events.

Cost-benefit analysis

Increasing flood protection features in schools and emergency response facilities would avoid damages and save tax payers money over the long run. Improvements to the Firehouse and the purchase of emergency response equipment would increase the capability of the Community to prepare for and respond to disasters, reducing the time and cost of recovery. Over time, these cost savings will offset the initial investment made.

Risk reduction

This project would make Hegarty School and Island Park Firehouse and emergency response facilities more flood resistant, reducing the risk to the school and emergency response assets. The risk assessment conducted for this project anticipates that the project would reduce the vulnerability of these assets, reducing the risk of future flooding from high to moderate.

A secure firehouse would enhance emergency response and re-entry to damaged areas. Risk would be reduced to emergency responders and vulnerable populations, including students and seniors. Emergency response facilities would be more readily accessible during and after key storm events.

Timeframe

Immediate (within two years)

Regulatory requirements

The project will need to meet the Village of Island Park zoning and building permit requirements.

Jurisdiction

The project is under the jurisdiction of the Village of Island Park, the Island Park Fire Department, and Island Park School District.

Sample rescue boat
Source: Wikimedia Commons

Critical facility resiliency and emergency response resources

Proposed

Oceanside

Superstorm Sandy flooded Oceanside schools and emergency facilities, damaging them and interfering with emergency response activities.

Description

This project would make schools and emergency facilities more resistant to flood damage and accessible following flood events. This project would make improvements to emergency response facilities, sanitation facilities, and schools to facilitate their use for post-disaster relief. It would construct improvements to Schools 4, 8, 9E, and 9M to provide flood protection that would enable the safe return of children and normal educational function as quickly as possible after disasters. It would provide generators for all schools and Hose No. 3, and improvements to sanitation facilities to improve their emergency response function. Work would be accomplished in coordination with the Oceanside School District, Fire Department, and Sanitation Department. The project would build on improvements already completed or underway, most notably the resilient reconstruction of the Oceanside Fire Headquarters and emergency dispatch center.

Implementation steps would include:

Schools

- Purchase and install multi-fuel generators at Schools 2, 3, 4, 5, 6, 7, 8, 9E, and 9M;
- Relocate mechanical and electrical equipment above projected flood heights; and
- Seal low-lying building openings at Schools 4, 8, 9E and 9M; and,
- Install passive perimeter floodwall and flood door protection.

Firehouses

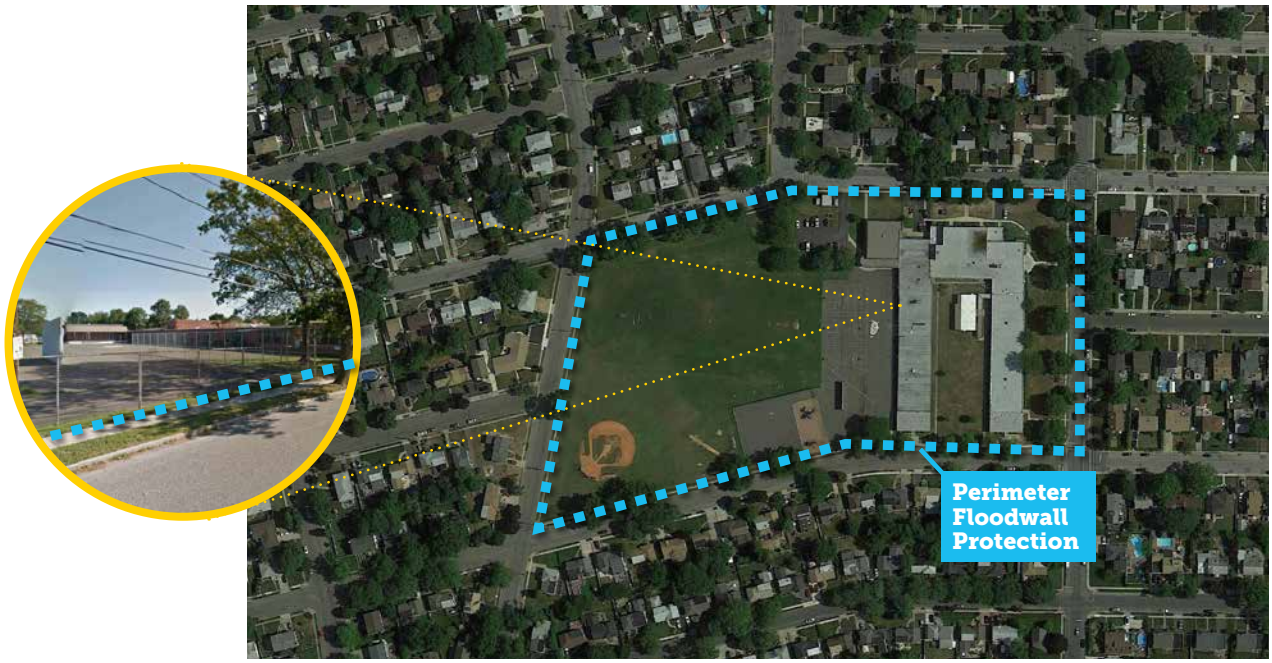
- Purchase and install a multi-fuel generator at Hose No. 3;
- Relocate mechanical and electrical equipment above projected flood heights;
- Seal low-lying building openings and install passive perimeter floodwall and flood door protection;
- Provide and install communication towers and radio resources;
- Purchase emergency response resources and vehicles;

Cost estimate:

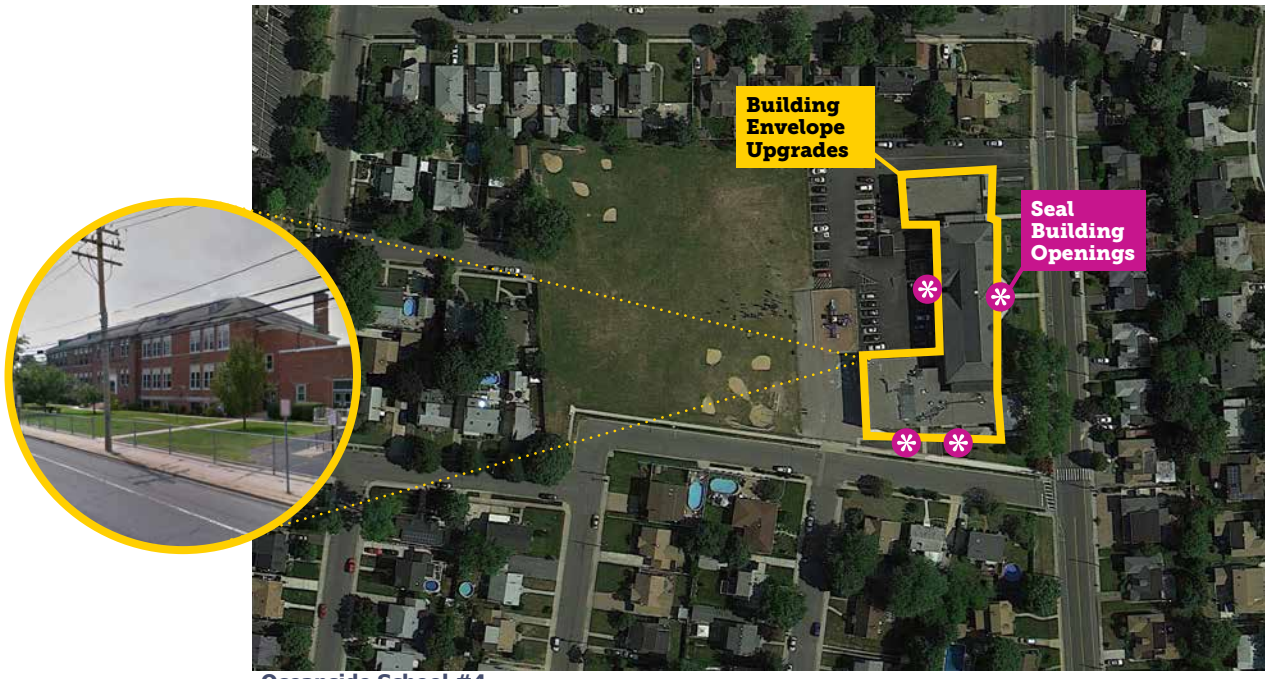
Cost estimate includes a study to analyze needed improvements and construction of resiliency enhancements to schools, fire facilities, and sanitation facilities; and the purchase of emergency response equipment.

Schools:	$3,800,000
Firehouse:	$4,200,000
Sanitation:	$700,000
Total cost estimate:	**$8,700,00**

Figure 23: Potential improvements to Oceanside schools



Oceanside School #8



Oceanside School #4

Source: Google Earth

- Purchase rescue boat(s); and,
- Install facilities in Hose No. 3 and Engine No. 1 to serve out-of-town emergency responders.

Sanitation facilities

- Improve sanitation facilities to provide enhanced emergency response function, including:
  - Purchase and install a multi-fuel generator;
  - Relocate mechanical and electrical equipment above projected flood heights; and,
  - Seal low-lying building openings and install passive perimeter floodwall and flood door protection.

Benefits

Local benefits include more resilient school facilities to reduce damage and enable children to return to school more quickly after a major flood. By increasing the protection of facilities, particularly schools, timeframes for recovery are significantly reduced. The value and benefits derived from these projects directly relate to the issues and concerns the Community and its residents faced immediately after Superstorm Sandy. Children were displaced from schools and relocated to other schools that experienced less damage. The school improvements would decrease the future likelihood of having to reconstruct damaged schools, and/or the need move children to other locations.

Health and social

The acquisition of emergency response equipment and building improvements would allow Oceanside emergency responders and residents to act more quickly in an efficient and well-coordinated manner and to prepare for and address situations that arise before, during and after emergencies. The schools and emergency response facilities are in strategic locations that can provide services to vulnerable populations, including seniors, the disabled, school-aged children, and families. These improvements would enable the facilities to function as feeding stations and supply distribution locations during emergencies. Flood protection would provide additional space for essential health and social services facilities to help keep them operational or to quickly recover from storm events.

Economic

Enhanced emergency response would help Oceanside economic centers recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. In addition, the early reestablishment of the schools would help provide a needed boost to residents and business owners looking to move back to Oceanside and reestablish themselves.

This project would indirectly help the local economy as it would serve as a resource to residents to help them recover more rapidly, which would help maintain the customer base needed by local businesses. This project would also help reduce post-disaster emergency and recovery costs by protecting the facilities. It could also accelerate the recovery by providing early recovery centers that assist residents in providing information and assistance needed post-disaster.

Environmental

This project could reduce some contamination associated with buildings being flooded and chemicals that end up in floodwaters.

Cost-benefit analysis

Increasing flood protection features in Oceanside schools and emergency response facilities would avoid damages and save tax payers money over the long run. Improvements to firehouses and the purchase of emergency response equipment would increase the capability of the Community to prepare for and respond to disasters, reducing the time and cost of recovery. Over time, these cost savings will offset the initial investment made.

Risk reduction

The entire school-aged population of Oceanside would directly benefit from the protection provided. The risk assessment completed for this project anticipates that the project would reduce the vulnerability of school and emergency response assets, reducing the risk of future flooding from high to moderate.

This project would make buildings and equipment more flood resistant. Critical facilities directly affected by these improvements include Schools 2, 3, 4, 5, 6, 7, 8, 9E, and 9M as well as Hose No. 3. Secure facilities would enhance emergency response and re-entry to damaged areas.

Timeframe

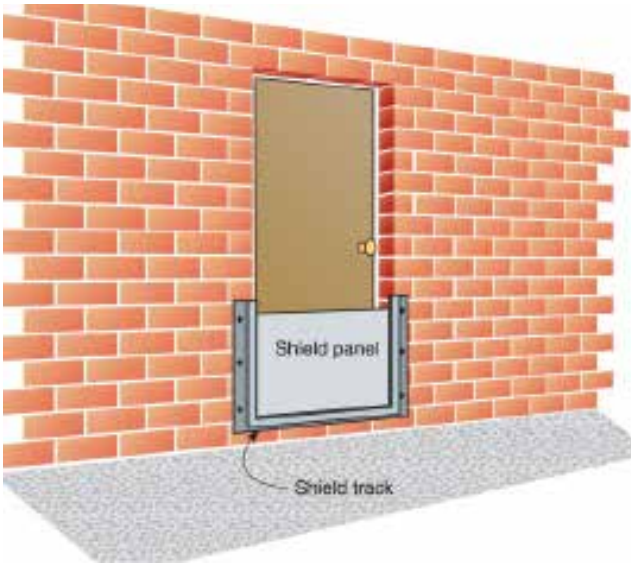
Immediate (within two years)

Regulatory requirements

The project needs to meet the requirements of Town of Hempstead building permits.

Jurisdiction

The project is within the jurisdiction of the Town of Hempstead, Oceanside School District, Oceanside Fire Department, and Oceanside Sanitation District.



Bulkhead door with shield panel
Source: FEMA

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

Tidal backflow prevention

Superstorm Sandy tidal surge overwhelmed the stormwater systems in Barnum Island, the Village of Island Park, and Harbor Isle, resulting in inland flooding that covered more than 95% of the Village and two hamlets. Outside of major storm events, tidal backflows into the stormwater system cause flooding of low-lying areas during full moon high tides and even moderate storms because stormwater outfalls are partially or fully under water.

Description

This project would install tidal water backflow devices to prevent tidal water from entering the stormwater system and flooding low lying areas.

Implementation steps would include:

- Perform a phased analysis of outflow function at Barnum Island, the Village of Island Park, and Harbor Isle locations shown in Figure 24;
- Develop a phased implementation strategy in conjunction with Nassau County, the Town of Hempstead, and the Village of Island Park; and,
- Install/repair backflow prevention devices on stormwater outfalls.

Cost estimate:

Cost estimates include but are not limited to the analysis of outflow functions, development of a phased implementation strategy, and installation and/or repair of backflow prevention devices on all stormwater outfalls.

Barnum Island:	$550,000
Village of Island Park:	$90,000
Harbor Isle:	$290,000
Total Cost Estimate:	**$930,000**

Figure 24: Stormwater outfall locations

Benefits

This project would reduce flooding caused by tidal backflow and infiltration, protecting Barnum Island, the Village of Island Park, and Harbor Isle during a major storm and from repetitive nuisance flooding caused by moon tides and other high tide events and storms.

Health and social

Installation of backflow preventers at outflow locations would aid in reducing localized flooding and failure of stormwater systems. This would reduce locations of pooled water that can carry pathogens and breed mosquitoes that can cause West Nile virus and other diseases.

Economic

An increased investment in asset protection demonstrates a high level of public service capacity, which helps with retaining existing businesses and attracting new ones. This project would indirectly help the local economy as it would serve as a means to help local businesses recover more rapidly, which would help maintain the customer base. This project would help reduce post-disaster emergency and recovery costs by protecting the facilities and reducing post-disaster cleanup times.

Environmental

Many parks and open space assets currently affected by tidal flooding and high water would experience reduced downtime and expedited recovery through this action. Backflow preventers would help to avoid spillback into stormwater facilities that contribute to overflow and localized flooding throughout the Community.

Cost-benefit analysis

Installation of backflow prevention systems would reduce localized flooding and alleviate repetitive flooding caused by storms and high tide events. This would reduce damages and costs of repairs to infrastructure, homes, and businesses. It will also reduce economic disruptions caused by nuisance flooding. The cost savings created would be greater than the relatively modest cost of installing and maintaining the backflow valves.

Risk reduction

Primary risk reduction affects a significant portion of the population due to the location of homes and businesses adjacent and proximate to low-lying areas on the shoreline, in proximity to affected stormwater drains, and other areas where tidal backflow currently exists. Application of drainage improvements would directly affect residences and businesses along the western edge of Harbor Isle, on either side of the Island Park Channel, California Canal, Wreck Lead, the lagoon adjacent to Kingston Boulevard, and the Redfield Road area.

Implementation of the tidal backflow prevention project would significantly reduce the risk of flooding to multiple assets. The risk assessment anticipated the risk of future flooding would be reduced from extreme to moderate for the sanitary sewer, stormwater drainage systems, and single-family housing. The risk assessment further anticipated that the risk of future flooding would be reduced from high to moderate for transportation assets including the Long Island Rail Road (LIRR), Austin Boulevard, and Long Beach Road, providing improved safety and access to services for the 8,370 residents living in the area[45].

Timeframe

Immediate (within two years)

Regulatory requirements

This project would require Town of Hempstead, Village of Island Park, and NYS Department of Environmental Conservation (DEC) permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park, Town of Hempstead, and Nassau County

Tidal backflow prevention

Proposed

Oceanside

Superstorm Sandy tidal surge overwhelmed Oceanside's stormwater system, resulting in inland flooding that covered the southern two-thirds of Oceanside. Outside of major storm events, tidal backflows into the stormwater system cause flooding of low-lying areas during full moon high tides and even moderate storms because stormwater outfalls are partially or fully under water.

Description

This project includes installation of tidal water backflow devices to prevent tidal water from entering the stormwater system and flooding low lying areas.

Implementation steps would include:

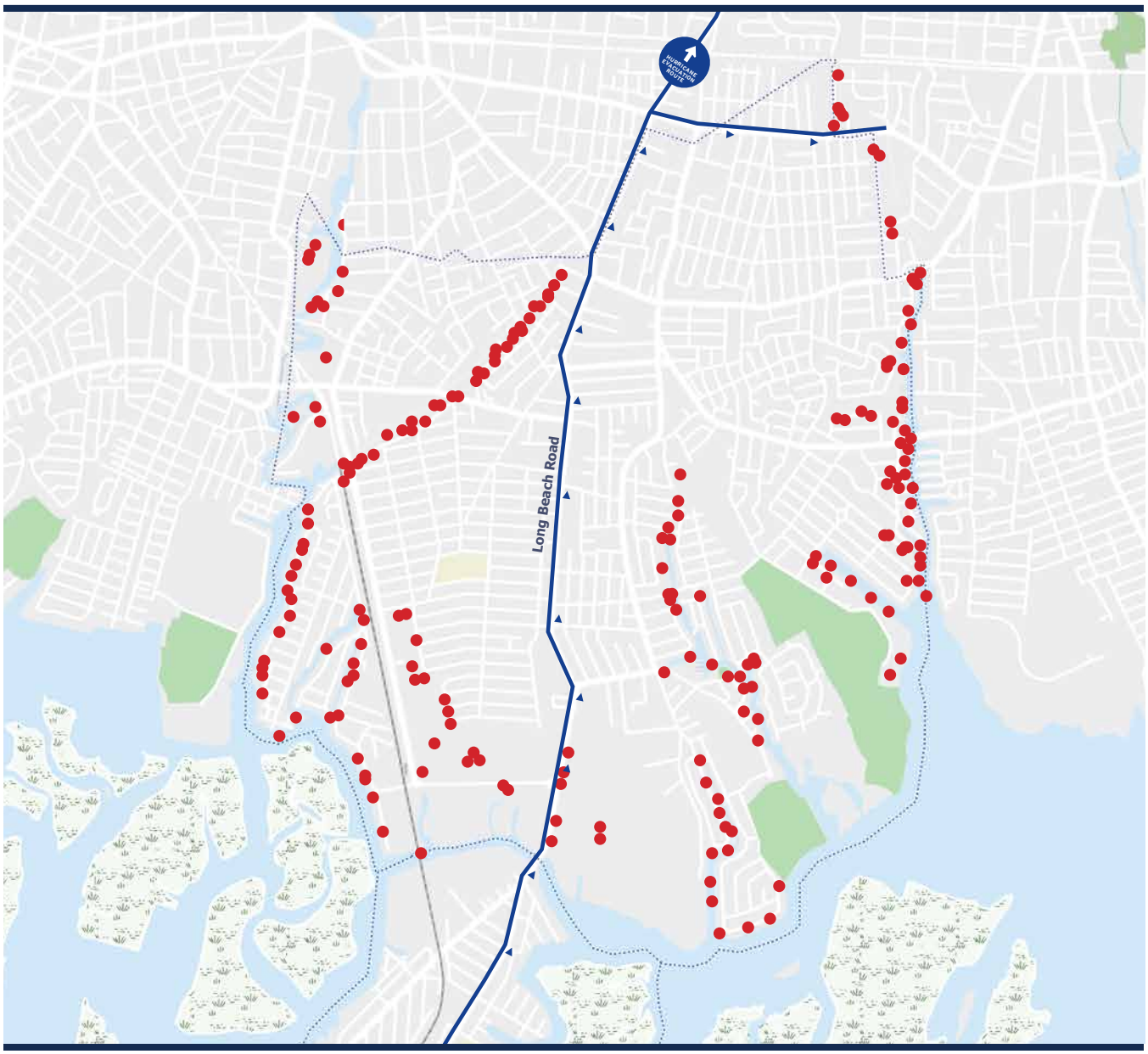
- Perform a phased analysis of outflow location and function at Oceanside locations shown on Figure 25;
- Develop a phased implementation strategy to identify the locations where tidal backflow devices would have the greatest benefit; and,
- Work in conjunction with Nassau County and the Town of Hempstead to install/repair backflow prevention devices on stormwater outfalls.

Cost estimate:

Cost estimate includes but is not limited to the analysis of outflow functions, development of a phased implementation strategy, and installation and repair of backflow prevention devices on all stormwater outfalls.

Total Cost Estimate: **$1,460,000**

Figure 25: Stormwater outfall locations



Legend

- NYRCR Community
- Stormwater outfalls
- Primary evacuation route
- Marshes
- Parks

N

0 0.2 0.4 0.8 Miles

Source: OpenStreetMap

Benefits

This project would reduce flooding caused by tidal backflow and infiltration, protecting Oceanside during a major storm. It would protect lower lying areas throughout the area from repetitive nuisance flooding caused by moon tides and other high tide events and storms.

Health and social

Installation of backflow preventers at outflow locations would aid in reducing localized flooding and failure of stormwater systems. This would reduce locations of pooled water that can carry pathogens and breed mosquitoes that can cause West Nile virus and other diseases.

Economic

An increased investment in asset protection demonstrates a high level of public service capacity, which helps with retaining existing businesses and attracting new ones. This project would indirectly help the local economy as it would serve as means to help local businesses recover more rapidly which would help maintain the customer base. This project would help reduce post-disaster emergency and recovery costs by protecting the facilities and reducing post-disaster cleanup times.

Environmental

Parks and open space assets currently affected by tidal flooding and high water would experience reduced downtime and expedited recovery through this action. Backflow preventers would help to avoid spillback into stormwater facilities that contribute to overflow and localized flooding.

Cost-benefit analysis

Installation of backflow prevention systems would reduce localized flooding and alleviate repetitive flooding caused by storms and high tide events. This would reduce damages and costs of repairs to infrastructure, homes, and businesses. It will also reduce economic disruptions caused by nuisance flooding. The cost savings created would be greater than the relatively modest cost of installing and maintaining the backflow valves.

Risk reduction

Primary risk reduction affects a significant portion of the population due to the location of homes and businesses near affected stormwater drains and other areas where tidal backflow currently occurs. Application of drainage improvements would directly affect residences and businesses along the Hog Island Channel, the Lawson Boulevard commercial/industrial corridor, Powell Creek, Mill River, and Bedell Creek to reduce the risk of future flooding.

Implementation of the tidal backflow prevention project would significantly reduce the risk of flooding to multiple. The risk assessment completed for this project anticipated the risk of future flooding would be reduced from extreme to moderate for the sanitary sewer, stormwater drainage systems, and single-family housing. The risk assessment further anticipated that the risk of future flooding would be reduced from high to moderate for transportation assets including the Long Beach Road, Oceanside Road, and other major north-south and east-west roadways, providing increased safety and improved access to services for the 32,109 residents living in the area.[46]

Timeframe

Immediate (within two years)

Tidal backflow prevention
Source: URS

Regulatory requirements

This project will require Town of Hempstead and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Town of Hempstead, and Nassau County

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

Drainage improvements

Superstorm Sandy overwhelmed the stormwater drainage systems in Barnum Island, the Village of Island Park, and Harbor Isle. The resulting floodwaters inundated homes, schools, and businesses, and blocked streets, preventing evacuation and emergency access. Moreover, the system regularly becomes overloaded during storms resulting in inadequate drainage of runoff and flooded streets. Streets and vital intersections become dangerous for travel due to stormwater and tidal flooding during high tide and minor rainfall events. This can block evacuation early in a major storm event, impeding evacuation and emergency access.

Description

This project would improve the stormwater drainage system to reduce flooding in Barnum Island, the Village of Island Park, and Harbor Isle in low-lying areas, roadways, and evacuation routes.

Implementation steps would include:

- Conduct a comprehensive phased analysis of the stormwater drainage system to:
  - Analyze system needs;
  - Inspect condition of system;
  - Identify and clear blockages and prioritizes repairs; and,
  - Identify improved regulatory actions (permitting, land use, zoning) to improve the long term function of the system.

Cost estimate:

Cost estimates include the study, phased implementation, and pilot projects specified above:

Barnum Island:	
Study:	$100,000
Improvements:	$1,250,000
Village of Island Park:	
Study:	$200,000
Improvements:	$6,380,000
Harbor Isle:	
Study:	$100,000
Improvements:	$1,880,000
Total cost estimate:	**$9,910,000**

Figure 26: Drainage improvements in Barnum Island, the Village of Island Park, and Harbor Isle

Potential drainage improvements to Long Beach Road in the Village of Island Park

0 20 Feet

Source: URS

Harbor Isle low-lying streets & homes

The Village of Island Park downtown and "bowl"

Legend

- NYRCR Community
- Areas prone to flooding
- Primary evacuation route
- Marshes
- Parks
- Buildings

N

0 0.2 0.4 0.8 Miles

Source: OpenStreetMap

- Design and construct phased improvements to the stormwater drainage system at priority locations, including pump station(s) in the Village of Island Park downtown to alleviate flooding of the area that includes the LIRR Station, Long Beach Road, and Nassau Lane;
- In Harbor Isle, assess feasibility of, and if feasible, elevate roadways and install yard drains at the southern tip of Harbor Isle to mitigate flooding. Roads include: Island Parkway West, North, and South; Island Park Place West; Sheridan Place and Washington Avenue; and,
- Implement a pilot project testing the application of green stormwater infrastructure, including permeable pavement.

Benefits

This project would reduce flooding, protecting Barnum Island, the Village of Island Park, and Harbor Isle during a major storm. It would protect lower lying areas, including the Island Park "bowl" and the southern end of Harbor Isle, from repetitive nuisance flooding caused by moon tides and other high tide events and small and moderate storms.

Health and social

Drainage improvements would aid in reducing localized flooding and failure of stormwater systems. Many locations and assets, including senior housing, special needs services, and schools would see improved conditions with this improvement.

Economic

Drainage improvements around employment centers would help them recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. This project would help reduce post-disaster emergency and recovery costs by decreasing the extent of flooding in the community.

Environmental

Parks and open space assets currently affected by tidal flooding and high water would experience reduced downtime and expedited recovery through this action. Pump stations and retention basins would help to slow the inundation of low-lying areas. Green infrastructure and recharge options would serve as filters to ensure that groundwater contamination is reduced.

Cost-benefit analysis

Drainage infrastructure improvements are a critical step to eliminating repetitive nuisance flooding during small storm events. Although the total project cost is high, the cost reductions achieved through eliminating the need for repeated repairs to infrastructure, homes, and businesses would offset these costs. The project will also reduce economic disruptions caused by nuisance flooding.

Risk reduction

This project would increase the stormwater drainage system capacity to reduce flooding in low-lying areas, roadways, and evacuation routes. Significant improvements in the drainage system would drastically reduce vulnerability for a large number of assets including economic resources, government facilities, schools, transportation systems, stormwater systems, water systems, religious organizations, parks and recreation, and single-family housing.

This project would affect a majority of the population due to the geographic extent of low-lying areas, and most residential assets that would see benefits from the improvements. Primary application of drainage improvements would directly affect residences and businesses in the "bowl" of the Village of Island Park, bounded roughly by Nassau Lane and Long Beach Road, the Village of Island Park business district along Long Beach Road, Harbor Isle between Warwick Road and Island Parkway South, and Barnum Island along Austin Boulevard from Nassau Lane east to Trafalgar Boulevard.

Implementation of the drainage improvement project would provide improved stormwater drainage for the 8,370 residents living in the area[47] and significantly reduce the risk of future flooding to multiple assets. The risk assessment completed for this project anticipated that the risk of future flooding to economic, sanitary sewer, stormwater drainage, and single family housing assets would be reduced from extreme to high risk. Flood risk to assisted living areas that house vulnerable populations, emergency rescue facilities, water systems, the transportation network, parks, recreation, and religious assets would be reduced from high to moderate.

Timeframe

Near-term (within three years)

Regulatory requirements

This project will require Village of Island Park and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park, Town of Hempstead (for Harbor Isle and Barnum Island), and Nassau County

Drainage Improvements

Proposed

Oceanside

Superstorm Sandy overwhelmed Oceanside's stormwater drainage system. The resulting floodwaters inundated homes, schools, and businesses, and blocked streets, preventing evacuation and emergency access. Moreover, the system regularly becomes overloaded during storms, resulting in inadequate drainage of runoff and flooded streets. Streets and vital intersections become dangerous for travel due to stormwater and tidal flooding during high tide and minor rainfall events. This can block evacuation early in a major storm event, impeding evacuation and emergency access.

Description

This project would improve the stormwater drainage system to reduce flooding in low-lying areas, roadways and evacuation routes.

Implementation steps would include:

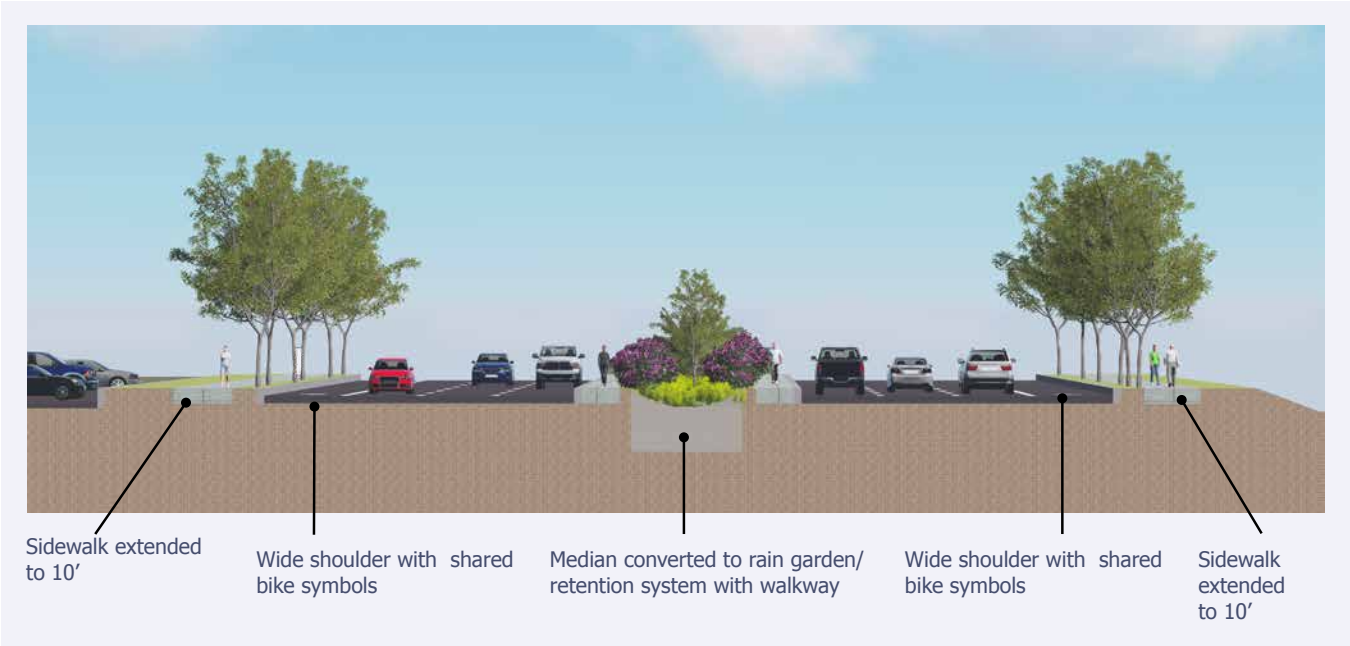
- Conduct a comprehensive phased analysis of the stormwater drainage system for implementation of a pilot or phased program of improvements that may include but is not limited to:
  - Analyze system needs;
  - Inspect condition of system;
  - Identify and clear blockages and prioritize repairs; and,
  - Identify improved regulatory actions (permitting, land use, zoning) to improve the long term function of the system.
- Conduct a phased implementation of identified drainage improvements at eight to ten intersections; and,

Cost estimate:

Cost estimates include the study, phased implementation, and pilot project specified above:

Study:	$200,000
Improvements:	$10,120,000
Total cost estimate:	**$10,320,000**

Figure 27: "Complete street" improvements along Long Beach Road



Typical section for potential "complete street" improvements to Long Beach Road

0 20 Feet

Source: URS

Long Beach Road viewed from Davison Avenue
Source: LiRo Group

- Implement a "complete street" pilot project on Long Beach Road, which will include improved stormwater drainage, streetscaping, and pedestrian and bicycle improvements to create amenities to support new economic investment.

Benefits

This project would reduce flooding, protecting Oceanside during a major storm. It would protect lower lying areas, including Schools 9E and 9M, from repetitive nuisance flooding caused by moon tides and other high tide events and small and moderate storms.

Health and social

Drainage improvements would aid in reducing localized flooding and failure of stormwater systems. Many locations, including senior housing, special needs services, and schools would see improved conditions with this improvement. This project would provide for a reduction in flooding that should improve access before, during, and after an emergency.

Economic

Drainage improvements around employment centers would help them recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. This project will help reduce post-disaster emergency and recovery costs by decreasing the extent of flooding in the community.

Environmental

Parks and open space assets currently affected by tidal flooding and high water would experience reduced downtime and expedited recovery through this action. Green infrastructure, complete street design, and pervious pavement options would serve as filters to ensure that groundwater contamination is reduced.

Cost-benefit analysis

Drainage infrastructure improvements are a critical step to eliminating repetitive nuisance flooding during small storm events. Although the total project cost is high, the cost reductions achieved through eliminating the need for repeated repairs to infrastructure, homes, and businesses would offset these costs. The project will also reduce economic disruptions caused by nuisance flooding.

Risk reduction

This project would increase the stormwater drainage system capacity to reduce flooding in low-lying areas, roadways, and evacuation routes. Significant improvements would drastically reduce vulnerability for a large number of assets including economic resources, government facilities, schools, transportation systems, stormwater systems, water systems, religious organizations, parks and recreation, and single-family housing.

This project would affect a majority of the population south of Windsor Parkway due to the geographic extent of low-lying areas, and residential assets located there would see benefits from the improvements. Primary application of drainage improvements will directly affect residences and businesses along major roads, including but not limited to, Lawson Boulevard, Daly Boulevard, Long Beach Road from Daly Boulevard to Windsor Parkway, Mott Street from Long Beach Road to Oceanside Road, and Oceanside Road from Mott Street to Windsor Parkway. Improvements to these corridors and major intersections would help to reduce flood risk for many residents and businesses.

Implementation of the drainage improvement project would provide improved stormwater drainage for the 32,109 residents living in the area48 and significantly reduce the risk of future flooding to multiple assets. The risk assessment conducted for this project anticipated that the risk of future flooding to economic, sanitary sewer, stormwater drainage, and single family housing assets would be reduced from extreme to high risk. Flood risk to schools, water systems, the transportation network, and religious assets would be reduced from high to moderate.

Example complete street in Charlotte, North Carolina

Source: Complete Streets

Timeframe

Near-term (within three years)

Regulatory requirements

This project will require Town of Hempstead and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Town of Hempstead and Nassau County

Perimeter flood safeguards – California Place Canal and Wreck Lead: Phase 1

Proposed

Barnum Island & the Village of Island Park

Superstorm Sandy tidal surge from California Place Canal and Wreck Lead devastated Barnum Island's residential neighborhoods, the Austin Boulevard commercial corridor, and the Village of Island Park's downtown, including the Island Park LIRR Station. Tidal surge from high tide events and even small storms causes regular flooding of adjacent Barnum Island neighborhoods, Austin Boulevard, and downtown Island Park. The entire area is low-lying, which limits the effectiveness of barrier systems, such as bulkheads, berms, and floodwalls. Without high ground to tie into, water simply flows around the edges of barriers.

Description

This project would evaluate technically feasible solutions to tidal flooding from California Place Canal and Wreck Lead and implement the first phase of a system of barriers and natural improvements to reduce flooding.

Implementation steps would include:

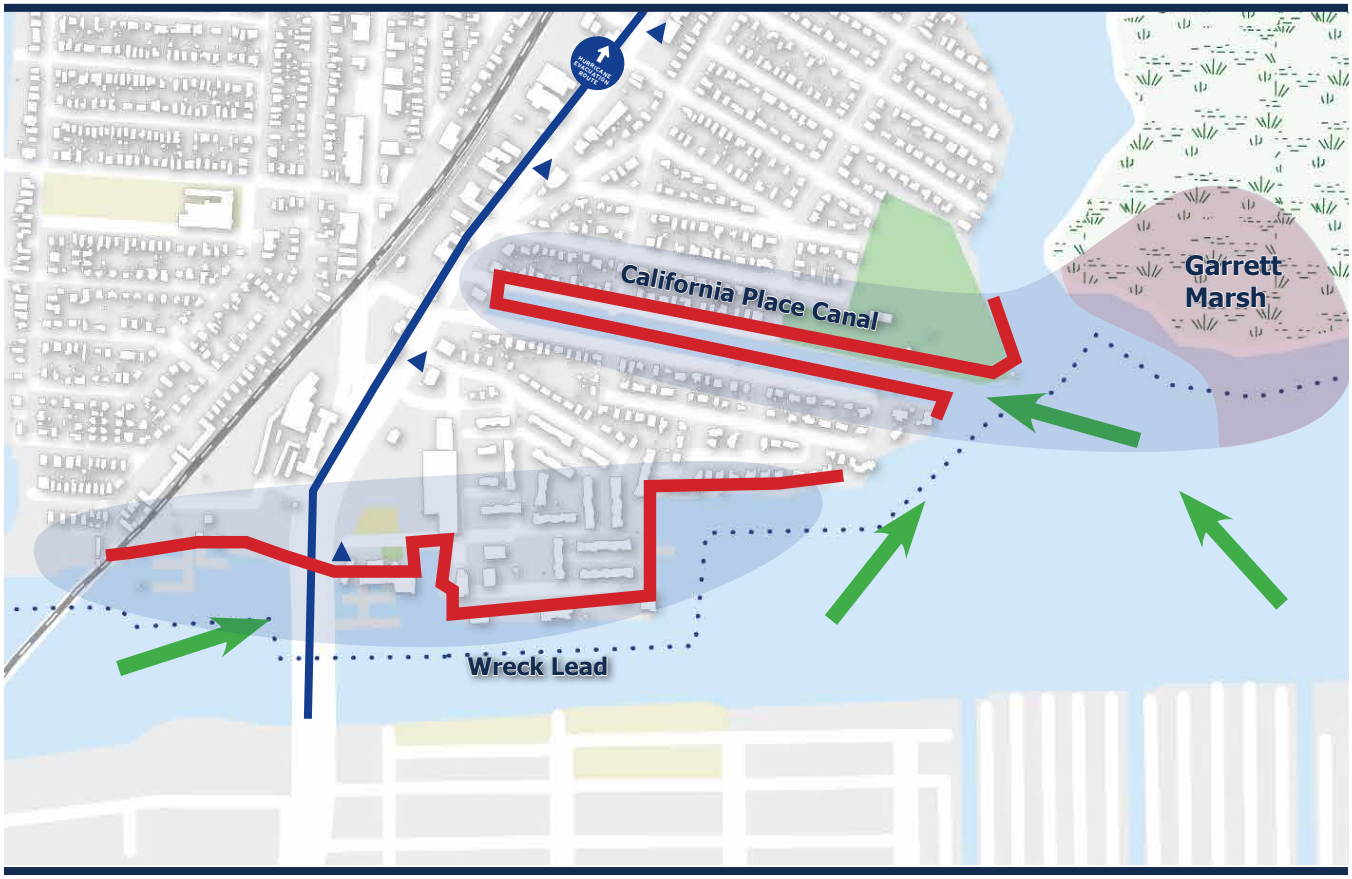
- Conduct a phased comprehensive shoreline conditions analysis and improvement strategy to determine a set of strategies to reduce tidal flooding of the entire low-lying area, including analysis of potential solutions to restore shorelines to better than pre-Hurricane Irene and Superstorm Sandy condition, considering a mix of technical and natural strategies including:
    - Hard infrastructure, such as bulkheads, levees and sea walls;
    - Natural solutions, such as marsh restoration and wetland construction;

Cost estimate:

Cost estimates include a study and phased implementation of improvements to California Canal and Wreck Lead.

Barnum Island:	
Study:	$125,000
Construction/improvements:	$3,000,000
Village of Island Park:	
Study:	$125,000
Construction/improvements:	$750,000
Total cost estimate:	**$4,000,000**

Figure 28: Vulnerable shorelines along California Place Canal and Wreck Lead



Legend

- NYRCR Community
- Marsh restoration
- Shoreline conditions analysis area
- Vulnerable shoreline
- Primary evacuation route
- Direction of tidal flow
- Buildings
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

  - Hybrid solutions, which combine hard infrastructure with natural approaches; and,
  - Wave attenuation, such as reefs, sea grass beds, to slow down the water.
- Implement flood barrier systems adjacent to the Canal and Wreck Lead where feasible; and,
- Coordinate with U.S. Army Corp of Engineers, the Village of Island Park, Town of Hempstead, Nassau County, and New York State to develop a phased approach to implement all recommendations from the shoreline conditions analysis and improvement strategy.

Benefits

This project would reduce flooding, protecting Barnum Island and the Village of Island Park during a major storm. It would protect lower lying areas, including California Place Canal North and California Place Canal South, downtown Island Park, and the Long Island Rail Road Station and electrical substation from repetitive nuisance flooding caused by moon tides and other high tide events and small and moderate storms.

Health and Social

Flood barriers would aid in reducing localized flooding and inundation of stormwater systems. Many locations, including senior housing and schools would see improved conditions with this improvement. This project would provide for a reduction in flooding that should improve access during and after emergencies.

Economic

Flood safeguards around employment centers, especially in the low-lying areas around downtown Island Park, would help them recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. This project would indirectly help the local economy as it would decrease flooding of the affected areas which would help maintain the customer base needed for many local businesses. This project would help reduce post-disaster emergency and recovery costs by decreasing the extent of flooding in the community.

Environmental

Parks and open space assets currently affected by tidal flooding and high stormwater would experience reduced downtime and expedited recovery through this action. Flood barriers and additional improvements would reduce the amount of inundation experienced by the community, reducing the amount of cleanup necessary following the event.

Cost-benefit analysis

The first phase of this project, the shoreline conditions analysis, will identify technically feasible and cost-effective solutions to reduce tidal flooding from California Place Canal and Wreck Lead. The cost of no action is high due to the high frequency of flooding during high tides and even minor storm events. The costs of repeated repairs to infrastructure, homes, and businesses are high. Frequent flooding of downtown Island Park has spurred disinvestment, reducing the economic capacity and the tax base of the Village of Island Park. Given this situation, the benefits appear to outweigh the costs based on the findings of the risk assessment and the determination of the health, social, environmental, and economic benefits this project can provide.

Risk reduction

This project would create a system of barriers and natural shoreline improvements. Significant communities exist around these resources, including residential neighborhoods and commercial corridors. The flood reductions resulting from these projects would greatly reduce the risk for all of these communities.

Primary risk reduction would affect a significant area of the population due to the location of homes and businesses near low-lying areas on the eastern edge of Barnum Island and adjacent to downtown Village of Island Park. Application of these barriers and shoreline improvements would directly affect residences and businesses along California Place Canal, Shell Creek Park, and Wreck Lead.

Implementation of the perimeter flood safeguards phase I project at California Place Canal and Wreck Lead would significantly reduce risk to multiple assets. The risk assessment conducted for this project anticipated that the future risk of flooding to economic, sanitary sewer, stormwater drainage systems, and single family housing assets would be reduced from extreme to high. Flood risk to assets including assisted living areas that house vulnerable populations and transportation systems would be reduced from high to moderate, providing improved access to services for the 2,414 residents living in the area.[49]

Timeframe

Near-term (within three years)

Regulatory requirements

This project will require Town of Hempstead, Village of Island Park, and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park, Town of Hempstead, and Nassau County

California Place North, Barnum Island
Source: LiRo Group

Perimeter flood safeguards

Proposed

Oceanside

Superstorm Sandy tidal surge along Bedell Creek, Powell Creek and Grand Canal was the major source of flooding along the Lawson Boulevard and Long Beach Road commercial corridors and Oceanside schools and neighborhoods. Tidal flows affect Bedell Creek and Grand Canal during high tide and small storm events, causing flooding of adjacent low-lying roads, the Lawson Boulevard commercial/industrial corridor, schools, neighborhoods, and parks.

Description

This project would create a system of barriers and natural shoreline improvements to reduce flooding from Oceanside waterways, including but not limited to, Bedell Creek, Powell Creek, and Grand Canal. Much of the area is low-lying, making solutions complex. A phased comprehensive shoreline conditions analysis would be the first step in the process. The analysis would identify a set of feasible permanent solutions.

Implementation steps would include:

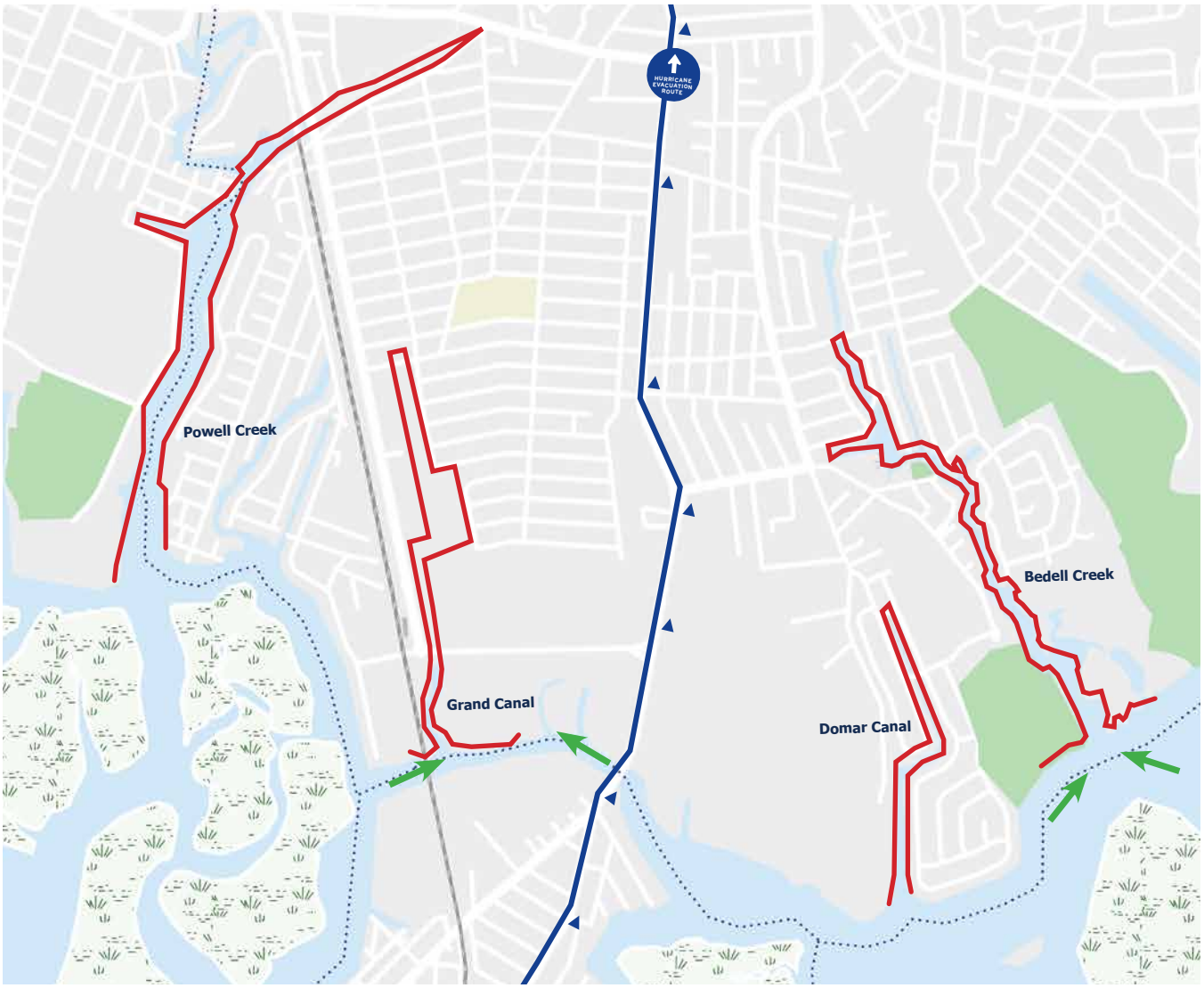
- Installation of flood barrier systems, which may include but are not limited to, the area along Bedell Creek, Powell Creek, and Grand Canal;
- Conducting and implementing a phased shoreline conditions analysis and improvement strategy; and,
- Coordination with U.S. Army Corp of Engineers, Town of Hempstead, Nassau County, and New York State to develop a phased approach to implement recommendations from the shoreline conditions analysis and improvement strategy.

Cost estimate

Cost estimate includes a comprehensive study and phased implementation of improvements.

Study:	$400,000
Construction of improvements:	$6,050,000
Total cost estimate:	**$6,450,000**

Figure 29: Vulnerable shorelines along Powell Creek, Grand Canal, Domar Canal and Bedell Creek



Tidal flooding and wind-driven tides

Legend

- NYRCR Community
- Shorelines requiring additional protections
- Primary evacuation route
- Direction of tidal flow
- Marshes
- Parks

N 0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

This project would reduce flooding, protecting all of Oceanside during a major storm. It would protect lower lying areas, including the Lawson Boulevard commercial/industrial corridor, Waukena Avenue, Oceanside Park, and Schools 8, 9E, and 9M, from repetitive nuisance flooding caused by moon tides and other high tide events and small and moderate storms.

Health and social

Flood barriers would aid in reducing localized flooding and inundation of stormwater systems. Many locations, including senior housing and schools would see improved conditions with this improvement. This project would provide for a reduction in flooding that should improve access before, during, and after emergencies.

Economic

Flood safeguards around employment centers, especially in the Grand Canal area, would help them recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. This project would indirectly help the local economy as it would decrease flooding in neighborhoods, which would help maintain the customer base needed by local businesses. This project would help reduce post-disaster emergency and recovery costs by decreasing the extent of flooding in the community.

Environmental

Parks and open space assets currently affected by tidal flooding and high stormwater would experience reduced downtime and expedited recovery through this action. Flood barriers and additional improvements would reduce the amount of inundation experienced by the community, reducing the amount of cleanup necessary following the event.

Cost-benefit analysis

Although the total cost is high, the benefits appear to outweigh the costs based on the findings of the risk assessment and the determination of the health, social, environmental, and economic benefits this project can provide. The cost of no action is high due to the high frequency of flooding during high tides and even minor storm events. The costs of repeated repairs to infrastructure, homes, and schools are high.

Risk reduction

This project would create a system of barriers and natural shoreline improvements to reduce flooding in the areas near Oceanside waterways, including but not limited to, Bedell Creek, Powell Creek and Grand Canal. Significant communities exist around these resources, including residential neighborhoods and commercial corridors. The flood reduction resulting from these projects would greatly reduce the risk for all of these communities.

Primary risk reduction would affect a significant portion of the population due to the location of homes and businesses in proximity or directly adjacent to low-lying areas, creeks, and shorelines. Application of barriers and shoreline improvements would directly affect residences and businesses along Grand Canal, Oceanside Park, Schools 8, 9E, and 9M, and along Barnum's Channel, Garrett Lead, and Bedell Creek.

Implementation of the perimeter flood safeguards in Oceanside would significantly reduce risk to multiple assets. The risk assessment anticipated that the future risk of flooding to economic, sanitary sewer, and stormwater drainage systems would be reduced from extreme to high. Flood risk to assets including single family housing and transportation systems would be reduced from high to moderate, providing improved flood safeguards for the 8,123 residents living in the area.[50]

Timeframe

Near-term (within three years)

Jurisdiction

Town of Hempstead

Regulatory requirements

This project will require Town of Hempstead and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Grand Canal, Oceanside
Source: URS

Destination revitalization and transit-oriented development

Proposed

Barnum Island & the Village of Island Park

Downtown flooding from Superstorm Sandy damaged businesses along Long Beach Road in the Village of Island Park. Sandy damage, on top of repeated damage from nuisance flooding from high tide events and small storms, has discouraged businesses from making investment in their properties. Several businesses decided not to reopen after Sandy. A plan to revitalize the downtown area and connect it to the Wreck Lead waterfront is needed to maintain and increase its economic viability.

Description

This project would build on the drainage and perimeter flood protection projects to support investment in the Village of Island Park's downtown and Wreck Lead waterfront. The infrastructure projects would reduce flooding, and the revitalization plan would identify the tools needed to attract new investment to the area. The project would result in the development of a mixed-use, transit-oriented development plan to revitalize the Village of Island Park's downtown and waterfront to attract new residents, businesses, and visitors to the Long Beach Road business district and Wreck Lead waterfront.

Implementation steps would include:

- Preparation of a downtown/waterfront revitalization plan that:
  - Identifies needed improvements for the Island Park business district and the Wreck Lead waterfront; and,
  - Develops a strategy to create transit-oriented development, including mixed-aged housing and mixed-use (residential/retail/office) options.

Cost estimate:

Cost estimate includes the revitalization plan and retention of a local disaster recovery manager for two years.

Revitalization Plan:	$150,000
Local Disaster Recovery Manager:	$100,000
Total Cost Estimate:	**$250,000**

Figure 30: The Village of Island Park downtown and waterfront revitalization area

Legend

- NYRCR Community
- Downtown revitalization area
- Pedestrian and accessibility improvements
- Primary evacuation route
- Connections to waterfront
- Buildings
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

- Retention of a local disaster recovery manager to manage programs and pursue additional funding.

Future implementation steps to be funded by other sources would include:

- Implement identified improvements to create a walkable downtown, including:
  - Streetscape improvements to enhance the appearance, create a cohesive sense of place, and improve pedestrian and bike circulation;
  - Building façade improvement program; and,
  - Zoning changes to encourage mixed-use development throughout the downtown and waterfront area.
- Establish new multi-modal road linkages:
  - Between downtown Island Park and the Wreck Lead waterfront;
  - Across downtown at the LIRR Station to create attractive and safe access across the tracks and Austin Boulevard to Shell Creek Park;
  - Improve pedestrian linkages between downtown and community beaches; and,
  - Create a waterfront walk/bike way and other improvement to support revitalization of the Wreck Lead waterfront.

Benefits

The revitalization plan would provide the direction and policy changes needed to spur reinvestment in the Village of Island Park downtown and waterfront, rebuilding tax base and providing new multi-family and mixed-use housing options.

Economic

The plan would initiate future redevelopment that would reduce risk for the identified areas. New development would support new jobs.

Cost-benefit analysis

The fiscal benefits of revitalizing Island Park's downtown and Wreck Lead waterfront are critical to the economic recovery of the Community from the aftermath of Superstorm Sandy. The cost of preparing a revitalization plan and employing a local disaster recovery manager to manage programs and pursue additional funding are low in comparison to the private investment and resulting increased tax base expected to be achieved with plan implementation.

Risk reduction

This project would create and implement a mixed-use, transit-oriented development plan to revitalize Island Park's downtown and waterfront to attract new residents, businesses, and visitors to the Long Beach Road business district and Wreck Lead waterfront. The plan would initiate future public investments and redevelopment that would reduce risk for the identified areas.

Timeframe

Near-term (within three years)

Regulatory requirements

The plan will include an Environmental Impact Assessment per the New York State Environmental Quality (SEQR) Review standards.

Jurisdiction

Village of Island Park and Town of Hempstead

Streetscaping along Long Beach Road at the Island Park Public Library

Source: URS

Tidal protection at street ends and near Landgraf Park

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

While most privately-owned shoreline properties are protected by bulkheads or other barriers, many street ends and parks are unprotected. Superstorm Sandy tidal surge inundated these breaks in the line of protection to flood streets, homes, schools, and businesses in Barnum Island, the Village of Island Park, and Harbor Isle. The Planning Committee identified protection of street ends and parks as a first step toward a more comprehensive perimeter protection system.

Description

This project would construct flood barriers at public street ends to protect roadways, residences, and businesses from tidal flooding. Prior to construction an analysis is required to determine the best method to reduce flooding at street ends. This may include but is not limited to installation of bulkheads, raising existing bulkheads, installing berms where feasible, and/or install other investigated flood barrier systems.

Implementation steps would include:

- Use the phased comprehensive shoreline conditions analysis conducted in the Phase 1 Perimeter Flood Safeguards to identify the best methods to alleviate flooding using flood barrier systems, berms and bulkheads at unprotected street ends and Landgraf Park on Waterford Road as shown in Figure 31;

Cost estimate	
Cost estimate includes a study and implementation of pilot programs.	
Barnum Island:	
Study:	$38,000
Pilot program/implementation:	$300,000
Village of Island Park:	
Study:	$38,000
Pilot program/implementation:	$300,000
Harbor Isle:	
Study:	$38,000
Pilot program/implementation:	$300,000
Total cost estimate:	**$1,014,000**

Figure 31: Street ends to evaluate for protection

- Implement identified improvements as pilot projects is key locations; and,
- Coordinate actions with other agency studies including the U.S. Army Corp of Engineers.

Benefits

This project would reduce flooding, protecting Barnum Island, the Village of Island Park, and Harbor Isle during a major storm. It would protect lower lying areas, including Francis X. Hegarty School, the Austin Boulevard commercial corridor, and the residences located in the Island Park "bowl."

Health and social

Street end protection would aid in reducing localized flooding and inundation of stormwater systems and local streets. Many locations, including senior housing and schools would see improved conditions with this project. Streets would be more passable through implementation of the street end protective measures.

Economic

An increased investment in enhancing emergency preparedness demonstrates a high level of public service capacity which helps with retaining existing businesses and attracting new ones. This project would indirectly help the local economy as it would serve as means to help local businesses recover more rapidly which would help maintain the customer base. This project would help reduce post-disaster emergency and recovery costs by protecting the facilities and reducing post-disaster cleanup times.

Environmental

Landgraf Park on Waterford Road is a primary recipient of improvements through street end protection. The park would be able to withstand storm surges and floodwaters with more frequency through installation of these safeguards. The project could reduce some contamination associated with streets and backyards being flooded with trash and debris that washes out of the channels.

Cost-benefit analysis

The costs of this project are justified by the protection of high-risk roadways, residences, and businesses. Significant communities exist around these resources, including residential neighborhoods, recreation assets, and commercial corridors. The flood risk reduction would reduce damage and the cost of repairs, providing strong benefits to these assets and the Community.

Risk reduction

This project would implement street end flood barriers to protect roadways, residences and businesses. It would directly affect residences and businesses along Island Park Channel, the Redfield Road area near Landgraf Park, and the entire eastern edge of Barnum Island including Trafalgar Boulevard, Kingston Boulevard, and Empire Boulevard. The resulting flood protection would improve the resiliency of significant assets, including residential neighborhoods and infrastructure systems, and the flood reduction resulting from this project would greatly reduce their risk.

The risk assessment completed for this project anticipated that the risk of future flooding to sanitary sewer, stormwater drainage systems, and single-family housing assets would be reduced from extreme to high. Flood risk to assets including transportation systems and parks would be reduced from high to moderate, providing improved flood safeguards for the 6,057 residents living in the area.[51]

Timeframe

Near-term (within three years)

Regulatory requirements

This project will require Town of Hempstead, Village of Island Park, and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park and Town of Hempstead

Street end bulkhead at California Place Canal, Barnum Island

Source: URS

Shoreline and beach restoration and environmental enhancements

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

Superstorm Sandy damaged the beaches in the Village of Island Park and Harbor Isle. All three beaches are in need of restoration and repairs to protect them from erosion and to protect adjacent areas from flooding.

Description

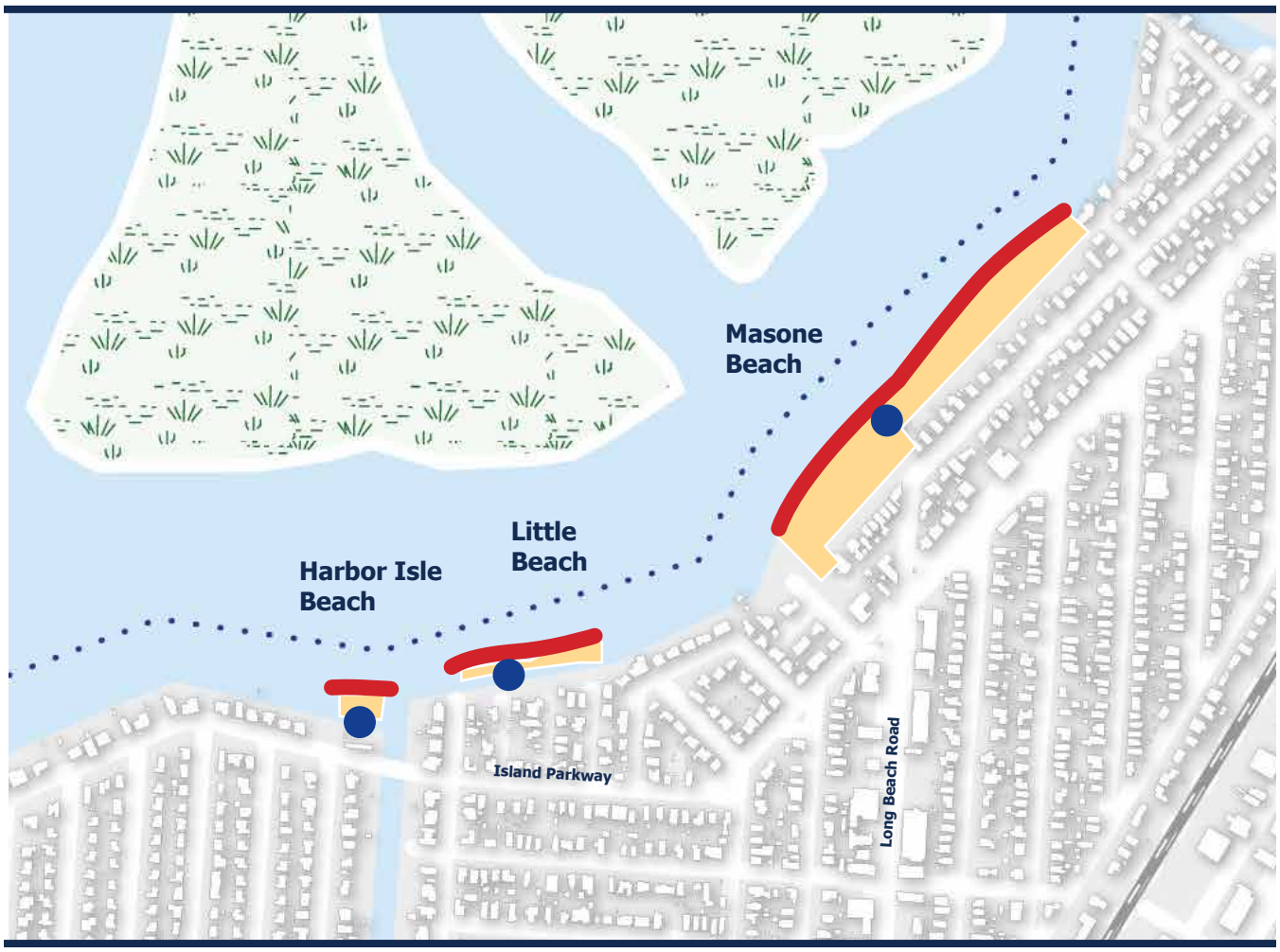
This project would restore local beaches, including Little Beach (in conjunction with an existing U.S. Army Corps of Engineers project), Masone Beach, and Harbor Isle Beach to protect them from erosion, and to protect adjacent residential areas from experiencing flooding at high and moon tides.

Implementation steps would include:

- Conduct a viability analysis and, where feasible, implement soft solutions and living shorelines, including but not limited to implementation of pilot projects along the beaches and shorelines;
- Restore and replenish beaches;
- Conduct a seawall integrity analysis and pilot repair program at Masone Beach;
- Restore recreational equipment at Masone Beach;
- Provide matching funds for the U.S. Army Corps of Engineers beach revitalization project at Little Beach;
- Remediate erosion at Jackson Place; and,
- Create access points to the Nassau County South Shore Blueway Trail.

Cost estimate	
Cost estimates include a study, pilot programs, and implementation of improvements.	
Village of Island Park:	
Little Beach U.S.A.C.E match:	$300,000
Masone Beach stability study and seawall pilot project:	$1,000,000
Harbor Isle:	
Environmental enhancement study:	$100,000
Harbor Isle Beach restoration:	$750,000
Total cost estimate:	**$2,150,000**

Figure 32: Living shoreline/beach replenishment and revitalization



Legend

- NYRCR Community
- Beach restoration
- Potential connection to Blueway Trail
- Beaches
- Buildings
- Marshes

N

0 0.125 0.25 Miles

Source: OpenStreetMap

Benefits

Beach repair and restoration would protect the adjacent residential neighborhoods from tidal flooding and provide enhanced recreational resources for the residents of Barnum Island, the Village of Island Park, and Harbor Isle.

Health and social

Beach improvements would add another line of protection to many of the neighborhoods surrounding Harbor Isle, Little, and Masone Beaches.

Economic

Improvements to these beaches and hard infrastructure would help them serve as needed shore breaks and filters for storm surges during and after a storm. This more rapid recovery reduces the chance that neighboring employment centers would reduce services and lay off employees. Funding these improvements would leverage current commitments from outside sources to reduce the effective amount that local government is committed to for these repairs.

Environmental

The project can reduce some contamination associated with floodwaters, acting as a filter system before those contaminants reach neighborhoods. While not creating new open space, this project would restore previously reduced open space to past levels.

Cost-benefit analysis

The costs of improvements to Harbor Isle Beach, Little Beach, and Masone Beach would be justified by the benefits of enhanced recreational facilities, reduced risk of tidal flooding to adjacent neighborhoods, and reduced clean-up and recovery costs.

Risk reduction

This project would restore local beaches including Little Beach (in conjunction with the existing U.S. Army Corps of Engineers project), Masone Beach, and Harbor Isle Beach. These improvements would add stability to weakened neighborhood beaches to restore them to more complete flood control capacities. This strengthening would help to reduce risk to neighboring residential and business populations.

Primary risk reduction would be to the beaches themselves, and beaches were identified as significant assets to the community. With this project, it is anticipated that the risk to beaches would be reduced from high to moderate. Secondary risk reduction will be provided to homes and businesses in proximity to the beaches along the northern edge of the Village of Island Park and Harbor Isle.

Timeframe

Immediate (within two years)

Regulatory requirements

This project will require Town of Hempstead, Village of Island Park, and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park and Town of Hempstead

Harbor Isle Beach, Harbor Isle
Source: URS

Little Beach, the Village of Island Park
Source: URS

Masone Beach, the Village of Island Park
Source: LiRo Group

Shoreline and open space preservation

Proposed

Oceanside

Superstorm Sandy eroded the Oceanside Park shoreline, and floodwaters crossed the park to flood Schools 9E and 9M, located adjacent to the park. Oceanside Park is a significant community amenity and was used to distribute emergency supplies after Superstorm Sandy.

Description

This project would revitalize the Oceanside Park shoreline to improve the resiliency of the area and establish a more sustainable resource for the Community. It would improve the resiliency of the nearby schools and neighborhoods by stabilizing the shoreline.

Implementation steps would include:

Prepare a shoreline improvement study and phased project implementation schedule. Phased implementation of the improvements may include but are not limited to the following:

- Installation of erosion control and shoreline revitalization measures, including living shorelines where feasible;
- Establishing a connection to the Nassau County South Shore Blueway;
- Construction of resiliency improvements to the park and recreation facilities in coordination with any improvements that may be identified by the Town of Hempstead;
- Educating the public about the park's role in emergency response, recreation, and potential to attract new residents and economic development; and,
- Coordinating actions with other agency studies including the Town of Hempstead, U.S. Army Corps of Engineers and Department of Environmental Conservation.

Cost estimate

Cost estimate includes study and phased implementation of shoreline and recreation improvements.

Shoreline improvements and open space study:	$200,000
Shoreline improvements and open space construction/improvements:	$3,600,000
Total cost estimate:	**$3,800,000**

Figure 33: Shoreline restoration for Oceanside Park

Legend

- NYRCR Community
- Shoreline restoration
- Potential connection to Blueway Trail
- Buildings
- Marshes
- Open space

N

0 0.125 0.25 Miles

Source: OpenStreetMap

Benefits

The shoreline restoration would protect the adjacent residential neighborhoods, areas in proximity to the Park and Schools 9E and 9M from tidal flooding. The project would also provide enhanced recreational resources for the residents of Oceanside.

Health and social

Park and shoreline improvements would add another line of protection to many of the neighborhoods surrounding Oceanside Park. There are school populations directly adjacent to the area that would directly benefit from an additional line of protection against tidal flooding and storm surge. This project would provide for a reduction in flooding that should improve access during and after an emergency.

Environmental

Oceanside Park would be protected and enhanced through this project. While not creating new open space, this project would restore previously reduced open space to past levels and greatly protect this asset in future storm events.

Cost-benefit analysis

This project would revitalize Oceanside Park to improve the resiliency of the area and establish a more sustainable resource for the Community. It leverages any park improvements identified by the Town of Hempstead, to maximize benefits to the Community. Stabilizing the shoreline would add another line of protection for nearby schools and neighborhoods surrounding Oceanside Park.

Risk reduction

This project would improve the recreational capacity of Oceanside Park and would establish a more sustainable and resilient resource for the Community by restoring the Park's shoreline. These improvements would directly affect neighboring residential and business areas by reducing their susceptibility to flooding.

Residential areas and school populations directly border the project area and are impacted by Bedell Creek, which flows alongside many population centers in this portion of the community. Improvements proposed for this area would reduce the likelihood of flooding in these populated areas.

Primary risk reduction would affect a significant population due to the location of homes and businesses in or adjacent to Oceanside Park or within range of the Bedell Creek flood path. Application of these shoreline improvements would directly affect residences and businesses along and adjacent to Greentree Drive, Mahlon Brower Drive, and Oceanside school 9E and 9M.

The risk assessment completed for this project anticipated that implementation of the shoreline and open space preservation project would significantly reduce risk to multiple assets. The risk of future flooding of sanitary sewer and stormwater drainage systems is anticipated to be reduced from extreme to high. The risk of future flooding to parks, single-family housing, and schools would be reduced from high to moderate, providing improved flood safeguards for the 1,905 residents living in the area.[52]

Timeframe

Immediate (within two years)

Regulatory requirements

This project will require Town of Hempstead and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Town of Hempstead

Figure 34: Potential improvements to Oceanside Park

Current conditions along Oceanside Park shoreline

Potential improvements to the Oceanside Park shoreline

Source: URS

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

Marsh restoration: Phase I

Marsh degradation has been exacerbated by Superstorm Sandy and resulting waste water infiltration from the Bay Park Sewage Treatment Plant. High nutrient content has reduced the structure of the marsh grass roots, which degrades the integrity of the marshland, causing accelerated erosion. Rising sea level threatens vegetation survival. Continued marsh degradation will further decrease water quality and threaten vulnerable habitats, inhibiting the ecological and protective functions of these vital environmental resources.

Description

This project would conduct a marsh restoration study and pilot implementation project for Garrett Marsh, located east of California Place Canal at Barnum Island. The goals are to increase flood protection to California Canal and the surrounding neighborhoods and to revitalize the marsh habitat and ecosystem.

Implementation steps would include:

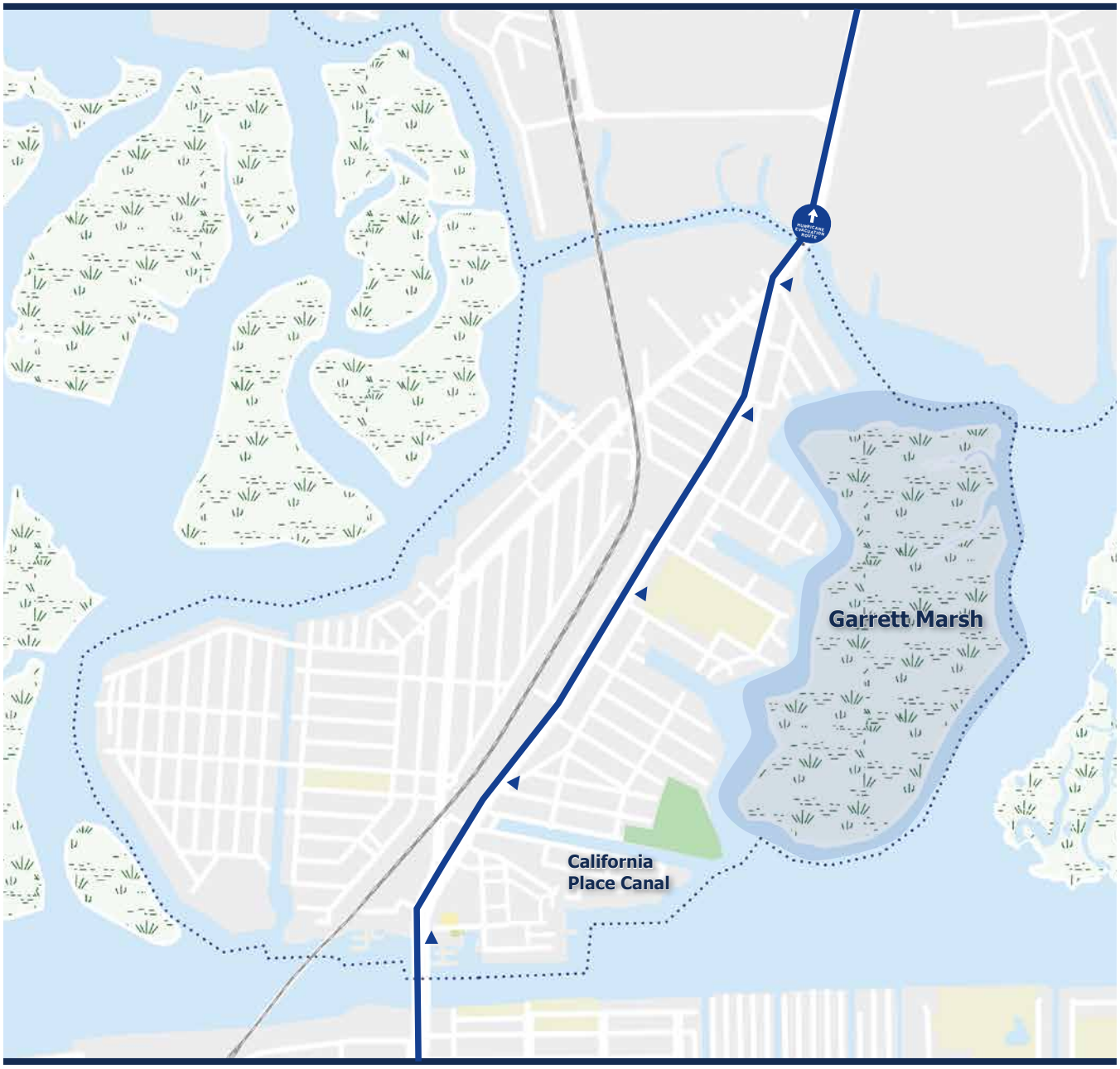
- Preparation of a marsh revitalization plan; and,
- Implementation of a pilot project to implement initial improvements identified in the marsh revitalization study, including:
  - Hard or hybrid-structures (flow controls, weirs, tide gates); and,
  - Natural solutions, such as marsh nourishment, re-vegetation, and living shorelines.

Cost estimate

Cost estimates include the study and pilot project implementation.

Marsh revitalization study:	$100,000
Marsh revitalization pilot	$500,000
Total cost estimate:	**$600,000**

Figure 35: Garrett Marsh at California Place Canal



Legend

- NYRCR Community
- Marsh restoration area
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

The marsh restoration would enhance the environmental quality of the water surrounding the Community, improve fish and wildlife habitat, and improve the natural flood attenuation features of the marshes, reducing flood risk for the Community.

Health and social

Marsh restoration would add another line of protection to many of the neighborhoods in Barnum Island and the Village of Island Park. There are school populations, senior housing, and special needs populations directly adjacent to the area that would directly benefit from an additional line of protection against tidal flooding and storm surge. This project would provide for a reduction in flooding that should improve access during emergencies.

Economic

Improvements to these marshlands would help them serve as needed wave attenuation and filters for storm surges during and after a storm. This improvement would dampen the initial impacts and reduce the chance that neighboring employment centers would reduce services and lay off employees. This project would help reduce post-disaster emergency and recovery costs by protecting neighboring assets and reducing post-disaster cleanup times.

Environmental

Marsh degradation has been exacerbated by Superstorm Sandy and resulting waste water infiltration from the Bay Park Sewage Treatment plant. Continued marsh degradation can lead to decreased quality of water and vulnerable habitats, which inhibits the ecological and protective functions of these vital lands. These assets would be strengthened and secured through this project. The project can also reduce some contamination associated with floodwaters, with the marsh acting as a filter system before those contaminants reach neighborhoods. Marshland restoration would improve the ability to withstand future storm events and break storm surge and high water events in the future.

Cost-benefit analysis

The cost of conducting a marsh revitalization study and restoration pilot project for Garrett Marsh would be justified by the enhanced environmental

View of Garrett Marsh from Barnum Island

Source: LiRo Group

quality of the water surrounding the Community and improvement in the natural flood attenuation features of the marsh, reducing flood risk and avoiding future flood repair costs for the Community.

Risk reduction

This project would conduct a restoration pilot project for Garrett Marsh east of California Place Canal at Barnum Island. These improvements would add stability to weakened marshlands and assess options to further restore them to more complete capacities. This strengthening would help to reduce risk to neighboring residential and business populations by adding another line of defense against rising floodwaters.

Risk reduction would affect a significant percentage of the population due to the location of homes and businesses in or adjacent to the marsh. Application of these marsh improvements would directly affect residences and businesses by restoring the marsh and returning its properties for water filtration and wave attenuation.

The risk assessment anticipates that implementation of the first phase of marsh restoration phase would reduce the risk of future flooding to nearby single-family housing from extreme to high, providing improved flood safeguards for the 1,303 residents living in the area.[53]

Timeframe

Immediate (within two years)

Regulatory requirements

This project will require Town of Hempstead, Village of Island Park, and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Village of Island Park and Town of Hempstead

Emergency transportation lifeline safety plan and initial implementation

Proposed

Barnum Island, the Village of Island Park & Harbor Isle

During Superstorm Sandy the transportation network, including along evacuation routes and streets approaching evacuation routes, became hazardous. Traffic lights did not operate due to power outages, and there was no communication system for informing residents of the flooded roads to avoid. It took four weeks to fully restore power and a fully-functioning street network. This project would identify emergency routes and the improvements needed for them to function during and after an emergency.

Description

This project would prepare a transportation safety enhancement plan that identifies a "lifeline" road network and the improvements needed to help it function better before, during, and after emergencies. It includes implementation of initial improvements, including solar powered backup street lighting and vehicle message signs.

This project would include the following components:

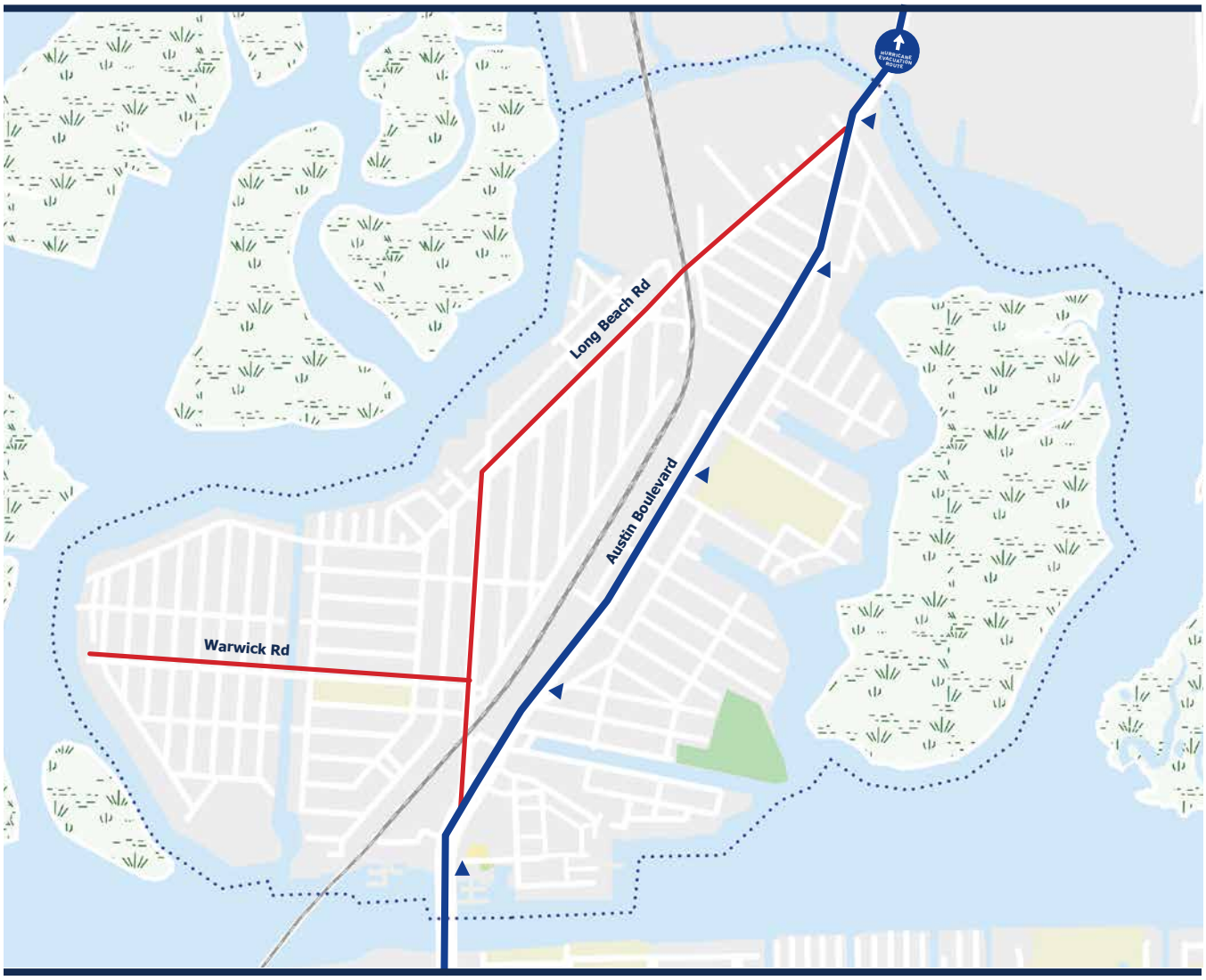
- Identification of local lifeline roads leading to critical facilities and regional evacuation routes;
- Development of comprehensive lifeline guidelines and standards for:
  - Priority debris removal on lifeline roads;
  - Connecting lifeline roads with critical facilities;
  - Priority power restoration on lifeline roads;
  - Operational cell phone tower coverage;

Cost estimate:

Cost estimates include preparation of the lifeline plan and implementation of solar powered backup street lights and vehicle message signs.

Barnum Island:	$320,000
Village of Island Park:	$320,000
Harbor Isle:	$320,000
Total cost estimate:	**$960,000**

Figure 36: Austin Boulevard: The main evacuation route from Barnum Island, the Village of Island Park, and Harbor Isle



Legend

- NYRCR Community
- Primary evacuation route
- Major connector
- Marshes
- Parks

0 0.125 0.25 0.5 Miles

N

Source: OpenStreetMap

  - Needs and locations for independently powered streetlights at key intersections and roadways;
  - Strategic locations for vehicle message signs;
  - Uniform lifeline signage;
  - Identify roadways that need to be raised to function in emergencies; and,
  - Connections to public transportation along lifeline roads.
- Coordination with regional emergency management agencies, including Nassau County, Town of Hempstead, Village of Island Park, and other emergency responders;
- Prioritized phased implementation plan;
- Public education; and,
- Implementation of initial lifeline improvements, including solar powered backup street lighting and vehicle message signs.

Benefits

This project would enhance public safety for evacuations and post-disaster returns for all residents and workers in Barnum Island, the Village of Island Park, Harbor Isle, and the barrier island. It would also improve access for emergency response.

Health and social

The identification of lifeline corridors would assist local governments in securing better access to critical facilities including those that serve vulnerable populations such as schools children, the disabled, and senior citizens. This action would identify lifeline roads across the three communities that would enable a more coordinated and rapid response to the majority of residents. The entire population would have better access to needed post-disaster supplies, services, and information that would be provided in locations accessible through the lifeline network.

Economic

The lifeline plan would help Community assets recover their functions faster after a storm. This more rapid recovery reduces the chance that employment centers would reduce services and lay off employees. Initial capital invested in the project would quickly show dividends in advanced recovery capabilities and response coordination.

Environmental

The plan would provide a framework for coordinated debris removal from lifeline roadways.

Cost-benefit analysis

Roadway improvements have a generally long useful life with proper maintenance and upgrades. Telecommunications upgrades are beneficial as long as upgrades are regularly conducted. The reduction in risk to public safety and the losses avoided due to rapid recovery make this project cost-effective.

Risk reduction

This project would enhance public safety during evacuations and post-disaster returns by helping the transportation and communication systems to function better before, during and after emergencies. This project would greatly assist in removing barriers to reach population centers faster and more reliably.

This project would directly affect many properties. Primary risk reduction would affect a large percentage of the population due to the location of homes and businesses directly on or adjacent to Austin Boulevard, Long Beach Road, and Warwick Road.

While the project will not reduce the risk of flooding, it will support safe evacuation for the 8,370 residents living in the area[54] and residents of the City of Long Beach and the entire barrier island.

Timeframe

Immediate (within two years)

Solar street lighting
Source: Maxwell Hamilton

Regulatory requirements

The project would need to meet the roadway design standards of Nassau County and the NYS Department of Transportation (DOT).

Jurisdiction

Village of Island Park, Town of Hempstead, and Nassau County

Emergency transportation lifeline safety plan and initial implementation

Featured

Oceanside

During Superstorm Sandy the transportation network, including along evacuation routes and streets approaching evacuation routes, became hazardous. Traffic lights did not operate due to power outages, and there was no communication system for informing residents of the flooded roads to avoid. It took four weeks to fully restore power and a fully-functioning street network. This project would identify emergency routes and the improvements needed for them to function during and after an emergency.

Description

This project would prepare a transportation safety enhancement plan that identifies a "lifeline" road network and the improvements needed to help it function better before, during, and after emergencies. It includes implementation of initial improvements, such as solar powered backup street lighting and vehicle message signs.

This project would include the following components:

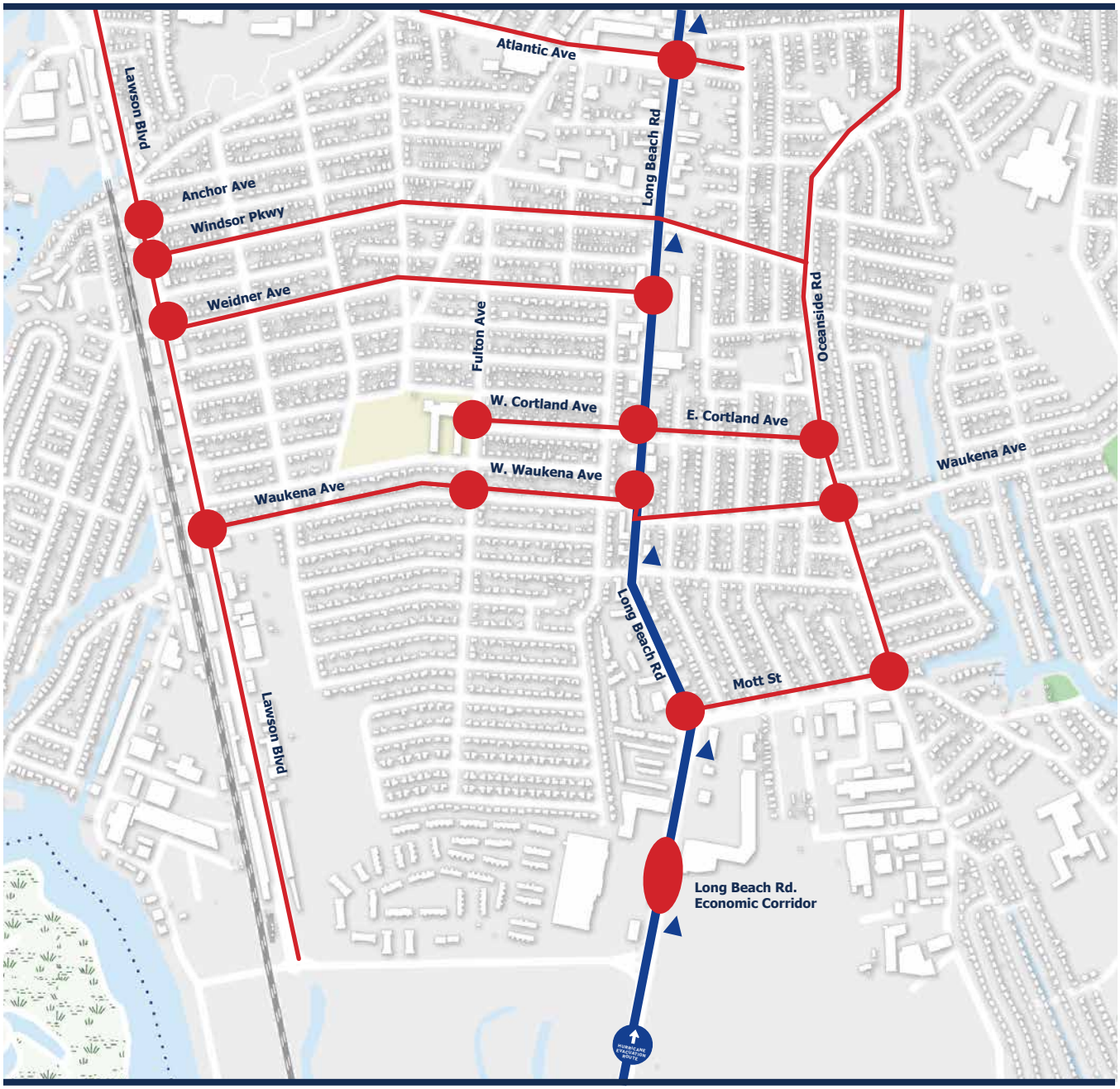
- Identification of local lifeline roads leading to critical facilities and regional evacuation routes;
- Development of comprehensive lifeline guidelines and standards for:
  - Priority debris removal on lifeline roads;
  - Connecting lifeline roads with critical facilities;

Cost Estimate:

Cost estimates include preparation of the lifeline plan and implementation of solar powered backup street lights and vehicle message signs.

Total cost estimate: **$1,440,000**

Figure 37: Proposed lifeline network for Oceanside



Legend

- NYRCR Community
- Primary evacuation route
- Major connector
- Intersections to receive proposed improvements
- Buildings
- Parks
- Marshes

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

  - Priority power restoration on lifeline roads;
  - Operational cell phone tower coverage;
  - Needs and locations for independently powered streetlights at key intersections and roadways;
  - Strategic locations for vehicle message signs;
  - Uniform lifeline signage;
  - Identify roadways that need to be raised to function in emergencies; and,
  - Connections to public transportation along lifeline roads.
- Coordination with regional emergency management agencies, including Nassau County, Town of Hempstead, Village of Island Park, and other emergency responders;
- Prioritized phased implementation plan;
- Public education; and,
- Implementation of initial lifeline improvements, including solar powered backup street lighting and vehicle message signs.

Benefits

This project would enhance public safety for evacuations and post-disaster returns for all residents and workers in Oceanside as well as those in Barnum Island, the Village of Island Park, Harbor Isle, and the barrier island. It would also improve access for emergency response.

Health and social

The identification of lifeline corridors would assist local governments in securing better access to critical facilities including some that serve vulnerable populations such as children, the disabled, and senior citizens. This action would identify lifeline roads that would enable a more coordinated and rapid emergency response to the benefit of a majority of residents. The entire population would have better access to needed post-disaster supplies, services, and information that would be provided in locations accessible through the lifeline network.

Economic

The lifeline plan would help Community assets recover their functions faster after a storm. This more rapid recovery reduces the chance that employment centers would reduce services and lay off employees. Initial capital invested in the project would quickly show dividends in advanced recovery capabilities and response coordination.

Environmental

The plan provides a framework for coordinated debris removal from key lifeline roadways.

Cost-benefit analysis

Roadway improvements have a generally long useful life with proper maintenance and upgrades. Telecommunications upgrades are beneficial as long as upgrades are regularly conducted. The reduction in risk to public safety and the losses avoided due to rapid recovery make this project cost-effective.

Risk reduction

This project would enhance public safety during evacuations and post-disaster returns by helping the transportation and communication system to function better before, during, and after emergencies. This project would assist in removing barriers to reach population centers faster and more reliably.

This project would directly affect many properties. Primary risk reduction would affect a large percentage of the population due to the location of homes and businesses directly on or adjacent to Long Beach Road, Lawson Boulevard, Waukena Avenue, Windsor Parkway, and Cortland Avenue.

While the project will not reduce the risk of flooding, it will support the safe evacuation of the 32,109 residents living in the area[55] and residents of Barnum Island, the Village of Island Park, Harbor Isle, the City of Long Beach, and the entire barrier island.

Hurricane evacuation signage
Source: Wikimedia commons

Timeframe

Immediate (within two years)

Regulatory requirements

The project would need to meet the roadway design standards of Nassau County and the NYS Department of Transportation (DOT).

Jurisdiction

The Town of Hempstead and Nassau County

Marsh restoration: Phase II

Featured

Barnum Island & Harbor Isle

Marsh degradation has been exacerbated by Superstorm Sandy and resulting waste water infiltration from the Bay Park Sewage Treatment Plant. Continued marsh degradation will further decrease water quality and threaten vulnerable habitats, inhibiting the ecological and potential protective functions of these vital environmental resources.

Description

This project would continue restoration of Garrett Marsh east of Barnum Island begun in Phase 1 and conduct a marsh restoration study and marsh restoration on Simmons Hassock Marsh west of Harbor Isle.

Implementation steps would include:

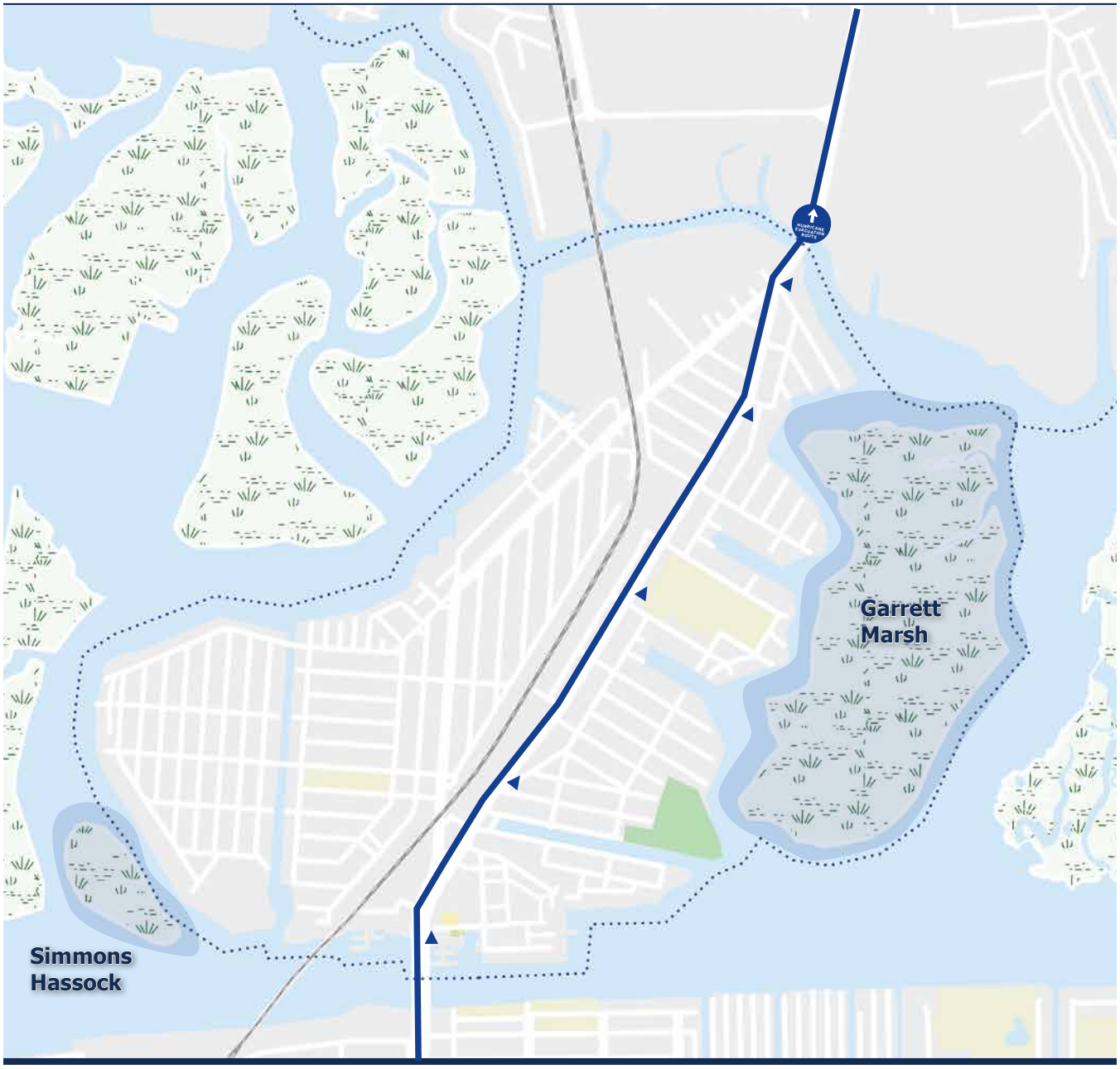
- Preparation of a marsh revitalization plan for Simmons Hassock Marsh; and,
- Implementation of phased improvements identified in the Phase 1 (Garrett Marsh) and Phase 2 (Simmons Hassock) marsh revitalization studies, including:
  - Hard or hybrid-structures (flow controls, weirs, tide gates); and,
  - Natural solutions, such as marsh nourishment and re-vegetation, living shorelines.

Cost estimate

Cost estimates include the study, continued restoration of Garrett Marsh and restoration of Simmons Hassock Marsh.

Marsh revitalization study:	$200,000
Marsh revitalization	$1,800,000
Total cost estimate:	**$2,000,000**

Figure 38: Garrett and Simmons Hassock marshes



Legend

- NYRCR Community
- Marsh restoration area
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

The marsh restoration would enhance the environmental quality of the water surrounding the Community and improve the natural flood attenuation features of the marshes, reducing flood risk.

Health and social

Marsh restoration would add another line of protection to many of the neighborhoods in Barnum Island and Harbor Isle. There are school populations, senior housing, and special needs populations directly adjacent to the area that would directly benefit from an additional line of protection against tidal flooding and storm surge.

Economic

Improvements to these marshes would dampen the initial impacts and reduce the chance that neighboring marinas would reduce services and lay off employees. This project would help reduce post-disaster emergency and recovery costs by protecting neighboring assets and reducing post-disaster cleanup times.

Environmental

Marsh degradation has been exacerbated by Superstorm Sandy and resulting waste water infiltration from the Bay Park Sewage Treatment Plant. Continued marsh degradation will lead to decreased quality of water and will endanger vulnerable habitats, which will inhibit the ecological and protective functions of these vital lands. These assets would be strengthened and secured through this project. The project could also reduce some contamination associated with floodwaters, with the marsh acting as a filter system before those contaminants reach neighborhoods. Marshland restoration would improve the ability to withstand future storm events and break storm surge and high water events in the future.

Cost-benefit analysis

The cost of completing restoration at Garrett Marsh and Simmons Hassock Marsh would be justified by the enhanced environmental quality of the water surrounding the Community and improvement in the natural flood attenuation features of the marshes, reducing flood risk and avoiding future flood repair costs for the Community.

Risk Reduction

This project would conduct a marsh restoration along Garrett Marsh at Barnum Island and Simmons Hassock Marsh at Harbor Isle. These improvements would add stability to weakened marshlands and assess options to further restore them to fully realize their flood control capabilities. This strengthening would help to reduce risk to neighboring residential

and business populations by adding another line of defense against rising floodwaters. Risk to a significant percentage of the population would be reduced due to the location of homes and businesses adjacent to the channels that surround each of these marshes.

The risk assessment completed for this project anticipates marsh restoration would reduce the risk of future flooding to nearby single-family housing from extreme to high, providing improved flood safeguards for the 4,932 residents living in the area.[56]

Timeframe

Near-term (within three years)

Regulatory requirements

This project will require Town of Hempstead and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Jurisdiction

Town of Hempstead

Hail Cove, Chesapeake Bay, before and after living shoreline marsh reconstruction
Source: U.S. Fish and Wildlife Service

Emergency staging area feasibility study and implementation

Featured

Barnum Island, the Village of Island Park & Harbor Isle

During Superstorm Sandy, there was no place to stage emergency equipment and vehicles in Barnum Island, the Village of Island Park, and Harbor Isle. The Island Park Fire Department moved equipment and vehicles out of the area to protect it from flooding, but still lost a fire engine, ambulance, two chiefs' vehicles, and a heavy rescue vehicle to flooding. Opportunities for a safe staging area are limited because all of the Village of Island Park is at a low elevation and subject to flooding.

Description

This project would identify potential sites for and construct an emergency staging area for operations during an emergency and to store emergency response equipment and supplies before, during and after a crisis.

Implementation steps would include:

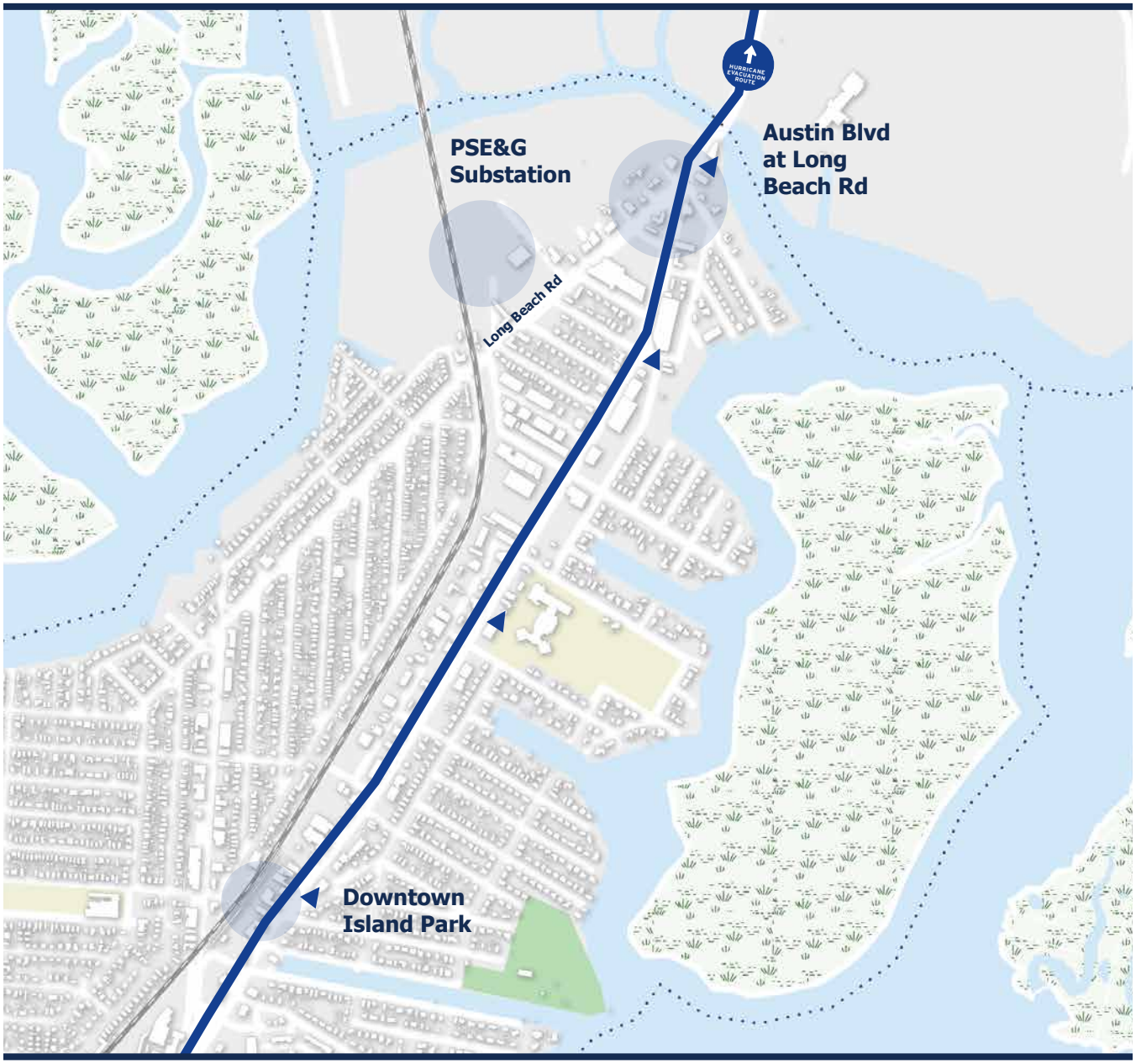
- Conduct a location feasibility study to determine requirements, considering needs to:
  - Elevate emergency vehicles and other response equipment above flood elevations;
  - Enhance the ability to serve the Island Park Village Hall during and outside of emergencies; and,
  - Supplement economic development efforts.
- Evaluation of the potential for a multi-story parking deck to be used to store emergency vehicles during flooding; and,
- Acquisition of a site near Village Hall and the LIRR Station and construction of a parking deck that would store emergency vehicles during flooding and would serve other Village uses, provide additional parking for transit users, and support downtown economic revitalization in other times.

Cost estimate:

Cost estimate includes feasibility study, acquisition costs, and construction of a structure.

Feasibility study:	$200,000
Acquisition and construction:	$2,287,000
Total cost estimate:	**$2,487,000**

Figure 39: Potential emergency staging area locations



Legend

- NYRCR Community
- Primary evacuation route
- Potential emergency staging area location
- Buildings
- Marshes
- Parks

N

0 0.1 0.2 0.4 Miles

Source: OpenStreetMap

Benefits

This project would increase the emergency response functions of the Island Park Fire Department, increasing safety for the residents of Barnum Island, the Village of Island Park, and Harbor Isle during emergencies. If construction of a multi-story parking deck downtown is the selected solution, it would support economic revitalization of the Village of Island Park's downtown.

Health and social

Establishing an emergency staging area would provide a central location for critical post-disaster supplies to be provided to the entire population, including socially vulnerable communities in the immediate vicinity such as school children, seniors, and the disabled. Establishing an emergency staging area would provide a central location for critical post-disaster supplies to be distributed to the entire Community.

Economic

The staging area would help bring services back faster after a storm. This more rapid recovery reduces the chance that employers will reduce services and lay off employees. The staging area would enable the Village of Island Park, Barnum Island, and Harbor Isle to better coordinate supply stock and response procedures. Efficiencies will be realized through shared costs of community services related to in-event response and coordination processes.

Cost-benefit analysis

The project is needed to support effective emergency response. Outside of crisis periods, the deck could be used for parking for the Island Park LIRR Station and to support the economic revitalization of downtown Island Park. Parking revenues would help to make this a cost-effective strategy. Additional parking will also support additional development in downtown and on the waterfront. The parking deck will indirectly support this new development and resulting tax revenues.

Risk reduction

This project would identify potential sites to function as an emergency operations center during an emergency and to store emergency response equipment and supplies before, during and after a crisis. The population served by this project would include all of Barnum Island, the Village of Island Park, and Harbor Isle. The potential for coordination between this project and others including critical facilities resiliency and the lifeline plan would help to reduce overall risk and response and recovery times.

The risk assessment conducted for this project anticipated that it would demonstrate risk reductions to government and civic buildings as well as to emergency response equipment, providing improved access to services for the 8,370 residents living in the area.[57]

Timeframe

Near-term (within three years)

Regulatory requirements

The project will need to meet the Village of Island Park zoning and building permit requirements.

Jurisdiction

Village of Island Park, Town of Hempstead, and Nassau County

Potential staging area location: Parking lot at Island Park LIRR Station
Source: LiRo Group

Island Park Fire Department
Source: LiRo Group

Perimeter flood safeguards – California Place Canal Phase II

Featured

Barnum Island & the Village of Island Park

Tidal flows from California Place Canal cause regular flooding of adjacent Barnum Island neighborhoods, Austin Boulevard, and downtown Island Park. The entire area is low-lying, which limits the effectiveness of barrier systems, such as bulkheads, berms, and floodwalls. When placed on low-lying ground, water simply flows around the edges of barriers.

Description

This project would build on the Phase 1 perimeter flood safeguards to add to a system of barriers and natural improvements to reduce flooding, including but not limited to raising California Place North and South roadways and Iowa Place.

Implementation steps would include:

- Phased construction of barriers and natural improvements identified in the Phase 1 shoreline conditions analysis; and,
- Coordination with the U.S. Army Corp of Engineers, Town of Hempstead, Nassau County and New York State to develop a phased approach to implement recommendations from the comprehensive shoreline conditions analysis and improvement strategy completed in Phase I. The recommendations could include installation of flood protection including but not limited to:
  - Installation of flood barrier systems adjacent to the Canal where feasible;
  - Phased construction of elevated roads road at California Place Canal (North and South) plus Iowa Place; and,
  - Construction of a "second line of protection" along the LIRR tracks to protect downtown Village of Island Park.

Cost estimate

Cost estimate includes barrier installation, phased roadway elevations, and construction of a second line of protection.

Total cost estimate:	**$2,000,000**

Figure 40: Vulnerable shorelines along California Place Canal

Legend

- NYRCR Community
- Vulnerable shoreline
- Primary evacuation route
- Direction of tidal flow
- Shoreline conditions analysis area
- Buildings
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

This project would expand on Phase I improvements, reducing flooding, protecting Barnum Island and the Village of Island Park during a major storm. It would protect lower lying areas, including California Canal Place North and California Canal Place South, downtown Island Park, and the LIRR Station and electrical substation from repetitive nuisance flooding caused by moon tides and other high tide events and small and moderate storms.

Health and Social

Flood barriers would aid in reducing localized flooding and inundation of stormwater systems. Many locations, including senior housing and schools, would see improved conditions with this improvement. This project would provide for a reduction in flooding that should improve access to these facilities before, during, and after an emergency.

Economic

Flood safeguards around employment centers, especially in the low-lying areas around downtown Island Park, would help them recover their functions faster after a storm. This more rapid recovery reduces the chance that the centers would reduce services and lay off employees. It would help reduce post-disaster emergency and recovery costs by decreasing the extent of flooding in the community.

Environmental

Many parks and open space assets currently affected by tidal flooding and high stormwater would experience reduced downtime and expedited recovery through this action. Flood barriers and additional improvements identified through study would reduce the amount of inundation experienced by the community, reducing the amount of cleanup necessary following the event.

Cost-benefit analysis

The first phase of this project, will identify technically feasible and cost-effective solutions to reduce tidal flooding from California Place Canal and Wreck Lead. The cost of no action is high due to the high frequency of flooding during high tides and even minor storm events. The costs of repeated repairs to infrastructure, homes, and businesses are high. Frequent flooding of downtown Island Park has spurred disinvestment, reducing the economic capacity and the tax base of the Village of Island Park. Given this situation, the benefits appear to outweigh the costs based on the findings of the risk assessment and the determination of the health, social, environmental, and economic benefits this project can provide.

Risk reduction

This project would create a system of barriers and natural shoreline improvements and raise the roadway to reduce flooding in the areas around California Place Canal and Iowa Place. Significant communities exist around these resources, including residential neighborhoods and commercial/business corridors. These flood management improvements would greatly reduce the risk for all of these communities.

Primary risk reduction would be to homes and businesses near low-lying areas on the eastern edge of Barnum Island or downtown Village of Island Park. Application of these barriers and shoreline improvements would directly affect residences and businesses along California Place Canal, Shell Creek Park, and along Wreck Lead.

The risk assessment anticipated that the future risk of flooding to economic, sanitary sewer, stormwater drainage systems, and single-family housing assets would be reduced from extreme to high. Flood risk to assets including assisted living areas that house vulnerable populations and transportation systems would be reduced from high to moderate, providing improved access to services for the 2,414 residents living in the area.[58]

Timeframe

Near-term (within three years)

Jurisdiction

Village of Island Park, Town of Hempstead, and Nassau County

Regulatory requirements

This project will require Town of Hempstead, Village of Island Park, and NYS DEC permits. It could also require U.S. Army Corps of Engineer permits, and where Federal permits or funding are involved, Coastal Zone Management federal consistency review by NYS DOS.

Facing west on California Place Canal

Source: LiRo Group

Critical facility resiliency – Island Park Village Hall reconstruction

Featured

The Village of Island Park

Superstorm Sandy destroyed the Island Park Village Hall, rendering it unable to perform its function as a community and emergency facility.

Description

This project would construct a new building for Village Hall, making it more resistant to flood damage, and accessible for emergency response during flooding events. This project is designed to mitigate future flooding damage to this important facility.

The reconstruction of Village Hall would include the following features:

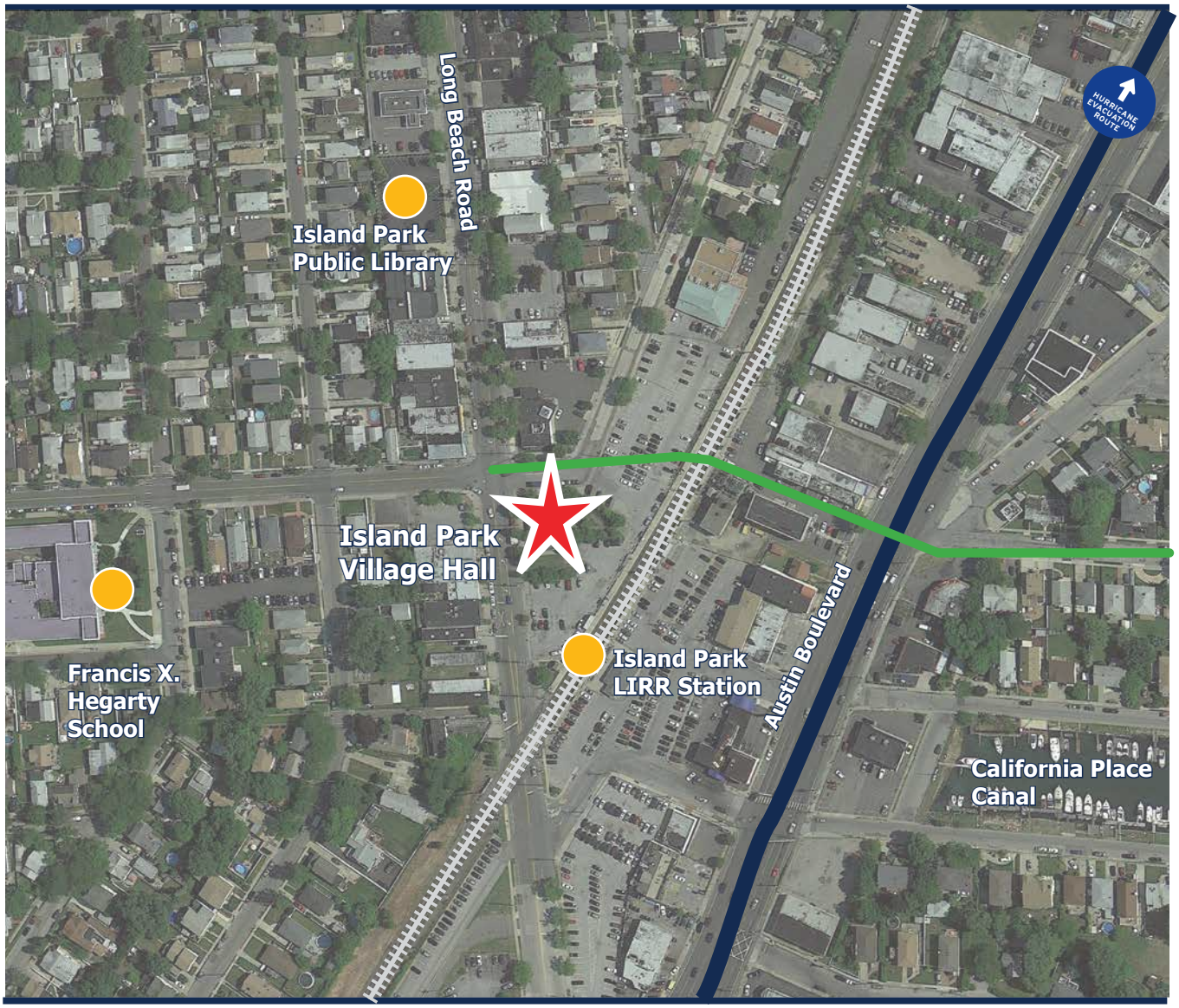
- Interior and exterior mechanical and electrical equipment to be placed above projected flood heights;
- Installation of flood protection along the building envelope and parking lot; and,
- Installation of multi-fuel generators to maintain power for its emergency functions.

Cost estimate

Cost estimate includes the reconstruction of Village Hall.

Total cost estimate:	**$1,430,000**

Figure 41: Downtown Village of Island Park and Village Hall



Source: Google earth

Legend

- Primary evacuation route
- Shoreline conditions analysis area
- Long Island Rail Road
- Community Asset
- Connections to waterfront

Benefits

The project would restore the function of Village Hall. A more resilient Village Hall would be less likely to be damaged in future storms, reducing future reconstruction and associated costs and service interruptions.

Health and social

The Village Hall is in a key strategic facility that needs to be able to function during an emergency. Reconstruction would ensure that the facility is able to function on a daily basis and during emergencies.

Economic

This project would help reduce post-disaster emergency and recovery costs by protecting the facility. It could also accelerate the recovery by providing an early recovery center location that assists residents in getting information and assistance needed post-disaster.

Environmental

The project could reduce contamination associated with flooding, which results from the release of chemicals into floodwaters when structures are flooded.

Cost-benefit analysis

A more resilient Village Hall would provide invaluable benefits to the community in terms of an important community facility that can withstand damages, and would reduce future reconstruction and associated costs and service interruptions.

Risk reduction

This project would make the Village Hall building and equipment more flood resistant. A secure facility would enhance emergency response and re-entry to damaged areas, reducing risk to vulnerable populations and emergency responders. This key facility would be more readily accessible during and after key storm events.

This project would directly affect Village Hall, and it would indirectly affect many nearby properties. Reconstruction of Village Hall would affect residences and businesses along Long Beach Road and neighborhoods adjacent to this area by providing a revitalized destination for community interaction, and in the event of future emergencies, a central coordination center.

Timeframe

Immediate (within two years)

Regulatory requirements

The project will need to meet the Village of Island Park zoning and building permit requirements.

Jurisdiction

The project is located in the Village of Island Park

Temporary Island Park Village Hall
Source: URS

Island Park Village Hall building
Source: LiRo Group

Oceanside industrial waterfront revitalization

Featured

Oceanside

During Superstorm Sandy, the industrial area located on Oceanside's western waterfront experienced flooding and damage. Tidal and storm flooding consistently affect the waterfront area flooding streets and businesses. Such flooding leaves the area vulnerable to economic, social, and environmental damage.

Description

This project would develop a mixed-use revitalization plan for the waterfront industrial area to prepare for its long-term revitalization and redevelopment. The plan will, consider economic development opportunities to support new water-dependent and water-enhanced businesses and mixed-use development, including senior housing.

The project would prepare a waterfront revitalization plan that:

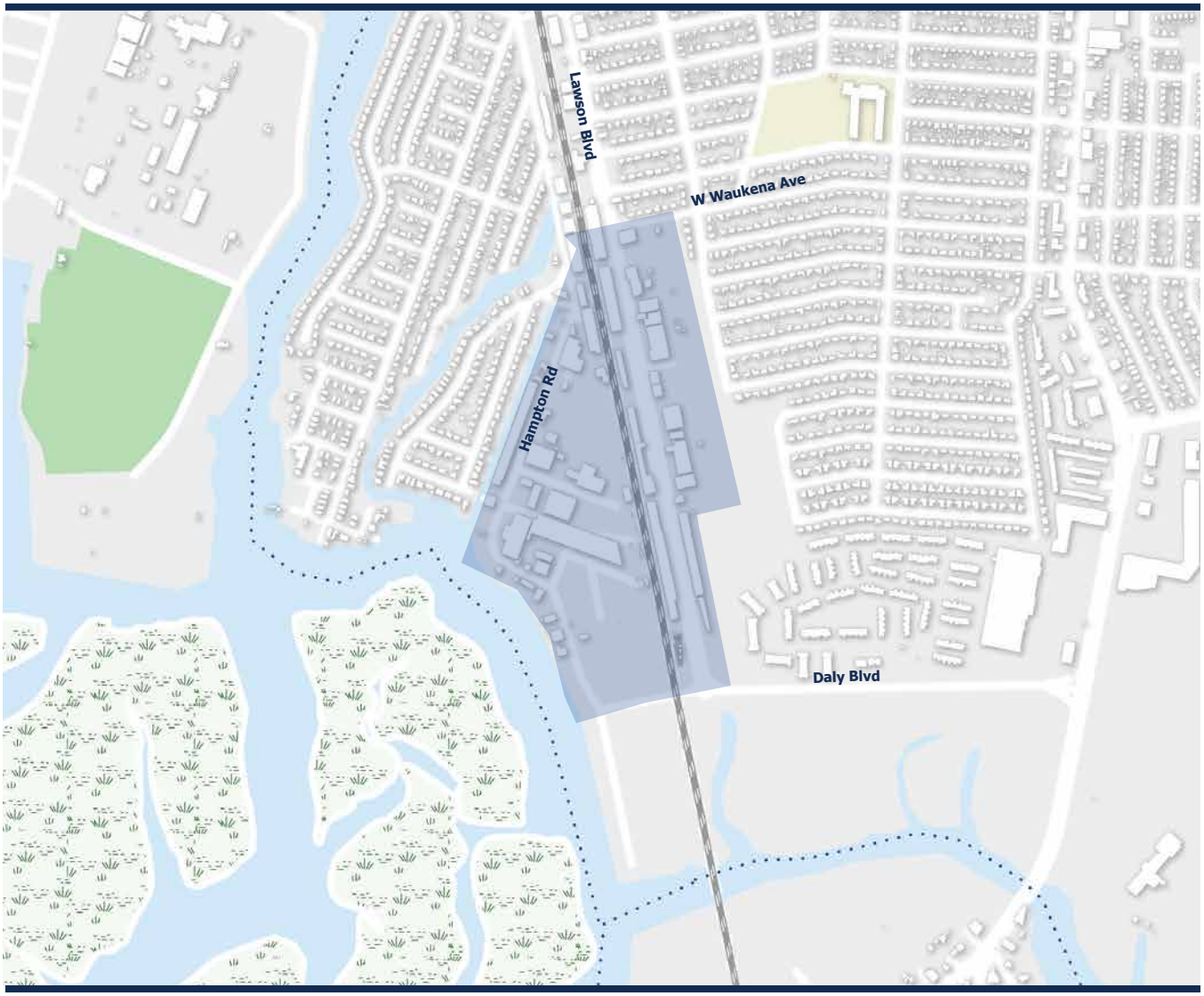
- Identifies needed improvements for the industrial area;
- Establishes new water-dependent and water-enhanced uses; and,
- Develops a strategy to create mixed-use development, including options for senior housing.

Cost estimate:

Cost estimate includes the study only.

Total cost estimate: **$150,000**

Figure 42: Waterfront revitalization study area



Legend

- NYRCR Community
- Industrial Area
- Buildings
- Marshes
- Parks

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

The revitalization plan would provide the direction and policy changes needed to spur reinvestment in the Oceanside waterfront industrial area, rebuilding tax base and providing new senior housing and mixed-use housing options.

Health and social

Mixed-use development with an emphasis on senior housing options would benefit the larger community by providing an additional housing choice for specific vulnerable populations.

Economic

This project would indirectly help the local economy as it will serve as a resource to residents and businesses that will help to maintain and increase the customer base needed and attract new residents to support local businesses.

Environmental

Plan implementation would require an environmental assessment to aid in potential cleanup of brownfield sites.

Cost-benefit analysis

The cost of preparing a revitalization plan is justified by the potential economic benefits of reinvestment in the Oceanside waterfront industrial area, additional senior housing, and mixed-use development that would enhance the tax base.

Risk reduction

This project would create and implement a mixed-use plan to revitalize Oceanside's industrial area along its waterfront to attract new businesses, residents, and visitors. The plan would create the framework for future investment and redevelopment that will reduce risk for the identified areas.

Timeframe

Near-term (within three years)

Regulatory Requirements

The plan will include an Environmental Impact Assessment per the New York State Environmental Quality (SEQR) Review standards

Jurisdiction

Town of Hempstead

Infrastructure conditions in the waterfront industrial district
Source: LiRo Group

View of the waterfront industrial district from adjacent neighborhoods
Source: LiRo Group

Critical facility resiliency: Oceanside Fire Station

Featured

Oceanside

Superstorm Sandy pushed emergency response in Oceanside to its limits. The inadequacies of two existing fire stations were particularly apparent. Engine No. 1 is outdated and is no longer effective, and Hose No. 1 was flooded during Sandy. Additional capacity is needed to increase emergency response and preparedness functions.

Description

This project would construct a new fire station to replace Engine No. 1 and Hose No. 1.

The project would:

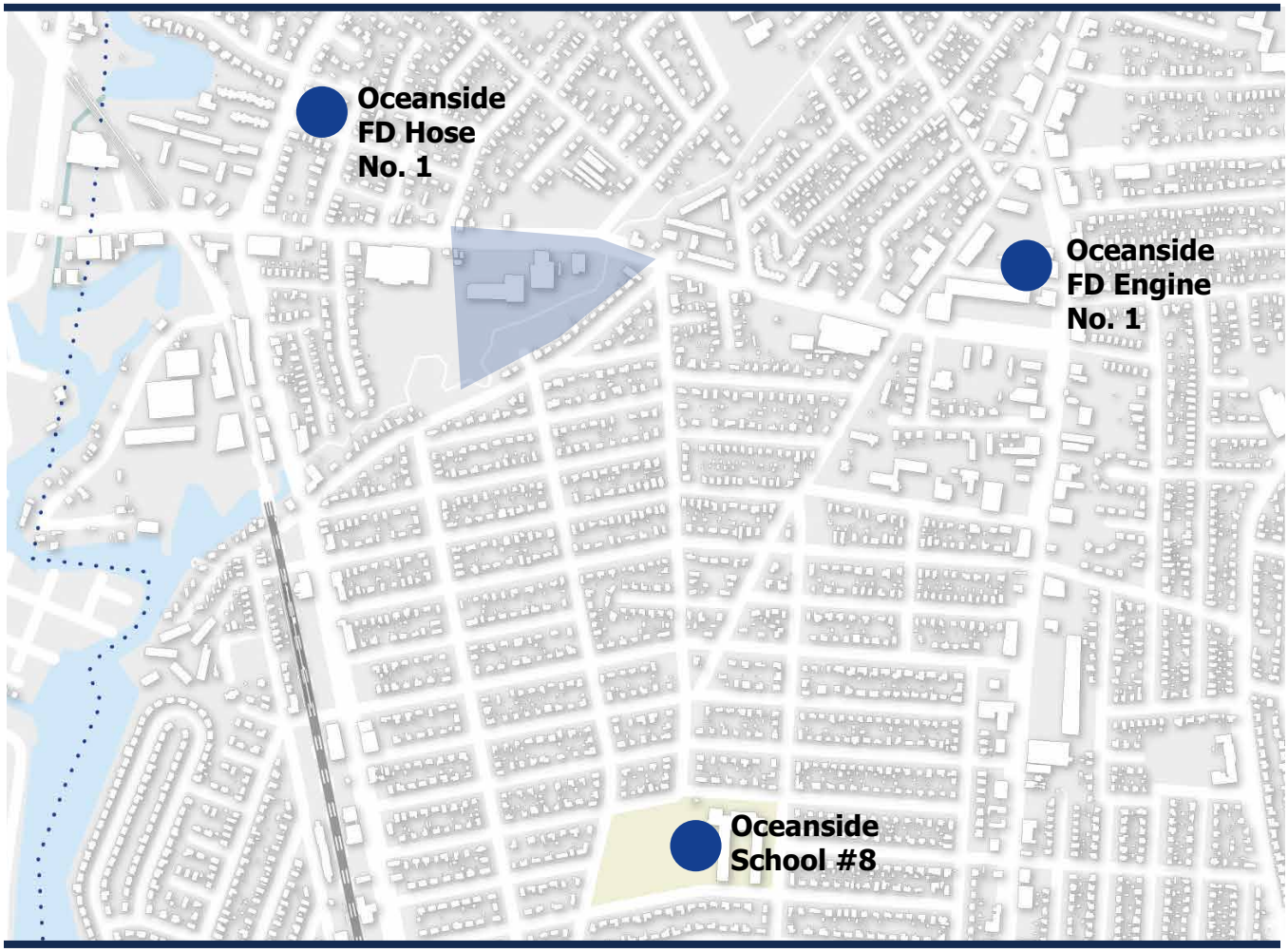
- Acquire and/or purchase a site for a new fire station;
- Design and construct a new fire station, park, and community center; and,
- Implement new recreational areas and preserve area(s) around the new fire station for open space opportunities.

Cost estimate:

Cost estimate includes the acquisition of a site and the development of a new fire station, community center, and park.

Total cost estimate: **$20 million**

Figure 43: Potential location of new Oceanside Fire Station



Legend

- NYRCR Community
- Potential fire station location
- Nearby community assets
- Buildings

N

0 0.125 0.25 0.5 Miles

Source: OpenStreetMap

Benefits

The project would provide improved emergency response capabilities for Oceanside. It would also provide recreational facilities for an area that currently lacks them.

Health and social

The new fire station would be strategically located, decreasing emergency response time and enhancing disaster preparedness. The project would ensure that the fire station can function well during emergencies and will be an upgrade from other stations in the area.

Economic

This project would help reduce post-disaster emergency and recovery costs by constructing a well-protected and fully operational facility to respond to emergencies. It could aid in accelerating recovery by providing information and assistance needed before, during, and after a disaster.

Environmental

The project would preserve and upgrade open space and could aid in the reduction of contamination associated with flooding of existing facilities.

Cost-benefit analysis

The project steps of acquisition of a site and the development of a new fire station, community center, and park, are cost-effective when the benefits of enhanced emergency response capabilities, accelerated recovery, and increased recreational space are considered.

Risk reduction

This project would construct new flood resistant buildings, replacing obsolete facilities at Engine 1 and Hose 1. Secure facilities would enhance emergency response in a disaster. Risk would be reduced to vulnerable populations and emergency responders. The new fire station would be more readily accessible during and after storm events.

Primary risk reduction would affect a large percentage of the population due to the location of homes and businesses in the service area of the new fire station. Nearby residents will be able to utilize the community center and park, and might some reduction in their risk of flooding due to increased groundwater recharge area at the park.

The risk assessment conducted for this project anticipated that construction of a new Oceanside Fire Station project would significantly reduce risk to some assets. The risk of future flood damage to economic assets would be significantly reduced from extreme to high risk. The risk to fire and rescue assets would be reduced from high to moderate risk, providing improved access to services for the 24,968 residents living in the area.[59]

Timeframe

Near-term (within three years)

Regulatory Requirements

The project will need to meet the Town of Hempstead zoning and building permit requirements.

Jurisdiction

Town of Hempstead

Oceanside Fire Department Hose No. 1
Source: LiRo Group

Oceanside Fire Department Engine No. 1
Source: Google Earth

Source: LiRo Group

Section V:
Additional materials

V. Additional materials

A. Additional resiliency recommendations

Additional Resiliency Recommendations are projects and actions the NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Planning Committee (Committee) would like to highlight but has not categorized as Proposed or Featured projects. The Additional Resiliency Recommendations are identified in the table below and are categorized by strategy, project name, project description, and whether or not the project is regional in scope. Identifying these projects in the NY Rising Community Reconstruction Plan (NYRCR Plan) will aid the Community in potential future implementation.

Table 16: Additional resiliency recommendations

Additional resiliency recommendations			
Strategy	**Project name**	**Short project description**	**Regional project (Y/N)**
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	Expand critical facility resiliency & emergency response resources	Install generators in senior facilities and emergency response centers in the Village of Island Park.	N
Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides	Barnum Island drainage improvements	Install drainage improvements to reduce flooding in Empire Boulevard, and Louisiana, Georgia, Florida, Carolina and Alabama Avenues.	N
Leverage the economic potential of the area's waterfront location and proximity to New York City	Community and economic asset preservation	Install Harbor Isle gateway signage on Warwick Road and Island Parkway Bridges as they cross Island Park Canal. Plant trees and vegetation on Harbor Isle streets to continue to attract new residents and economic development. Make local marinas more resistant to flood damage.	N
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Shoreline & open space improvements	Secure new open space and protect/ restore/improve existing open space in Barnum Island, Village of Island Park and Harbor Isle. Project may include acquisition and remediation of a brownfield site for recreational use.	N

Table 16: Additional resiliency recommendations, continued

Additional resiliency recommendations			
Strategy	**Project name**	**Short project description**	**Regional project (Y/N)**
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment.	Shoreline & open space improvements	Restore and enhance parks in Barnum Island and the Village of Island Park, including Shell Creek Park. Construct improvements for Wrights Field in Oceanside. The project goal is to reduce flooding of adjacent neighborhoods, restore and increase resiliency, and enhance recreational facilities.	N
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection	Alternative power generation & distribution	Evaluate the potential for generation and distribution of solar, wind, tidal, geothermal, fuel cell, and other alternative power sources. Evaluate solar carports at public parking facilities. The project will require coordination with traditional and alternative power companies to evaluate power distribution options.	Y
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection	Bay Park Sewage Treatment Plant upgrades	Continue to monitor Bay Park Sewage Treatment Plant improvement projects and work with Nassau County to tie local improvements into the Sewage Treatment Plant Potential local projects for this Community include integrating the timing of the Austin Boulevard stormwater improvements with the proposed treatment plant improvements and supporting the relocation of the treatment plant outfall from Reynolds Channel to the Atlantic Ocean.	Y
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection	Regional tidal protection approaches	Implement natural enhancements in support of regional solutions such as new vegetation, reef construction, and shell mounds. Support the region-wide implementation of barriers – such as gates across narrow waterway openings and raised roadways – where studied and appropriate.	Y

B. Master table of projects

The Proposed Projects, Featured Projects, and Additional Resiliency Recommendations identified throughout the NYRCR Plan are reflected in the table below. These are categorized according to strategy, project name, project description, recovery support function (RSF), estimated cost, and whether or not the project is regional in scope. This will aid the Committee in meeting benchmarks to implement the NYRCR Plan.

Table 17: Master table of projects

Proposed, featured, and additional resiliency recommendations

Strategy	Project name	Short project description	Project category	RSF	Cost estimate	Regional project (Y/N)
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	Critical facility resiliency & emergency response resources	Make improvements to firehouses, emergency response facilities, schools, and sanitation facilities and equipment to improve flood resiliency. Purchase of emergency rescue boats and multiple generators are also included.	Proposed	Community planning & capacity building and health & social services	$11.39 million	N
Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides	Tidal backflow prevention	Install tidal water backflow devices to prevent tidal water from entering the stormwater system and flooding low lying areas.	Proposed	Infrastructure	$2.39 million	N
Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides	Drainage improvements	Conduct a comprehensive analysis of the stormwater drainage system and improve it to reduce flooding in low lying areas. Implement improvements including but not limited to raising roadways, upgrading systems within and adjacent to evacuation routes, at identified streets and intersections, and along economic corridors. Project includes a potential pilot study/ project to implement green infrastructure and pervious paving.	Proposed	Infrastructure	$20.23 million	N

Table 17: Master table of projects, continued

Proposed, featured, and additional resiliency recommendations						
Strategy	**Project name**	**Short project description**	**Project category**	**RSF**	**Cost estimate**	**Regional project (Y/N)**
Protect shoreline areas from tidal surge through a combination of structural, nonstructural, and hybrid shoreline stabilization techniques	Perimeter flood safeguards: Southern Oceanside, Wreck Lead, and Phase 1 of California Place Canal	Conduct a comprehensive shoreline analysis to identify feasible shoreline protection strategies, and then implement a system of barriers and natural shoreline improvements along Grand Canal, Bedell Creek, Powell Creek, Wreck Lead, and California Place Canal to reduce flooding of adjacent assets and neighborhoods.	Proposed	Infrastructure and natural & cultural resources	$10.45 million	N
Leverage the economic potential of the area's waterfront location and proximity to New York City	Destination revitalization and transit-oriented development	Create and implement a mixed-use transit-oriented development plan to revitalize Island Park's downtown and waterfront to attract visitors, residents and new businesses to the Long Beach Road business district and Wreck Lead waterfront. The project includes a revitalization plan and retention of a local disaster recovery manager to manage programs and pursue additional funding.	Proposed	Community planning & capacity building, housing, and economic development	$250,000	N
Protect shoreline areas from tidal surge through a combination of structural, nonstructural, and hybrid shoreline stabilization techniques	Tidal protection at street ends & near Landgraf Park	Install barriers at public street ends and Landgraf park to protect adjacent neighborhoods from tidal flooding.	Proposed	Infrastructure	$1.01 million	N
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Shoreline, beach, and open space restoration, preservation, and environmental enhancement	Restore local beaches – Little Beach (in conjunction with the existing U.S. Army Corps of Engineers project), Harbor Isle Beach, and Masone Beach. Improve the recreational capacity of Oceanside Park and restore the Park's shoreline to protect adjacent schools and neighborhoods from flooding.	Proposed	Natural & cultural resources	$5.95 million	N
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Phase 1 marsh restoration	Conduct a marsh restoration study and implement a restoration pilot project for Garrett Marsh east of Barnum Island.	Proposed	Natural & cultural resources	$600,000	N

Table 17: Master table of projects, continued

Proposed, featured, and additional resiliency recommendations						
Strategy	**Project name**	**Short project description**	**Project category**	**RSF**	**Cost estimate**	**Regional project (Y/N)**
Implement an emergency response system that engages in emergency planning, response, and communications at the Community level	Emergency transportation lifeline safety plan & initial implementation	Prepare a public safety plan that identifies a "lifeline" road network and improvements to help them function better before, during, and after emergencies. Implement initial improvements, including independently powered streetlights and vehicle message signs.	Proposed in Barnum Island, the Village of Island Park and Harbor Isle Featured in Oceanside	Community planning & capacity building and infrastructure	$960,000 $1.44 million	Y
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Phase 2 marsh restoration	Complete restoration of Garrett Marsh, conduct a marsh restoration study for Simmons Hassock Marsh west of Harbor Isle, and conduct restoration of Simmons Hassock Marsh.	Featured	Natural & cultural resources	$2 million	N
Implement an emergency response system that engages in emergency planning, response, and communications at the Community level	Emergency staging area feasibility study and implementation	Identify a site for and construct an emergency operations center and to store emergency response equipment and supplies before, during, and after a crisis for Barnum Island, the Village of Island Park, and Harbor Isle.	Featured	Community planning & capacity building, infrastructure, and economic development	$2.49 million	N
Protect shoreline areas from tidal surge through a combination of structural, nonstructural, and hybrid shoreline stabilization techniques	Phase 2 perimeter flood safeguards: California Place Canal	This project builds on phase 1 perimeter flood safeguards to construct additional barrier systems and natural improvements to protect against flooding from California Place Canal.	Featured	Infrastructure	$2 million	N
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	Critical facility resiliency: Island Park Village Hall Reconstruction	Construct a new building for the Village Hall in Island Park using resilient techniques, such as elevating utilities, floodproofing the building envelope, and installing generators.	Featured	Community planning & capacity building	$1.43 million	N
Leverage the economic potential of the area's waterfront location and proximity to New York City	Oceanside waterfront revitalization	Prepare a plan for the long-term revitalization and redevelopment of the Oceanside waterfront industrial area, considering economic development opportunities to support new water-dependent and water-enhanced businesses and mixed-use development, including senior housing.	Featured	Community planning & capacity building, housing, and economic development	$150,000	N

Table 17: Master table of projects, continued

Proposed, featured, and additional resiliency recommendations						
Strategy	**Project name**	**Short project description**	**Project category**	**RSF**	**Cost estimate**	**Regional project (Y/N)**
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	New Oceanside fire station, park, and community center	Construct a new fire station to replace Hose 1 and Engine 1 in Oceanside. Project includes a small community center and park to serve the area, which currently lacks recreation facilities.	Featured	Community planning & capacity building, health & social services, natural & cultural resources	$20 million	N
Reduce the risk of flooding to critical facilities and emergency service facilities, such as police and fire departments, schools, and other facilities that serve vulnerable populations	Critical facility resiliency & emergency response resources	Install generators in senior facilities and emergency response centers in the Village of Island Park.	Additional	Health & social services	$1-$5 million	N
Implement progressive stormwater management systems and infrastructure upgrades to decrease flooding in areas that consistently flood during storm events and high tides	Barnum Island drainage improvements	Install drainage improvements to reduce flooding in Empire Boulevard, and Louisiana, Georgia, Florida, Carolina and Alabama Avenues.	Additional	Infrastructure	$5 to $10 million	N
Leverage the economic potential of the area's waterfront location and proximity to New York City	Harbor Isle community & economic asset preservation	Protect economic assets and provide community enhancements in Harbor Isle, including installation of gateway signage at the Warwick Road and Island Parkway Bridges as they cross Island Park Canal; and planting of trees and vegetation on Harbor Isle streets to continue to attract new residents and economic development	Additional	Economic development	$1 to $5 million	N
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Open space protection	Secure new open space and protect/ restore/improve existing open space in Barnum Island, Village of Island Park and Harbor Isle. Project may include acquisition and remediation of a brownfield site for recreational use.	Additional	Natural & cultural resources	$15 million	N

Table 17: Master table of projects, continued

Proposed, featured, and additional resiliency recommendations						
Strategy	**Project name**	**Short project description**	**Project category**	**RSF**	**Cost estimate**	**Regional project (Y/N)**
Restore, enhance, and improve natural areas, including local beaches, marshes, parks, and other open spaces, to provide recreation opportunities and enhance the natural environment	Shoreline & open space improvements	Restore and enhance parks in Barnum Island and the Village of Island Park, including Shell Creek Park. Construct improvements for Wrights Field in Oceanside. The project is meant to reduce flooding of adjacent neighborhoods, restore and increase resiliency, and enhance recreational facilities.	Additional	Natural & cultural resources	$1 to $5 million	N
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection	Alternative power generation & distribution	Evaluate the potential for generation and distribution of solar, wind, tidal, geothermal, fuel cell, and other alternative power sources. Evaluate solar carports at public parking facilities. The project will require coordination with traditional and alternative power companies to evaluate power distribution options.	Additional	Infrastructure	>$10 million	Y
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Waste Water Treatment Plants, and regional tidal protection	Bay Park Sewage Plant upgrades	Continue to monitor the Bay Park Sewage Treatment Plant improvement projects, and work with Nassau County to tie local improvements into the Waste Water Treatment Plan. Potential local projects for this Community include integrating Austin Boulevard stormwater improvements with the proposed treatment plant improvements and supporting the relocation of the treatment plant outfall from Reynolds Channel to the Atlantic Ocean.	Additional	Infrastructure and natural & cultural resources	>$10 million	Y
Support solutions for regional and local power generation, waste water treatment upgrades to Bay Park and Long Beach Sewage Treatment Plants, and regional tidal protection	Regional tidal protection approaches	Implement natural enhancements in support of regional solutions such as new vegetation, reef construction, and shell mounds. Support the region-wide implementation of barriers – such as gates across narrow waterway openings and raised roadways – where studied and appropriate.	Additional	Infrastructure and natural & cultural resources	>$10 million	Y

C. Public engagement process

The NYRCR Barnum Island/Oceanside/the Village of Island Park/Harbor Isle Community (Community) public engagement process included nine Planning Committee meetings, an online survey, and three Public Engagement Events. This section summarizes of the meetings public outreach process.

Planning Committee meetings

The Committee held nine meetings during the planning process, from September 2013 through March 2014. Each meeting was open to the public and audience participation was encouraged through questions and public comment cards, which asked for feedback and served as a mechanism for people to sign up to receive future announcements about upcoming Public Engagement Events. Public attendance of Committee meetings varied over the course of the project from as few as four to as many as 40 people.

The list below summarizes the purpose of and topics discussed at each of the Committee meetings:

Meeting 1: Introduction to the NYRCR planning process and identification of key Community issues

Meeting 2: Asset identification and Community visioning

Meeting 3: Confirmation of key messages using feedback from the first Public Engagement Event

Meeting 4: Consideration of potential strategies, projects, and actions for inclusion in the Plan using feedback from the second Public Engagement event

Meeting 5: Refinement of the risk assessment

Meeting 6: Project refinement and initial prioritization

Meeting 7: Project prioritization and selection for inclusion in the Plan

Meeting 8: Confirm Proposed and Featured Projects and finalize Additional Resiliency Recommendations

Meeting 9: Review draft Plan

Due to the large geographic area of the Community, the Committee split into two geographic-based subcommittees to address project details. One subcommittee represented the areas of Barnum Island, the Village of Island Park, and Harbor Isle; The other represented Oceanside. Six subcommittee meetings were held during the course of the project to facilitate open dialogue about community-specific issues, strategies, and projects.

Community survey

The public engagement process included a survey that was available at the Oceanside and Island Park libraries and online at the NY Rising Community Reconstruction (NYRCR) Program website from October 2013 through February 2014. The survey asked questions on how Superstorm Sandy affected residents, what issues were still concerns during flood events, priorities for the future, and the types of strategies that would lessen flooding during storm events.

Public Engagement Events

Public outreach methods

Public outreach methods used to publicize and promote the Public Engagement Events included:

Door hangers, signs, and flyers

- Flyers were sent home with elementary and middle school students in the Oceanside and Island Park school districts;
- Committee members shared flyers with family, friends, colleagues, and neighbors;
- Street teams distributed door hangers throughout the Community for each meeting, focusing on residential neighborhoods, senior communities, houses of worship, and Long Island Rail Road (LIRR) stations;
- Street teams distributed flyers to businesses and organizations throughout the Community prior to each meeting;
- Flyers were mailed or emailed to organizations for distribution through their own networks; and,
- Lawn signs were printed and distributed at visible locations throughout the Community including key intersections, commercial corridors and shopping centers, Island Park Village Hall, LIRR stations, and public plazas.

Electronic and social media

- Each meeting was announced via the Community's Storm Recovery website and the Storm Recovery Facebook page;
- Meetings were announced on the Island Park School District's website and electronic signs; and,
- Emails were sent to people who had provided their names and email addresses at Committee meetings and prior Public Engagement Events.

October 9, 2013 Public Engagement Event
Source: Sustainable Long Island

First Public Engagement Event

The first Public Engagement Event was held on October 9, 2013 at Saint Anthony's Church in Oceanside, New York and was attended by more than 75 residents. In addition, an online survey was used to obtain feedback on resiliency planning from residents unable to attend meetings. The survey was advertised at the meeting and made available through a link on the NYRCR Program website.

The first Public Engagement Event was structured as an open house during which people could come at any time and stay as long as they liked. The open house was designed to gather community knowledge, experience, and recommendations, which were essential to developing the Community's Plan. Participants were invited to review information on the NYRCR Program and information about the Committee's work, including draft vision statements, community assets, needs and opportunities, and preliminary strategies.

Interactive stations that addressed Plan topics were arranged around the room. Each station was staffed by members of the Consultant Team, and members of the Committee were available throughout the evening to help answer questions and further guidance to attendees. An exit survey was conducted as participants left the meeting to gain feedback on the format and information presented, and as a way to collect additional email addresses to continue to inform the community about future Public Engagement Events and opportunities to remain involved in the project.

Second Public Engagement Event

The second Public Engagement Event was held on November 6, 2013 at Lincoln Orens Middle School in the Village of Island Park, New York and was attended by more than 180 people. The Public Engagement Event began with a brief overview of the NYRCR Program and a review of strategies included in the Community's Conceptual Plan. The Committee welcomed participants and spoke about

November 6, 2013 Public Engagement Event

Source: Sustainable Long Island

the importance of the planning process. The meeting then moved to small-group facilitated break-out sessions. Participants were asked to provide insights on local storm damages due to Superstorm Sandy and Hurricane Irene, identify their top priorities among the Conceptual Plan strategies to help the Community become more resilient, and brainstorm innovative strategies and resiliency techniques that should be further investigated as part of the NYRCR planning process.

Third Public Engagement Event

The third Public Engagement Event was held on March 3, 2014 to review of the Proposed Projects, Featured Projects, and Additional Resiliency Recommendations under consideration for inclusion in the NYRCR Plan. The meeting was organized using an open house format held over two sessions at the Father Joseph O'Connell Knights of Columbus in Oceanside, New York. The first session was held in the afternoon, from 2:00p.m. to 4:00p.m., and the second in the evening from 7:30p.m. to 10:00p.m.

A brief orientation was given multiple times during each open house session to provide attendees with an understanding of the purpose and format of the meeting. Display boards featuring each of the Proposed Projects, Featured Projects, and Additional Resiliency Recommendations were set up around the room so that participants could view project-specific information. Members of the Committee and Consultant Team were on-hand to answer questions and discuss projects. Project feedback forms were provided to gather public feedback on the projects. The project feedback form was also made available online via the Storm Recovery website for anyone who was not able to attend the meeting in person.

Final public meeting

A final public meeting, to be held later in spring 2014, will share the work of the Committee and the NYRCR Plan with the public.

March 3, 2015 Public Engagement Event
Source: Sustainable Long Island

D. Community asset inventory

Table 18: Interpreting risk scores

Interpreting Risk Scores

	100-year event (Hazard score = 3)					
Exposure	5	15	30	45	60	75
	4.5	13	27	40.5	54	67.5
	4	12	24	36	48	60
	3.5	10.5	21	31.5	42	52.5
	3	9	18	27	36	45
	2.5	7.5	15	22.5	30	37.5
	2	6	12	18	24	30
	1.5	4.5	9	13.5	18	22.5
	1	3	6	9	12	15
	0.5	1.5	3	4.5	6	7.5
		1	2	3	4	5
	Vulnerability					

	500-year event (Hazard score = 4)					
Exposure	5	20	40	60	80	100
	4.5	18	36	54	72	90
	4	16	32	48	64	80
	3.5	14	28	42	56	70
	3	12	24	36	48	60
	2.5	10	20	30	40	50
	2	8	16	24	32	40
	1.5	6	12	18	24	30
	1	4	8	12	16	20
	0.5	2	4	6	8	10
		1	2	3	4	5
	Vulnerability					

For the purpose of preparing a NY Rising Community Reconstruction Plan the storm event recommended for considering the efficacy of projects and actions is a 100 year storm (1% annual chance). Communities may additionally want to evaluate risk to a higher intensity, less frequent event, such as the 500-year event (0.2% annual chance). For this reason, two sets of possible risk score ranges (one for the 100-year event, using a hazard score of 3; and another for the 500-year event, using a hazard score of 4) are provided, with guidance on how to interpret the risk scores. While the risk scores themselves differ between the two events as a result of using different hazard scores, the basis for how assets are categorized into the severe, high, moderate, or residual risk levels is the same between the two events, as shown by the similarly shaded regions in the tables above. For example, a risk score of 60 in the 100-year event evaluation is shown as an 80 in the 500-year even evaluation, but both scores are classified as Severe risk.

Risk scores help identify assets with elevated potential for storm damage. In addition to the risk score, other factors also contribute to determining which assets should be addressed, how soon they should be addressed, and their priority for the community. Some factors that should be considered for each asset in developing a community risk management strategy include: contribution to life safety, if the asset is a critical facility, value of asset to the community, environmental services provided, economic contribution of the asset, whether alternatives are available, and capacity of the asset to adapt.

RISK SCORE RANGES

100 year event:	500 year event:
Severe (Risk Score >53)	Severe (Risk Score >70)

Risk scores in this category occur only if one of the two factors, exposure or vulnerability, is rated 5, and the other is 4 or higher; this could represent that the asset is in a dangerous situation. Both exposure and vulnerability should be reduced, if possible. Consider relocation a priority option for these assets.

High (Risk Score 24 - 53)	High (Risk Score 32 - 70)

Risk scores in this category are indicative of conditions that could lead to significant negative outcomes from a storm. Using the risk scoring system, a total of 24 (or 32 for the 500-year event) can only be achieved if the vulnerability is 4 and exposure is 2, or vice versa. A vulnerability of 4 indicates the likely loss of service of an asset for an extended period of time. For many assets this may be unacceptable. Actions should be taken to reduce vulnerability, such as elevating or floodproofing the asset, to help avoid a long-term loss of function. A score of 4 for exposure indicates most of the local landscape attributes that help reduce storm damages are absent. Actions to restore landscape attributes may be appropriate. All other risk scores higher than 24 (or 32 for the 500-year event) indicate either the exposure or the vulnerability, or both, are higher than the conditions discussed above, lending more weight to the need to take actions that reduce risk. Relocation may be necessary in the future if other means of adaptation or management actions are not effective.

Moderate (Risk Score 6 - 23)	Moderate (Risk Score 8 - 31)

Risk scores in this category pose moderate to serious consequences, but adaptation may be of lower priority due to one factor, exposure or vulnerability, remaining relatively low. Use a combination of measures to reduce exposure and/or vulnerability.

Residual (Risk Score <6)	Residual (Risk Score < 8)

Risk scores in this category occur when both exposure and vulnerability are relatively low. This situation suggests floods would pose minor or infrequent consequences. However, a vulnerability score of 3 may not be acceptable for critical facilities or high community value assets, because the community cannot afford to be without these services, event on an infrequent basis. Note that risk is never completely eliminated. Some residual risk still remains even after management measures have been implemented. Monitor conditions and adapt as necessary.

Table 19: Risk scores by asset group

Asset	Risk Area	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
Assisted living, PSCH Island House and South Point Plaza Nursing & Rehab	High	3	3.00	3	**27.0**
Beaches	Extreme	3	4.50	3	**40.5**
Economic / commercial districts – Island Park, Long Beach Rd, Lawson Blvd	Extreme	3	4.00	4	**48.0**
Economic / industrial districts – Hampton Rd, Lawson Blvd, Island Park	Extreme	3	4.50	4	**54.0**
Government / civic – Village Hall, IP FD Exempts Hall, Libraries, Post Offices	Extreme	3	4.00	4	**48.0**
Community organizations – American Legion, community centers, Knights of Columbus, VFW 5199, Sacred Heart Parish Center	Extreme	3	3.50	4	**42.0**
Emergency response Island Park, Barnum Island, Harbor Isle – BI Fire, IP FDHQ, IP FD Training	High	3	3.00	4	**36.0**
Emergency response Oceanside – Maintenance, Engine 1, HQ, Hose 1-3	High	3	2.50	4	**30.0**
Fueling stations	High	3	2.50	3	**22.5**
Healthcare – SN Communities Hospital, Dialysis Center	Moderate	3	2.00	3	**18.0**
Apartments & condominiums	Extreme	3	3.50	3	**31.5**
Marinas	Extreme	3	4.50	5	**67.5**
Schools	High	3	3.00	5	**45.0**
Sanitary sewer & stormwater drainage – Bay Park WWTP, TOH Sanitation D7, IP Public Works, system-wide sanitation and storm sewer	Extreme	3	4.50	5	**67.5**
System-wide telecommunications	Extreme	3	3.50	5	**52.5**
System-wide water systems	High	3	3.00	5	**45.0**
Power – LIPA/PSEG and LIRR electric substations	Extreme	3	4.50	5	**67.5**
Parks & recreation	Extreme	3	4.50	3	**40.5**
Religious organizations	High	3	2.50	3	**22.5**
Senior housing	High	3	3.00	3	**27.0**
Senior services – Oceanside Care Center	Moderate	3	2.00	3	**18.0**
Transportation system – Austin Blvd evacuation route, LIRR IP and Oceanside, system-wide roadways	Extreme	3	4.00	3	**36.0**
Single-family housing Oceanside	High	3	2.50	4	**30.0**
Single-family housing Island Park, Barnum Island, Harbor Isle	Extreme	3	4.50	4	**54.0**

Table 20: Community asset risk scores

	Economic		
	Asset Name	**Risk Area**	**Risk Score**
1	Aero Marine	Extreme	**67.5**
2	Andy's Marina	Extreme	**67.5**
3	Bridgeview Yacht Club	Extreme	**67.5**
4	Empire Point Marina	Extreme	**67.5**
5	Island Park Business District	Extreme	**48.0**
6	Island Park Industrial District	High	**42.0**
7	K&K Marina	Extreme	**67.5**
8	Oceanside Hampton Rd Industrial District	Extreme	**54.0**
9	Oceanside Lawson Blvd Economic Corridor	Extreme	**48.0**
10	Oceanside Lawson Blvd Industrial District	Extreme	**54.0**
11	Oceanside Long Beach Rd Economic Corridor	Extreme	**48.0**
	Health and Social Services		
	Asset Name	**Risk Area**	**Risk Score**
12	Barnum Island Fire District	High	**36.0**
13	Oceanside Schools #9E and #9M	High	**45.0**
14	Florence Smith School #2	Moderate	**30.0**
15	Francis X. Hegarty Elementary School	High	**45.0**
16	Fulton Avenue School #8	High	**37.5**
17	Island Park FD Exempts Hall	High	**36.0**
18	Island Park FD Headquarters	High	**36.0**
19	Island Park Fire Department Training Facility	High	**36.0**
20	Island Park Village Hall	Extreme	**48.0**
21	Lincoln Orens Middle School	High	**45.0**
22	North Oceanside School #5	Moderate	**30.0**
23	Oaks School #3	Moderate	**30.0**
24	Oceanside Care Center Inc.	Moderate	**18.0**
25	Oceanside FD Engine 1	High	**30.0**
26	Oceanside FD Headquarters	Moderate	**24.0**
27	Oceanside FD Hose 1	Moderate	**24.0**
28	Oceanside FD Hose 2	High	**30.0**
29	Oceanside FD Hose 3	Moderate	**24.0**
30	Oceanside FD Maintenance Bldg	High	**30.0**
31	Oceanside High School #7	Moderate	**30.0**

*** Denotes system asset**

Table 20: Community asset risk scores, continued

32	Oceanside High School Castleton #6	Moderate	**30.0**
33	South Nassau Communities Hospital	Moderate	**18.0**
34	South Nassau Dialysis Center	High	**22.5**
35	South Oceanside School #4	High	**37.5**
36	TOH Sanitation District 7	High	**37.5**
37	U S Post Office Island Park	Extreme	**48.0**
38	U S Post Office Oceanside	Moderate	**30.0**
39	Village of Island Park Department of Public Works	High	**45.0**
	Housing		
	Asset Name	**Risk Area**	**Risk Score**
40	Alhambra Condos	High	**22.5**
41	Bishop Kellenberg Garden Apts	Moderate	**18.0**
42	Island Park Senior Housing	High	**27.0**
43	Mill River Gardens Apartments	High	**22.5**
44	Ocean Harbor Apartments	High	**22.5**
45	Oceanside Cove Co-ops	High	**22.5**
46	Oceanside Knolls Apartments	Moderate	**18.0**
47	PSCH Island House	High	**27.0**
48	Regency Apartments	Extreme	**31.5**
49	Sherwood Townhouse Apartments	Moderate	**18.0**
50*	**Single-Family Housing Island Park, Barnum Island, Harbor Isle**	**Extreme**	**54.0**
51*	**Single-Family Housing Oceanside**	**High**	**30.0**
52	South Point Plaza Nursing and Rehabilitation Center	High	**27.0**
53	Summit Apartments	Moderate	**18.0**
54	The Glen Apartments	Moderate	**18.0**
55	The Yacht Club	Extreme	**31.5**
56	Theresa Gardens Apartments	Moderate	**18.0**
57	Valley Town House Apartments	Moderate	**18.0**
58	Woodcrest Apartments	High	**22.5**

*** Denotes system asset**

Table 20: Community asset risk scores, continued

	Infrastructure Systems		
	Asset Name	**Risk Area**	**Risk Score**
59	Austin Boulevard evacuation route	Extreme	**36.0**
60	Auto Spa	High	**27.0**
61	Bay Park Sewage Treatment Plant and pump stations	Extreme	**67.5**
62	BP Gas Station	Moderate	**18.0**
63	Gulf Oceanside Gas Station	Moderate	**18.0**
64	Hess Gas Station	High	**22.5**
65	Hess Gas Station	Moderate	**18.0**
66	Kings Oceanside C Store Gas Station	High	**22.5**
67	LIPA/PSEG E.F. Barrett Power Station	Extreme	**67.5**
68	LIRR Island Park Station	Extreme	**31.5**
69	LIRR Oceanside Station	Extreme	**31.5**
70	LIRR electric substation	Extreme	**60.0**
71*	**Multi-community roadways**	**High**	**27.0**
72*	**Sanitation systems**	**Extreme**	**60.0**
73*	**Storm sewer systems**	**Extreme**	**60.0**
74*	**Telecommunications**	**Extreme**	**52.5**
75	USA Gasoline Gas Station	Moderate	**18.0**
76	USA Gasoline Gas Station	Moderate	**18.0**
77	Valero Gas Station	Moderate	**18.0**
78*	**Water systems**	**High**	**45.0**

*** Denotes system asset**

Table 20: Community asset risk scores, continued

	Natural and Cultural Resources		
	Asset Name	**Risk Area**	**Risk Score**
79	American Legion Post 1246	Extreme	**42.0**
80	First Methodist Church	Moderate	**18.0**
81	First Presbyterian Church	Moderate	**18.0**
82	Full Gospel Church	High	**22.5**
83	Harbor Isle Beach	Extreme	**40.5**
84	Island Park Greek Orthodox Church	High	**22.5**
85	Island Park Jewish Center / Soul Stirring Church	High	**22.5**
86	Island Park Library	High	**36.0**
87	Island Park United Methodist Church	High	**22.5**
88	JCC	High	**30.0**
89	Knights Of Columbus	Moderate	**24.0**
90	Little Beach	Extreme	**40.5**
91	Margie Street Park	Extreme	**40.5**
92	Masone Beach	Extreme	**40.5**
93	Mayor Landgraf Park	Extreme	**40.5**
94	Oceanside Community Center	Moderate	**24.0**
95	Oceanside Jewish Center	Moderate	**18.0**
96	Oceanside Library	Moderate	**30.0**
97	Oceanside Lutheran Church	Moderate	**18.0**
98	Oceanside Marine Nature Study Area	Extreme	**40.5**
99	Oceanside Park	Extreme	**40.5**
100	Sacred Heart Parish Center	High	**30.0**
101	Sacred Heart Roman Catholic Church & Rectory	High	**22.5**
102	Shell Creek Park	High	**31.5**
103	St Andrews Episcopal Church	Moderate	**18.0**
104	St Anthonys Church	Moderate	**18.0**
105	Temple Avodah	Moderate	**18.0**
106	VFW Post 5199	Extreme	**42.0**
107	Windsor Avenue Bible Church	Moderate	**18.0**
108	Wrights Field	Extreme	**40.5**
109	Young Israel of Oceanside	Extreme	**31.5**

*** Denotes system asset**

Table 21: Risk to Systems

System Name	Risk Area	Asset Type	Hazard	Exposure Score	Vulnerability Score	Risk Score
Sanitary sewer & stormwater drainage – Bay Park STP, TOH Sanitation D7, IP Public Works, system-wide stormwater drainage	Extreme	Wastewater	3	4.50	5	**67.5**
System-wide telecommunications	Extreme	Telecommunications	3	3.50	5	**52.5**
System-wide water systems	High	Water Supply	3	3.00	5	**45.0**
Transportation system – Austin Blvd evacuation route, LIRR IP and Oceanside, system-wide roadways	Extreme	Transportation	3	4.00	3	**36.0**
Single-family housing Oceanside	High	Single-Family Residence	3	2.50	4	**30.0**
Single-family housing Island Park, Barnum Island, Harbor Isle	Extreme	Single-Family Residence	3	4.50	4	**54.0**

Table 22: Risk assessment tool

Asset Information						
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Socially Vulnerable Populations**	**Critical Facility**	
PSCH Island House	High	Housing	Supportive Housing	Yes	Yes, FEMA	
South Point Plaza Nursing and Rehabilitation Center	High	Housing	Senior Housing	Yes	Yes, FEMA	
Harbor Isle Beach	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No, Locally Significant	
Little Beach	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No, Locally Significant	
Masone Beach	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No, Locally Significant	
Island Park Business District	Extreme	Economic	Downtown Center	No	Yes, FEMA	
Oceanside Long Beach Rd Economic Corridor	Extreme	Economic	Employment Hub	No	No, Locally Significant	
Oceanside Lawson Blvd Economic Corridor	Extreme	Economic	Employment Hub	No	No, Locally Significant	
Oceanside Hampton Rd Industrial District	Extreme	Economic	Industrial, Warehousing and Manufacturing	No	No, Locally Significant	
Oceanside Lawson Blvd Industrial District	Extreme	Economic	Industrial, Warehousing and Manufacturing	No	No, Locally Significant	
Island Park Industrial District	High	Economic	Industrial, Warehousing and Manufacturing	No	No, Locally Significant	
Island Park Village Hall	Extreme	Health_and_Social_Services	Government and Administrative Services	No	Yes, FEMA	
Island Park Fd Exempts Hall	High	Health_and_Social_Services	Government and Administrative Services	No	Yes, FEMA	
Island Park Library	High	Natural_and_Cultural_Resources	Libraries	No	Yes, FEMA	
Oceanside Library	Moderate	Natural_and_Cultural_Resources	Libraries	No	Yes, FEMA	
U S Post Office Island Park	Extreme	Health_and_Social_Services	Government and Administrative Services	No	No, Locally Significant	
U S Post Office Oceanside	Moderate	Health_and_Social_Services	Government and Administrative Services	No	No, Locally Significant	
American Legion Post 1246	Extreme	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Oceanside Community Center	Moderate	Natural_and_Cultural_Resources	Community Centers	No	No, Locally Significant	
JCC	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Knights Of Columbus	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Sacred Heart Parish Center	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
VFW Post 5199	Extreme	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Barnum Island Fire District	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Island Park Fd Headquarters	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Island Park Fire Department Training Facility	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Oceanside Fd Maintenance Bldg	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Oceanside Fd Engine 1	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Oceanside Fd Headquarters	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	

	Landscape Attributes							Risk Assessment			
Community Value	Erosion Rate ≥1 foot per year or unknown	Waterline frequently at shore defense or upland vegetation	Shore defenses absent, not constructed to anticipated conditions, or deteriorating	Protective vegetation between asset and flood source absent	Dunes absent, below BFE, eroding, little vegetation; Bluff slope unstable, little vegetation	Asset on coastal barrier island or filled wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**4**	**48.0**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**4**	**48.0**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**4**	**48.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**4**	**54.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**4**	**42.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**4**	**48.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**4**	**48.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**4**	**42.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**4**	**42.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36.0**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**4**	**36.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**4**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24.0**

Table 22: Risk assessment tool, continued

Asset Information						
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Socially Vulnerable Populations**	**Critical Facility**	
Oceanside Fd Hose 1	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Oceanside Fd Hose 2	High	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Oceanside Fd Hose 3	Moderate	Health_and_Social_Services	Emergency Operations/Response	No	Yes, FEMA	
Hess Gas Station	High	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
BP Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
Gulf Oceanside Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
Hess Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
Kings Oceanside C Store Gas Station	High	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
USA Gasoline Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
Auto Spa	High	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
USA Gasoline Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
Valero Gas Station	Moderate	Infrastructure_Systems	Liquid Fuels	No	No, Locally Significant	
South Nassau Communities Hospital	Moderate	Health_and_Social_Services	Primary/Regional Hospitals	Yes	Yes, FEMA	
South Nassau Dialysis Center	High	Health_and_Social_Services	Healthcare Facilities	Yes	Yes, FEMA	
Regency Apartments	Extreme	Housing	Multi-Family Residence	No	No	
Alhambra Condos	High	Housing	Multi-Family Residence	No	No	
Oceanside Cove Co-ops	High	Housing	Multi-Family Residence	No	No	
The Yacht Club	Extreme	Housing	Multi-Family Residence	No	No	
Ocean Harbor Apartments	High	Housing	Multi-Family Residence	No	No	
Sherwood Townhouse Apartments	Moderate	Housing	Multi-Family Residence	No	No	
Summit Apartments	Moderate	Housing	Multi-Family Residence	No	No	
The Glen Apartments	Moderate	Housing	Multi-Family Residence	No	No	
Valley Town House Apartments	Moderate	Housing	Multi-Family Residence	No	No	
Woodcrest Apartments	High	Housing	Multi-Family Residence	No	No	
Empire Point Marina	Extreme	Economic	Marina/Water Based Business	No	No	
K&K Marina	Extreme	Economic	Marina/Water Based Business	No	No	
Bridgeview Yacht Club	Extreme	Economic	Marina/Water Based Business	No	No	
Andy's Marina	Extreme	Economic	Marina/Water Based Business	No	No	
Aero Marine	Extreme	Economic	Marina/Water Based Business	No	No	
Boardman Elementary / Middle School #9	High	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Florence Smith School #2	Moderate	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Francis Hegarty Elementary School	High	Health_and_Social_Services	Schools	Yes	Yes, FEMA	

		Landscape Attributes							Risk Assessment			
	Community Value	Erosion Rate ≥1 foot per year or unknown	Waterline frequently at shore defense or upland vegetation	Shore defenses absent, not constructed to anticipated conditions, or deteriorating	Protective vegetation between asset and flood source absent	Dunes absent, below BFE, eroding, little vegetation; Bluff slope unstable, little vegetation	Asset on coastal barrier island or filled wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**4**	**30.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**4**	**24.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**3**	**31.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**3**	**31.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**5**	**45.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**5**	**30.0**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**5**	**45.0**

Table 22: Risk assessment tool, continued

Asset Information						
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Socially Vulnerable Populations**	**Critical Facility**	
Fulton Avenue School #8	High	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Lincoln Orens Middle School	High	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
North Oceanside School #5	Moderate	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Oaks School #3	Moderate	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Oceanside High School #7	Moderate	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Oceanside High School Castleton #6	Moderate	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
South Oceanside School #4	High	Health_and_Social_Services	Schools	Yes	Yes, FEMA	
Bay Park WWTP and Pump Stations	Extreme	Infrastructure_Systems	Wastewater	No	Yes, FEMA	
Sanitation systems	Extreme	Infrastructure_Systems	Wastewater	No	Yes, FEMA	
TOH Sanitation District 7	High	Health_and_Social_Services	Public Works Facilities	No	Yes, FEMA	
Village of Island Park Department of Public Works	High	Health_and_Social_Services	Public Works Facilities	No	Yes, FEMA	
Storm sewer systems	Extreme	Infrastructure_Systems	Stormwater	No	Yes, FEMA	
Telecommunications	Extreme	Infrastructure_Systems	Telecommunications	No	Yes, FEMA	
Water systems	High	Infrastructure_Systems	Water Supply	No	Yes, FEMA	
LIPA E.F. Barrett Power Station	Extreme	Infrastructure_Systems	Power Supply	No	Yes, FEMA	
LIRR Substation	Extreme	Infrastructure_Systems	Power Supply	No	Yes, FEMA	
Oceanside Marine Nature Study Area	Extreme	Natural_and_Cultural_Resources	Natural Habitats	No	No	
Margie Street Park	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	
Mayor Landgraf Park	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	
Oceanside Park	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	
Shell Creek Park	High	Natural_and_Cultural_Resources	Parks and Recreation	No	No	
Wrights Field	Extreme	Natural_and_Cultural_Resources	Parks and Recreation	No	No	
Island Park United Methodist Church	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
First Methodist Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
First Presbyterian Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Full Gospel Church	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Island Park Greek Orthodox Church	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Island Park Jewish Center / Soul Stirring Church	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Oceanside Jewish Center	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Oceanside Lutheran Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Sacred Heart Roman Catholic Church & Rectory	High	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	

	Landscape Attributes							Risk Assessment			
Community Value	Erosion Rate ≥1 foot per year or unknown	Waterline frequently at shore defense or upland vegetation	Shore defenses absent, not constructed to anticipated conditions, or deteriorating	Protective vegetation between asset and flood source absent	Dunes absent, below BFE, eroding, little vegetation; Bluff slope unstable, little vegetation	Asset on coastal barrier island or filled wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**5**	**37.5**
High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**5**	**45.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**5**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**5**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**5**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**5**	**30.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**5**	**37.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**5**	**60.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**5**	**37.5**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**3.00**	**5**	**45.0**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**5**	**60.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**5**	**52.5**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**3.00**	**5**	**45.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**5**	**67.5**
High	No	Yes	Yes	No	Yes	Yes	2	**3**	**4.00**	**5**	**60.0**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**3.50**	**3**	**31.5**
High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	**3**	**40.5**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**

Table 22: Risk assessment tool, continued

Asset Information						
Asset	**Risk Area**	**Asset Class**	**Asset Sub-category**	**Socially Vulnerable Populations**	**Critical Facility**	
St Andrews Episcopal Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
St Anthonys Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Temple Avodah	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Windsor Avenue Bible Church	Moderate	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Young Israel of Oceanside	Extreme	Natural_and_Cultural_Resources	Cultural or Religious Establishments	No	No, Locally Significant	
Island Park Senior Housing	High	Housing	Senior Housing	Yes	Yes, FEMA	
Oceanside Knolls Apartments	Moderate	Housing	Senior Housing	Yes	Yes, FEMA	
Mill River Gardens Apartments	High	Housing	Senior Housing	Yes	Yes, FEMA	
Bishop Kellenberg Garden Apts	Moderate	Housing	Senior Housing	Yes	Yes, FEMA	
Theresa Gardens Apartments	Moderate	Housing	Senior Housing	Yes	Yes, FEMA	
Oceanside Care Center Inc.	Moderate	Health_and_Social_Services	Daycare and Eldercare	Yes	Yes, FEMA	
Austin Boulevard Evacuation Route	Extreme	Infrastructure_Systems	Transportation	No	Yes, FEMA	
LIRR Island Park Station	Extreme	Infrastructure_Systems	Transportation	No	Yes, FEMA	
Multi-community Roadways	High	Infrastructure_Systems	Transportation	No	Yes, FEMA	
LIRR Oceanside Station	Extreme	Infrastructure_Systems	Transportation	No	Yes, FEMA	
Single-Family Housing Oceanside	High	Housing	Single-Family Residence	No	No	
Single-Family Housing Island Park, Barnum Island, Harbor Isle	Extreme	Housing	Single-Family Residence	No	No	

		Landscape Attributes							Risk Assessment			
	Community Value	Erosion Rate ≥1 foot per year or unknown	Waterline frequently at shore defense or upland vegetation	Shore defenses absent, not constructed to anticipated conditions, or deteriorating	Protective vegetation between asset and flood source absent	Dunes absent, below BFE, eroding, little vegetation; Bluff slope unstable, little vegetation	Asset on coastal barrier island or filled wetland	Landscape Attribute Score ("Yes" = +0.5)	Hazard Score	Exposure Score	Vulnerability Score	Risk Score
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	**3**	**31.5**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	**3**	**27.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	**3**	**22.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.00**	**3**	**18.0**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**4.00**	**3**	**36.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	3	**31.5**
	High	No	No	Yes	Yes	Yes	Yes	2	**3**	**3.00**	3	**27.0**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**3.50**	3	**31.5**
	High	No	No	Yes	No	Yes	Yes	1.5	**3**	**2.50**	4	**30.0**
	High	No	Yes	Yes	Yes	Yes	Yes	2.5	**3**	**4.50**	4	**54.0**

E. Endnotes

Foreword

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: Barnum Island- $4 million; Oceanside - $22.2 million; the Village of Island Park - $7.4 million, and Harbor Isle - $3 million.

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F. Glossary

ADA - Americans with Disabilities Act
BFE - Base Flood Elevation
CBA – Cost Benefit Analysis
CDBG-DR - Community Development Block Grant – Disaster Recovery
CERT - Community Emergency Response Team
FEMA – Federal Emergency Management Agency.
FEMA HMGP – FEMA Hazard Mitigation Grant Program
FEMA SFHA - FEMA Special Flood Hazard Area
GIS – Geographic Information System
HUD – Department of Housing and Urban Development.
LIREDC - Long Island Regional Economic Development Council
LIRR - Long Island Rail Road
NDRF – National Disaster Recovery Framework
NFIP – National Flood Insurance Program
NIMS – National Incident Management System
NYRCR – New York Rising Community Reconstruction Program
NYS – New York State
NYS DEC - New York Department of Environmental Conservation
NYSERDA - New York State Energy Research and Development Authority
NYS HCR – New York State Homes and Community Renewal
NYS DOS – New York State Department of State
NYS DOT – New York State Department of Transportation
NWS - National Weather Service
OEM - Office of Emergency Management
PSEG - Public Service Electric and Gas Company
RSF – Recovery Support Function
SART - State Agency Review Team
SLOSH - Sea, Lake, and Overland Surge from Hurricanes
SPLASH - Stop Polluting Littering and Save Harbors
STP - Sewage Treatment Plant
TOD - Transit-Oriented Development
USACE – U.S. Army Corps of Engineers
USGS – United States Geological Survey

Barnum Island/Oceanside/ the Village of Island Park/Harbor Isle

NY Rising Community Reconstruction Plan

www.stormrecovery.ny.gov/nyrcr