

Lido Beach/Point Lookout Community Reconstruction Plan



NY Rising Community Reconstruction Program

March 2014



This document was developed by the NY Rising Community Reconstruction (NYRCR) Lido Beach/Point Lookout Planning Committee as part of the NYRCR Program within the Governor's Office of Storm Recovery. The NYRCR Program is supported by the New York State (NYS) Homes and Community Renewal, NYS Department of State, and NYS Department of Transportation. The document was prepared by the following consultant firms:

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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

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



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 Committee, passionately committed to realizing a brighter, more resilient future for their Community.

The NYRCR Plan

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

a series of comprehensive reconstruction and resiliency strategies, and identified projects and implementation actions to help fulfill those strategies.

The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the 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 Lido Beach/Point Lookout is eligible for up to \$6 million in CDBG-DR implementation funds.²

While developing projects for inclusion in this NYRCR Plan, Planning Committee 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 Committee 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.

² The following localities' allocations comprise the NYRCR Community's total allocation: Lido Beach - \$3 million; Point Lookout - \$3 million.



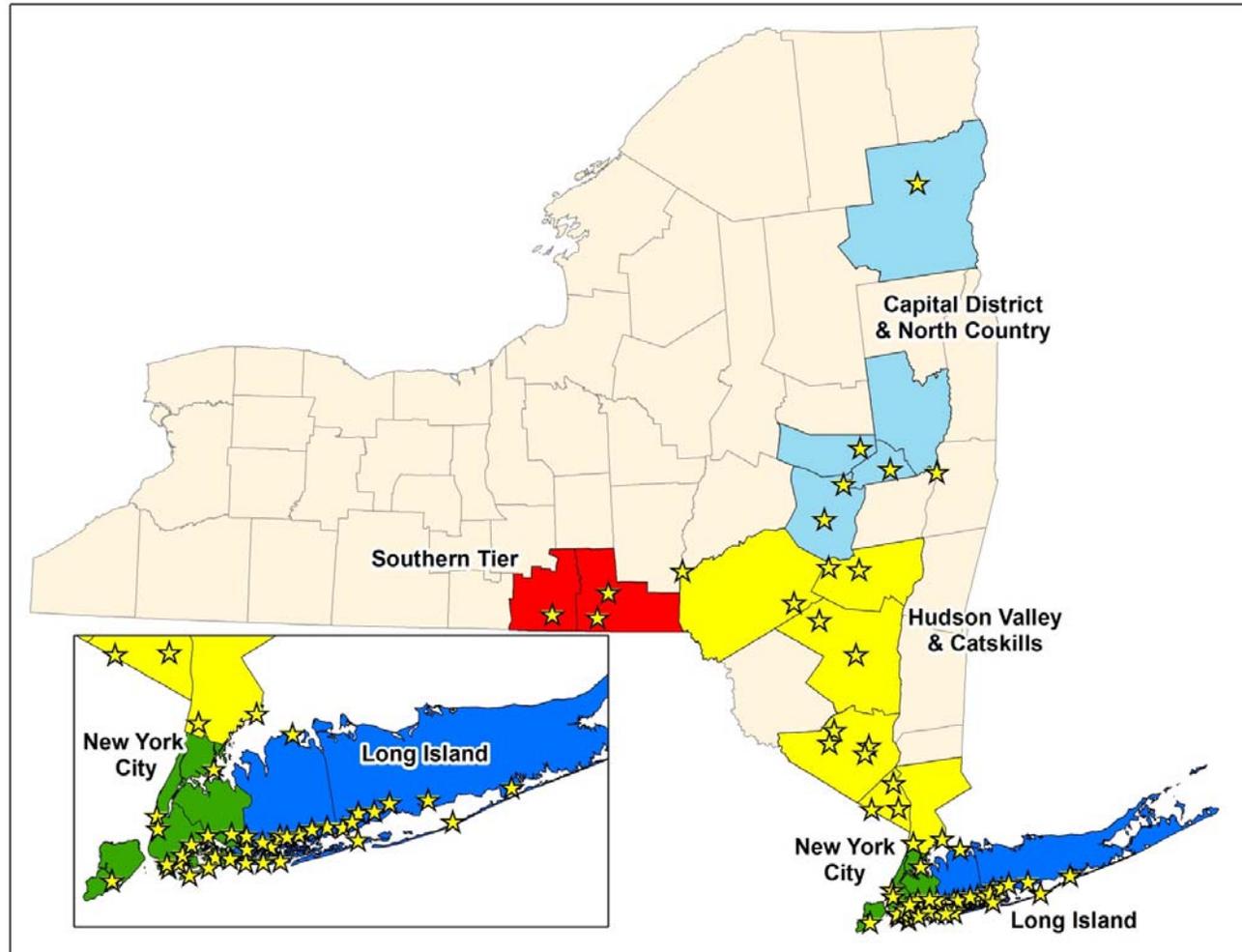
The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions 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.



Foreword

NYRCR Communities



Find out more at

www.stormrecovery.ny.gov/nyrcr

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

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Executive Summary

A. Overview

The NY Rising Community Reconstruction (NYRCR) Program was established to provide additional rebuilding and revitalization assistance to communities severely damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. Through the NYRCR Program, New York State is assisting communities to rebuild better and safer based on community-driven plans that consider current damage, future threats to community assets, and the community's economic future. There are 13 communities in Nassau County participating in the NYRCR Program and all but one of the communities is located on the South Shore of Long Island. These coastal communities were hit hard by Superstorm Sandy.

The communities of Lido Beach and Point Lookout are located on a Barrier Island along the South Shore of Nassau County (Figure ES-1). Lido Beach and Point Lookout are two hamlets in the Town of Hempstead. Both communities were heavily damaged by Superstorm Sandy. Through the NYRCR Program, the NYRCR Lido Beach/ Point Lookout Community (Community) has been allocated up to \$6 million (\$3 million each for Lido Beach and Point Lookout) for the implementation of resiliency projects identified in this plan. The geographic scope of the Community includes all of Lido Beach—from its border with the City of Long Beach at Maple Boulevard to the shared border of Point Lookout at the Town Park at Malibu—and all of Point Lookout—from the Town Park at Malibu on the west to Jones Inlet on the east. The communities are bounded by Reynolds Channel to the north and the Atlantic Ocean to the south.

Storm impacts

Superstorm Sandy struck New York on October 29, 2012. It was the largest storm to land ashore in New York's history. A high water mark of 10.2 feet was recorded by the U.S. Geological Survey in the Lido Dunes neighborhood of Lido Beach. Floodwater from the bayfront met floodwater from the ocean in both communities. Lido Boulevard, a major thoroughfare and the primary evacuation route for Point Lookout, Lido Beach, and the adjacent City of Long Beach was covered by more than a foot of water. Flooding was

exacerbated by additional water forced through the storm drain outfalls on the bay back through the stormwater system and onto neighborhood streets.

Homes, businesses, and critical facilities throughout Lido Beach and Point Lookout sustained flood damage. According to the Federal Emergency Management Agency's Disaster Housing Assistance Program, residents reported more than \$10.5 million in damages to homes. The Lido Towers, a five-story condominium on the oceanfront, was flooded up to the ceiling of the first floor and suffered foundation damage.

Critical facilities throughout both communities were damaged by the storm. The Long Beach Elementary School/Pre-K Center, Long Beach Middle School, and School District Offices, all located in Lido Beach, were damaged by floodwater, which forced schools to close for several weeks and children to be bussed to schools off the island. The District Offices were heavily damaged and are still closed. All three fire stations in the Community sustained damage. Flooding at the Lido–Point Lookout Fire District Lido Beach Fire Station reached a depth of 4 feet inside the building. The Point Lookout Rescue Company, located on Reynolds Channel, was so heavily damaged by flooding that it has been decommissioned by the Fire District.

Power was disrupted throughout both communities, resulting in the loss of electricity to homes. Both communities were without electricity for nearly 2 weeks and without natural gas for several days. Cellular communication was intermittent as a result of damage to communication equipment. Effectively, Lido Beach and Point Lookout were isolated for almost 2 weeks following the storm.

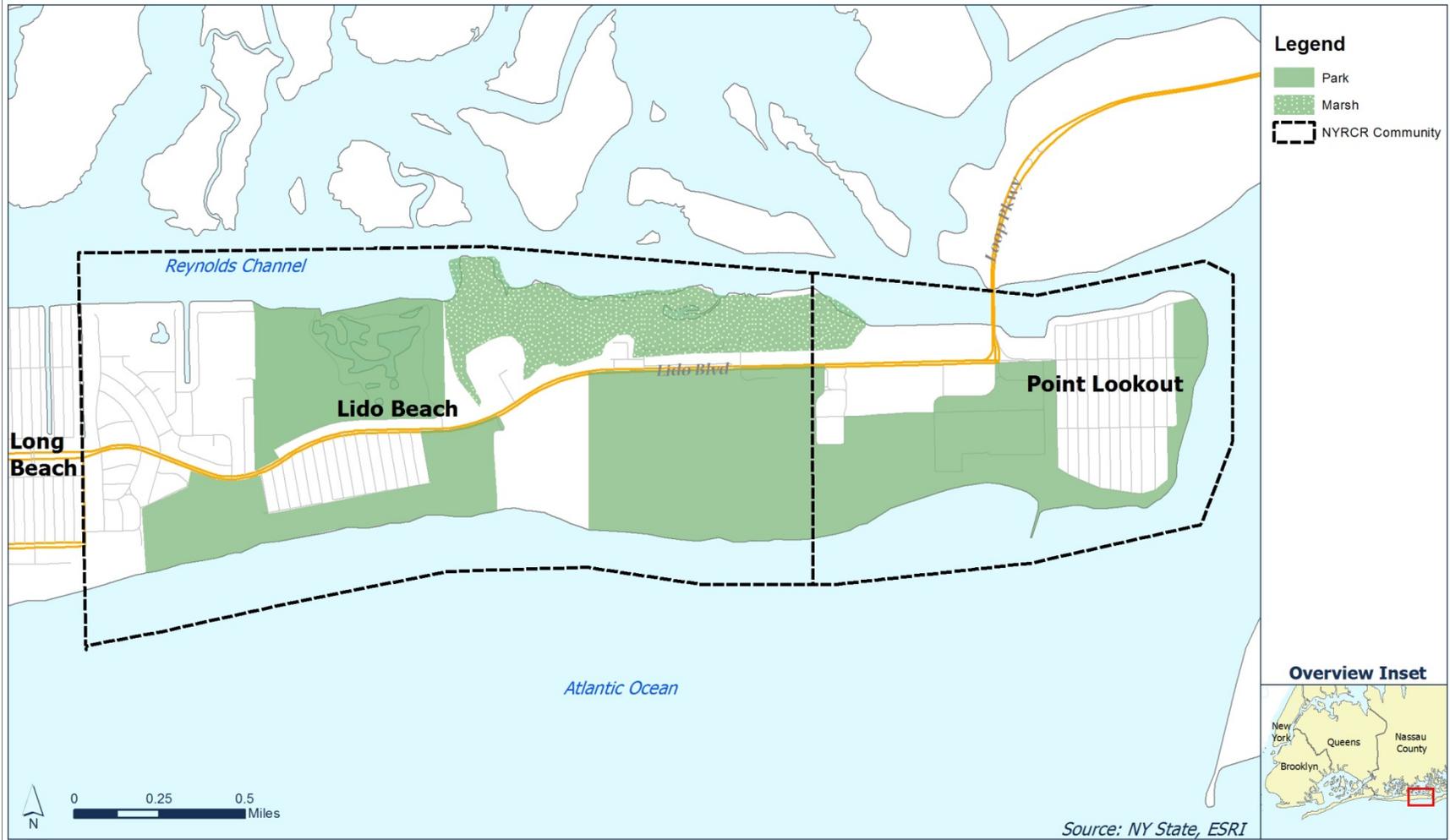
Superstorm Sandy impacted the local economy by damaging commercial areas, including the waterfront along Reynolds Channel in Point Lookout and the Town Parks along the oceanfront. Some businesses were closed for nearly a year after the storm.

Natural areas in both communities also suffered damage due to the storm. Reynolds Channel, located along the bayfront of both communities, was reported by the U.S. Army Corps of Engineers to have at least 40 vessels sunk in its waters as a result of Superstorm Sandy. The Lido Beach Passive



Lido Beach and Point Lookout

Figure ES-1: Geographic Scope of the Lido Beach and Point Lookout NYRCR Plan



Nature Preserve, the last salt marsh on the Barrier Island, suffered shoreline erosion and was littered with debris deposited by floodwater. On the oceanfront, the primary frontal dune at Lido Beach was completely destroyed from Maple Boulevard to Biarritz Street. The dunes were also breached in several locations by the storm surge from Lido Beach down to Point Lookout, allowing floodwater to enter neighborhoods. Superstorm Sandy also accelerated erosion along the unprotected northeastern and southeastern tips of Point Lookout.

Critical issues

The aftermath of Hurricane Irene and Superstorm Sandy highlighted the need to address several issues facing the community to improve the resiliency of infrastructure and critical facilities and to enhance emergency preparedness. Critical facilities, including schools and fire stations, and the stormwater system infrastructure were heavily damaged and remain vulnerable to damage from future storm events. Natural resources, such as the marsh and the dunes, also require protection to enhance their resiliency to future events.

Schools, municipal buildings in Town Parks, and fire houses were hard hit by Superstorm Sandy and remain vulnerable to future storm events. The Lido–Point Lookout Fire District has been working to repair facilities and to improve resiliency to future events.

Access to power and cellular communication during and after an emergency was identified as a critical issue for Lido Beach and Point Lookout. Power and cellular outages were widespread during and after Superstorm Sandy. Lack of power and the inability to communicate increased the isolation of residents during response efforts.

The inability of stormwater to drain is a major issue for both communities. Stormwater systems have been damaged in major storm events, including Superstorm Sandy. In addition, stormwater outfall drains located on the bayfront are open, allowing tidal water to flow back into the stormwater system, forcing water through the system and onto streets. The backflow into the stormwater system causes flooding during normal rainfalls and high-tide events and catastrophic system failures during major storm events.

A critical issue facing both communities is the ability for residents to access evacuation routes. Evacuating prior to a storm event is the first step to

protecting the health and safety of residents. Lido Boulevard is the only evacuation route for Lido Beach and Point Lookout residents. Lido Boulevard was impassable during and after Superstorm Sandy as a result of flooding because the stormwater system was unable to drain floodwaters. Residents were unable to evacuate and were forced to remain on the island without electricity or cellular communication.

Coastal erosion and storm damage to natural protective systems has increased the vulnerability of both communities to future storm events. The loss of the primary frontal dune on the western end of Lido Beach and dune breaches increase the vulnerability of both communities to storm surge and flooding. Superstorm Sandy accelerated coastal erosion at the northeastern tip of Point Lookout. A stone and rubble revetment protects most of the shoreline of Point Lookout along Jones Inlet; however, the revetment does not continue up to and around the northern end of the community, leaving residences vulnerable to coastal erosion. The Lido Beach Passive Nature Preserve also experienced erosion of its shoreline as a result Superstorm Sandy. The marsh is the last remaining salt marsh on the Barrier Island, provides habitat for shorebirds, and functions as an area of floodwater conveyance and storage. The dunes, the northern tip of Point Lookout, and the marsh areas need protection and enhancement to restore their storm buffer capacity and other environmental functions.

B. Working together to rebuild stronger, smarter, and safer

The NYRCR Planning Committee, with input from the public, developed goals for enhancing resiliency of Community assets that were aligned with the Community's core values. The Community developed the Vision Statement in Figure ES-2 to guide the development of its goals.

Public outreach

The Community Vision Statement and NYRCR Plan recommendations were shaped in a public engagement process that included 11 Planning Committee Meetings, 3 Public Engagement Events, and outreach through a variety of mediums and methods.

The three Public Engagement Events were held from October 2013 through March 2014 to share project information and solicit feedback from the

NYRCR Lido Beach and Point Lookout Vision Statement

Point Lookout and Lido Beach will continue to be vibrant, island residential communities that provide a healthy environment and resilient infrastructure and maintain a high quality of life for residents and visitors by preserving natural resources, providing beautiful beaches and other recreational opportunities, and maintaining a working waterfront.

Figure ES-2: NYRCR Lido Beach/Point Lookout Vision Statement

Community to shape NYRCR Plan recommendations. The three Public Engagement Events were each attended by 40 to 45 members of the public.

The first Public Engagement Event, held October 15, 2013, in Lido Beach, was designed to provide an overview of the NYRCR Program, while engaging community members in a small group forum for a discussion about a community vision, community assets, vulnerabilities, and strategies for making the Community more resilient.

At the second Public Engagement Event, held November 4, 2013, in Lido Beach, a small group discussion format was used to conduct three interactive sessions to gather information on the effects of Superstorm Sandy and identify projects for achieving resiliency, and for residents to select innovative strategies to pursue. The public identified locations of flooding events, discussed issues with post-storm communication due to damaged cellular communications equipment and intermittent coverage, and provided information about disaster recovery immediately after Superstorm Sandy. The public also recommended additional strategies for resolving the recovery issues they identified during the event.

An open house format at the third Public Engagement Event, held February 20, 2014, in Point Lookout, provided nine project stations that included project boards staffed by subject matter experts in civil engineering and coastal protection and Planning Committee Members to answer questions.

The project boards contained illustrations, benefit analyses, maps, and prompts for the public to facilitate obtaining feedback on the projects.

The final Public Engagement Event, to be held in spring 2014, will present the final NYRCR plan to the Community.

C. Blueprint for implementation

Goals and associated strategies were developed through the Planning Committee Meetings, the three Public Engagement Events, an online survey, an asset inventory, a risk assessment, and a needs and opportunities analysis for Lido Beach and Point Lookout. Strategies guided the development of projects to increase the resiliency of assets and reduce future risk to storm events. Metrics such as resiliency, time frame, and technical feasibility were used to develop a series of capital projects, feasibility studies, policy recommendations, and regional cooperation initiatives for recovering and rebuilding from the impacts of Superstorm Sandy and Hurricane Irene. The Plan includes three sets of projects to address critical community needs: Proposed Projects, Featured Projects, and Additional Resiliency Recommendations. NYRCR projects are classified in the following ways:

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

All of the projects included in the NYRCR Plan are important to the Community. Projects for NYRCR Lido Beach and Point Lookout are listed below in Table ES-1 by strategy (some of the projects fit multiple strategies

and are listed more than once). The order of appearance is not a reflection of project priority or ranking.



Table ES-1: Table of Projects

| Reconstruction and Resiliency Strategy | Project Name | Short Description | Project Category |
|--|--|---|------------------|
| Increase protection from coastal storms | Revetment Repair/Reconstruction | Construct sections of rock revetment at northeast end of Point Lookout for protection of homes, businesses, and recreational facilities | Proposed Project |
| Increase protection from coastal storms | Repair Dunes & Construct Dune Walkovers | Fill breaches and repair dunes to prevent tidal surge from flooding streets, homes, and businesses; construct walkovers to provide beach access | Proposed Project |
| Improve stormwater drainage | Tidal Backflow Prevention and Stormwater Treatment | Prevent tidal water from infiltrating low-lying areas at stormwater outfalls that are partially or fully submerged during high tides and storms, causing flooding. Reduce contaminants discharged from outfalls. | Proposed Project |
| Improve stormwater drainage | Drainage Improvements (Phase 3A) | Comprehensive stormwater study to identify improvement areas to reduce flooding along evacuation routes, primary roadways, low-lying areas, and economic corridors Section 3A (along Lido Boulevard from Maple Boulevard to Harrogate Street, Lido Beach) will be the first phase of construction. | Proposed Project |
| Improve stormwater drainage | Alternative Stormwater Opportunities | Conduct an analysis of the stormwater management system in the vicinity of the Town Parks and Nickerson Beach. Design and construct stormwater management systems at key project locations in Town Parks based on recommendations of stormwater management system study. | Featured Project |
| Improve stormwater drainage | Encourage Stormwater Capture during Sidewalk Replacement | Install stormwater management system under sidewalks when sidewalks are replaced | Featured Project |
| Increase resiliency of critical facilities | Critical Facility Resiliency | Provide resiliency enhancement to emergency service buildings and secure critical facilities with resiliency enhancements and flood protection | Proposed Project |
| Meet communication needs pre-event Promote evacuation | Evacuation Education and Outreach Program and Lifeline Safety Plan | Develop a Lifeline Safety Plan and establish a program for providing regular education and outreach about emergency evacuation; includes development of a reverse 911 system for the Lido–Point Lookout Fire District | Proposed Project |
| Increase resiliency of salt marsh to coastal erosion | Shoreline and Marsh Restoration and Open Space Protection | Provide stabilization of the shoreline of the Lido Beach Passive Nature Preserve and Tidal Salt Marsh with creation of natural habitat | Featured Project |





Section I: Community overview

Section I: Community overview

The State of New York has developed the New York Rising Community Reconstruction (NYRCR) Program, an innovative post-disaster planning process, to help communities rebuild better and safer.

The NYRCR Lido Beach/Point Lookout Planning Committee (Committee) is composed of community representatives from Lido Beach and Point Lookout partnered with planning experts from the Governor's Office of Storm Recovery and New York State Department of State. The Committee used a community-based planning process to develop an NYRCR Plan that addresses repairing existing damage and mitigating future threats to create a safer and more resilient community. The Committee developed the NYRCR Plan in coordination with the State Planner, State Region Lead, and Consultant Team through Committee meetings, Public Engagement Events, and meetings with stakeholder representatives.

A. Geographic scope of NYRCR Plan

The NYRCR Planning Committee for the hamlets of Lido Beach and Point Lookout identified both communities in their entirety as the geographic scope for the purposes of the Lido Beach/Point Lookout NYRCR Community Reconstruction Plan (NYRCR Plan). This geographic scope, referred to as the NYRCR Community, incurred substantial damage during Superstorm Sandy in October 2012.

Lido Beach and Point Lookout are Census Designated Places within the jurisdiction of the Town of Hempstead in Nassau County, New York. Both communities are located on the eastern end of Long Beach Island, a barrier island on the southern shore of Long Island (Figure I-1).¹ Point Lookout occupies the eastern tip of the island (Figure I-2). Lido Beach shares its eastern border with Point Lookout and its western border with the City of Long Beach. Reynolds Channel establishes the northern border of each community. Point Lookout is bordered to the east by Jones Inlet.

Lido Beach and Point Lookout share health and social services and infrastructure assets with the City of Long Beach. The Long Beach Medical

Center provided primary and specialty medical care for the area until it was severely damaged by Superstorm Sandy, and it has remained closed since the storm. The City of Long Beach School District serves both Lido Beach and Point Lookout. Lido Elementary School / Long Beach Pre-K Center, Long Beach Middle School, and Long Beach High School are in Lido Beach. Further, the City of Long Beach wastewater treatment plant receives sanitary sewage from Lido Beach.

Topographically, Lido Beach and Point Lookout slope downward from the ocean to the bay (Figure I-3). The high point on the island north of Lido Boulevard is artificial and was part of the Nike Missile Base, which was operated from 1955 until 1963 by the U.S. Department of Defense. The Nike Missile Base used rock and soil to elevate an area that is now used for Long Beach School District bus parking to about 14 feet above mean sea level.

Lido Beach

Lido Beach has a population of about 2,897.² The median income in Lido Beach is \$113,430 and the median value of owner-occupied housing units is \$754,800.² Approximately 95% of the homes are owner-occupied.³ On average, homeowners and renters in Lido Beach spend more than 35% of their total annual income for housing. The U.S. Department of Housing and Urban Development (HUD) threshold for affordability of housing is 30% of a household's annual income.⁴

Development of Lido Beach began in the early 1920s, starting with the Lido Dunes neighborhood.⁵ Approximately 44% of the housing units in Lido Beach were constructed between 1960 and 1969, prior to the adoption and enforcement of a flood damage prevention ordinance by the Town of Hempstead.⁶

Lido Beach was a popular summer resort for several decades. The Lido Hotel, a Moorish-style building on the coast, was completed in 1929 as an exclusive seaside resort. The Navy used the hotel as a discharge center



during World War II. The hotel reopened afterwards, but was converted to condominiums in 1981.

The Lido Beach Golf Club is located on the north side of Lido Boulevard in Lido Beach. One of three Lido–Point Lookout Fire District Buildings and three Long Beach School District buildings, the high school, middle school, and one elementary school, are located in Lido Beach. A wastewater pump station is located in Lido Beach that moves wastewater from the western end of Lido Beach to the City of Long Beach wastewater treatment plant.

Lido Beach West Town Park, Town Park at Sands, Nickerson Beach Nassau County Park, and Lido Beach Town Park are large public beaches located along the Atlantic Ocean in Lido Beach.

Camp Anchor, a facility operated by the Town of Hempstead, is located in Lido Beach at the Atlantic Ocean and provides year-round programs for children and adults with special needs.

Infrastructure in Lido Beach includes roads, sidewalks, and a stormwater drainage system. The main road through Lido Beach is Lido Boulevard. To travel from Lido Beach to the mainland, there are three bridges: one connects to the mainland from the City of Long Beach, one from the Village of Atlantic Beach, which is to the west of the City of Long Beach, and the other from Point Lookout.

Lido Beach is protected from minimal storm surge by a combination of natural and hard shoreline infrastructure elements including a dune system, a nature preserve, bulkheads, and a stormwater drainage system.

An engineered dune system along the Atlantic includes several breaks intended to allow people to walk to the ocean without having to climb over a dune. There are some walkways over the dunes. Dunes are not of uniform height or width. Several breaches in the dune system occurred during Hurricane Irene and Superstorm Sandy from Buxton Street west to the Long Beach city line and the entire primary dune along Lido Beach was lost in the storm.

Lido Beach has two Passive Nature Preserves that occupy approximately 50 acres. The preserves are located to the north of Lido Boulevard. The western preserve is adjacent to Long Beach schools and covers approximately 37 acres. The eastern preserve is the Town of Hempstead Lido Nature Preserve.

Lido Beach has a tidal salt marsh on the bay side of the island that covers 185 acres from the Lido Beach Golf Course to the Town of Hempstead West Marina. The tidal salt marsh is owned by New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service.

Approximately 1.5 miles of bulkhead have been constructed along Reynolds Channel on the bay side of the island. Bulkheads are not of uniform height and are not continuous along Reynolds Channel or along the sides of the canals that connect to the channel along either Lagoon Drive or Blackheath Road. Other than the bulkhead at the high school and along part of the Town of Hempstead owned Lido Beach Golf Club, bulkheads are located on private property.

The stormwater drainage system in Lido Beach follows the natural drainage pattern for surface water from Lido Boulevard to the north and was designed to convey water from the ocean side of the island toward the bay. Outfalls or discharge points from the stormwater drainage system are along Reynolds Channel. However, the streets perpendicular to Lido Boulevard from Allevard Street to Prescott Street slope toward Ocean Boulevard and the drainage causes pooling of water at Ocean Boulevard.

With the schools, nature preserves, and beaches, well over 50% of the land in Lido Beach is tax exempt.

Point Lookout

Point Lookout has a population of about 1,219.⁷ The median income in Point Lookout is \$107,354 and the median value of owner-occupied housing units is \$777,893.⁸ Approximately 78% of the homes are owner-occupied.⁹ On average, homeowners and renters in Lido Beach spend more than 38% of their total annual income for housing, which exceeds the HUD threshold for affordability of housing.¹⁰

Approximately 53% of the housing stock in Point Lookout was constructed before 1939, prior to the adoption and enforcement of a flood damage prevention ordinance by the Town of Hempstead.¹¹

The development pattern of Point Lookout began in the 1920s when concrete streets were laid and the land was subdivided and sold for single-family housing.

Point Lookout is a walkable community. It restricts on-street parking and protects pedestrians with a 15-mile per hour speed limit.

Point Lookout maintains its beach district for use by Point Lookout residents.

The Town of Hempstead Department of Conservation and Waterways and Energy Park, a Post Office, and the second of three Lido–Point Lookout Fire District Buildings are located in Point Lookout along Lido Boulevard. Along the bay in Point Lookout, there are four marinas or commercial fishing stations as well as some seafood restaurants and other related businesses and the third of the three Lido-Point Lookout Fire District Buildings.

Town Park at Point Lookout and Town Park at Malibu are two large public beaches located along the Atlantic Ocean in Point Lookout. A third large public recreational area, Point Lookout Beach District Park, is located at the eastern end of Point Lookout along Jones Inlet.

Infrastructure in Point Lookout includes roads, sidewalks, and a stormwater drainage system. The main road through Lido Beach is Lido Boulevard. Loop Parkway Bridge connects Point Lookout to the mainland. Two other bridges connect Point Lookout to the mainland; these are located in the Village of Atlantic Beach and the City of Long Beach.

Point Lookout is protected from minimal storm surge and flooding by a combination of natural and hard shoreline infrastructure elements including a dune system, revetment, bulkheads, and a stormwater drainage system.

An engineered dune system along the ocean includes some breaks intended to allow people to walk to the ocean without having to climb over a dune and some walkways over dunes that protect the dune. Dunes are not of uniform height or base width. Dunes were overtopped and damaged or lost in Superstorm Sandy.

Jones Inlet is located at the eastern end of Point Lookout. A revetment, a wall of rocks of varying sizes, was built along Jones Inlet over a period of several years to limit erosion of the eastern end of the island and to prevent flooding of the Point Lookout residents. The revetment reaches the Atlantic Ocean side of the island, but does not reach all the way to Reynolds Channel. Prior to construction of the revetment in 1953, an entire street at the east end of Point Lookout was reclaimed by the ocean during a coastal storm. The revetment has been credited with limiting damage in Point Lookout over the past five decades, but it has deteriorated and efficacy in the future is uncertain.¹² Two groins extend into the Atlantic from Point Lookout near Jones Inlet.

Approximately 0.8 mile of bulkhead has been constructed along the Reynolds Channel side of Point Lookout. Bulkheads are not of uniform height, are not continuous, and are located on private property.

The stormwater drainage system in Point Lookout was designed to convey water from the oceanfront of the barrier island toward the bay with outfalls along Reynolds Channel. However, the natural movement of surface water at the eastern end of Point Lookout is from the center of the island toward Jones Inlet where the ground elevation is lowest. Because movement of water in the drainage system is intended to be accomplished by gravity, the system is not effective and, during Hurricane Irene and Superstorm Sandy, this caused significant drainage problems and flooding.

With the Town of Hempstead buildings and beaches, as in Lido Beach, over 50% of the land in Point Lookout is tax exempt.



Lido Beach and Point Lookout

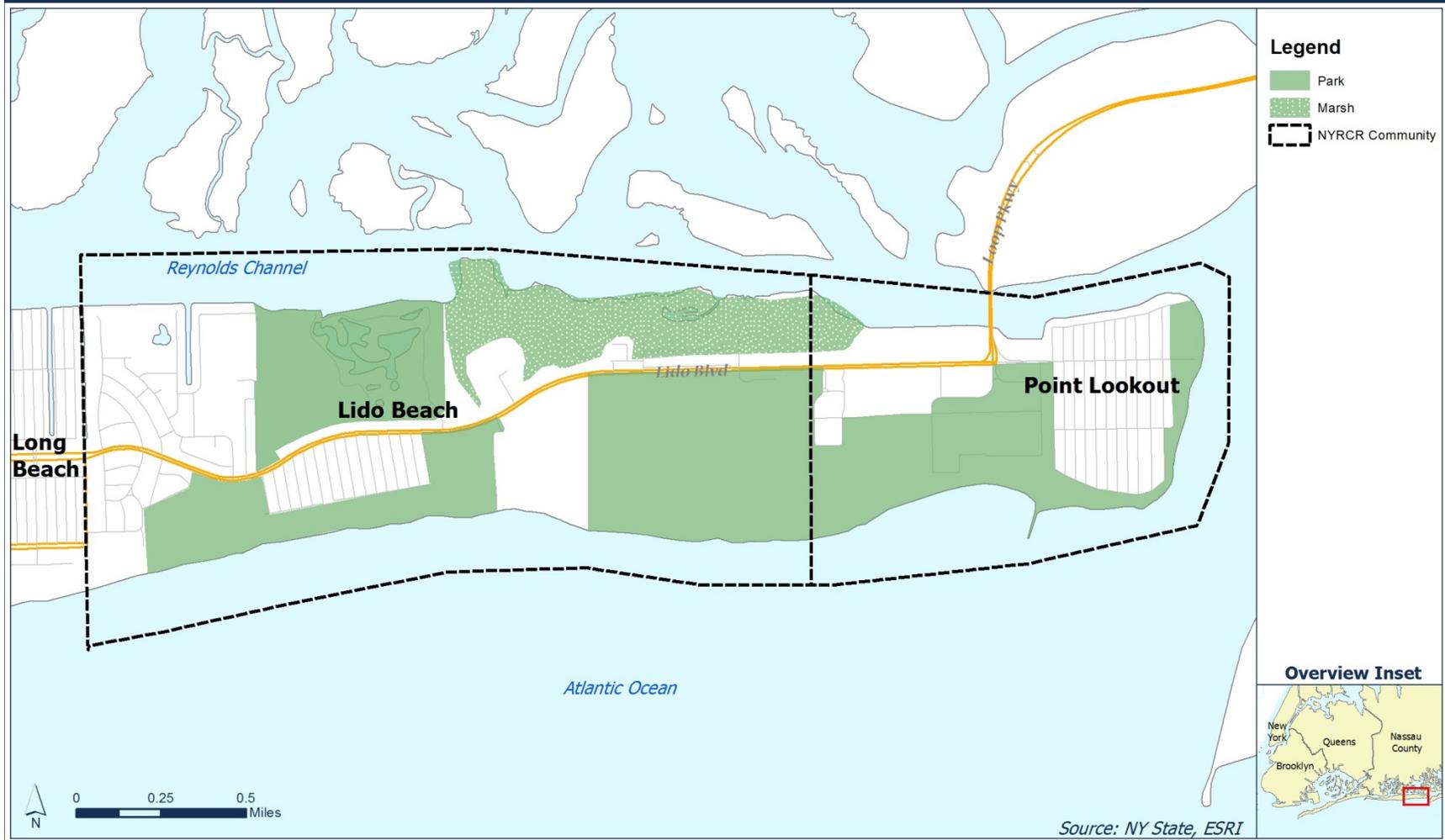
Figure I-1: Location of Lido Beach and Point Lookout





Lido Beach and Point Lookout

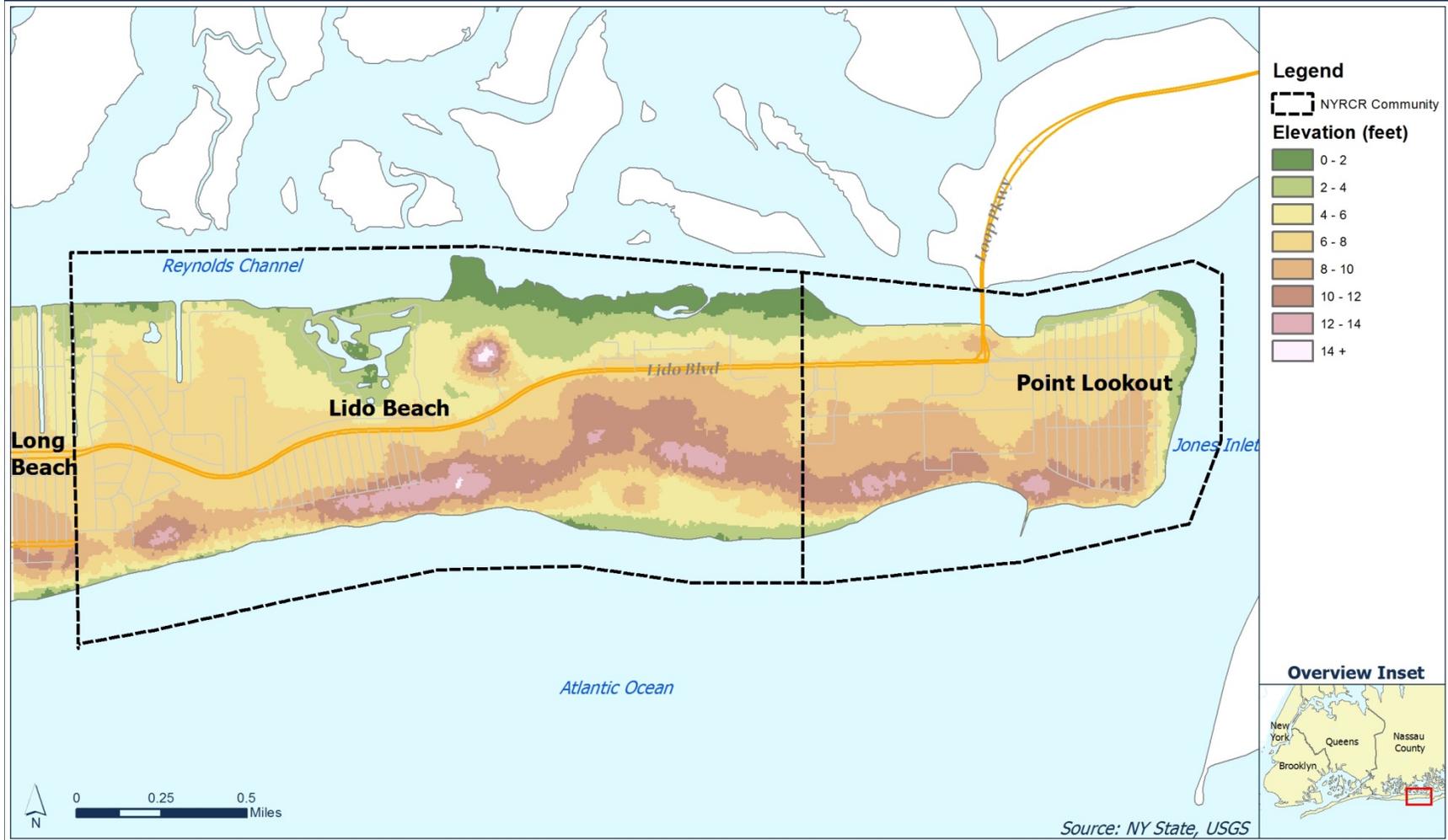
Figure I-2: Geographic Scope of the Lido Beach and Point Lookout NYRCR Plan





Lido Beach and Point Lookout

Figure I-3: Topographic Map of Lido Beach and Point Lookout



B. Description of storm damage

Hurricane Irene

Hurricane Irene moved across New York City on August 28, 2011, with the strongest winds at landfall located east of the center, striking Long Island, measured at roughly 63 mph.¹³ The storm surge generated by Irene was roughly 4.42 feet above ground surface, with a storm tide of 8.17 feet above ground surface at Point Lookout (Figure I-5).¹⁴ The storm surge caused hundreds of millions of dollars in property damage in New York City and Long Island. Tropical storm-force winds along with heavy rains resulted in power outages for 1.1 million residents that lasted up to around 1 week across much of Long Island, and included more than \$1.3 billion in damages and 10 fatalities.¹⁵ Flooding in Lido Beach was sufficient to allow kayaking on the streets. The dune system in Lido Beach was severely eroded during the storm. Structures and basements in Lido Beach and Point Lookout had some damage.¹⁶

Superstorm Sandy

Superstorm Sandy struck New York on October 29, 2012, bringing a storm surge of 3 to 6 feet above ground level in Nassau County.¹⁷

Superstorm Sandy was the largest storm to land ashore in New York's recorded history. The storm caused 53 fatalities.¹⁸ Sandy also destroyed an estimated 305,000 homes, affected more than 2,000 miles of roads, produced catastrophic flooding in subways and tunnels, and damaged major power transmission systems.¹⁹ Fourteen counties in New York were declared Federal disaster areas.²⁰ Economic losses in New York were estimated to be between \$30 and \$50 billion, with an estimated \$10 to \$20 billion in insured losses.²⁰

According to the Committee, the majority of homes and businesses in Lido Beach and Point Lookout experienced flooding and sustained various levels of structural damage as a result of Superstorm Sandy (Figure I-4).

The storm tide (water level resulting from the combination of storm surge and the astronomical tide) at the Lido Townhouses was observed to be at the U.S. Geological Survey high-water mark of 10.2 feet, and the storm tide

near the intersection of Hewlett Avenue and Beech Street was recorded as a USGS high-water mark of 9.3 feet.²² Sustained winds of 49 knots with gusts of up to 64 knots were recorded in Point Lookout.²³



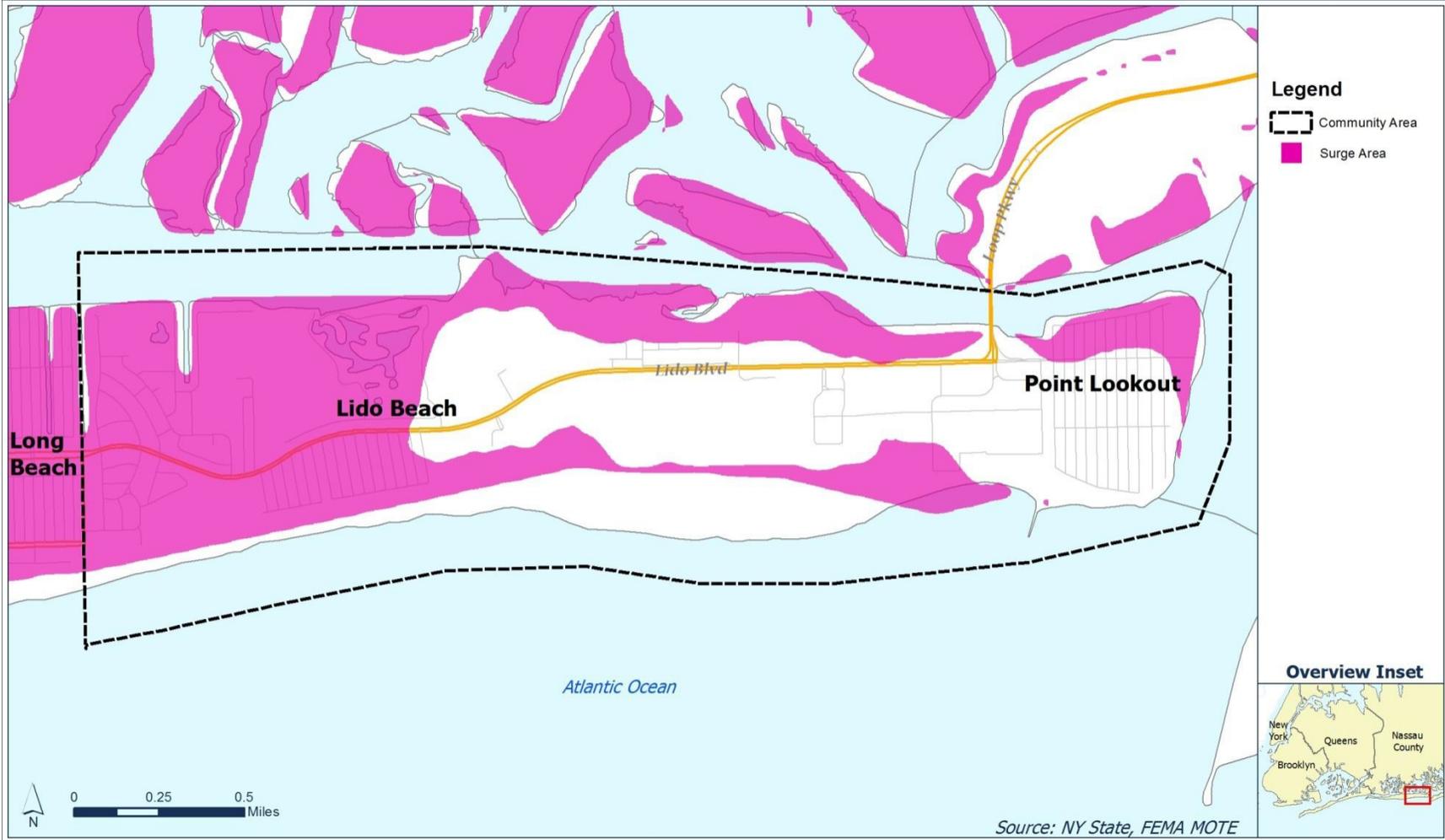
Figure I-4: Lido Boulevard, Lido Beach, October 2012

Courtesy, Kate Murray

According to the Point Lookout Chamber of Commerce Web site, storm surge in Lido Beach and Point Lookout was approximately 3 feet deep from the Reynolds Channel side of the island and flood waters from Reynolds Channel and from the Ocean met on the island.²⁴ Because a system of dunes provided some protection along the oceanfront of Lido Beach and Point Lookout and because ground elevation is lower on the bay side of the island than on the oceanfront, the majority of damage occurred on the bay side; facilities used by the commercial marinas on the Reynolds Channel were damaged and homes and businesses were flooded. Homes and businesses in other parts of Lido Beach and Point Lookout, as well as critical facilities and assets, also sustained damage due to flooding including residential structures closest to Jones Inlet. Damage was caused not only by storm surge flooding, locations of which are depicted in Figure I-6, but also flooding caused by ponding in low-lying areas due to rainfall and poor drainage throughout the communities.

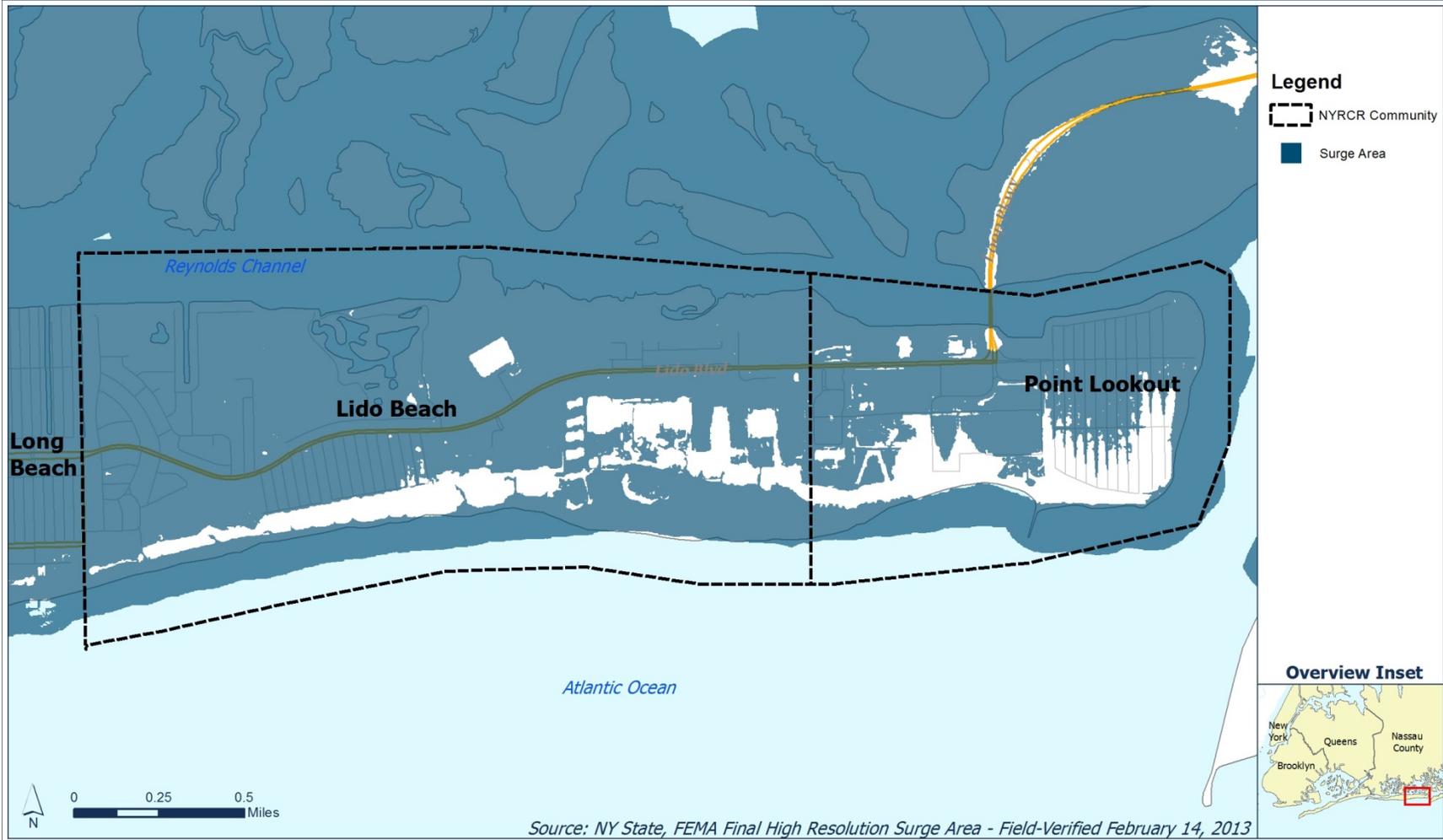
Lido Beach and Point Lookout

Figure I-5: Hurricane Irene Storm Surge Area



Lido Beach and Point Lookout

Figure I-6: Superstorm Sandy Surge Area



The Federal Emergency Management Agency (FEMA) Disaster Housing Assistance Program (DHAP) is a joint HUD and FEMA initiative that provides assistance to families displaced from their homes by disasters such as Superstorm Sandy. June 2013 data show that there were 1,074 FEMA registrations by homeowners in Lido Beach and Point Lookout with total damage of approximately \$10.5 million (Tables I-1 and I-2).

Table I-1: DHAP Damage Registrations for Owner-Occupied Housing

| Location | No. of Valid Registrations | Average Damage per Housing Unit | Total Damage |
|---------------|----------------------------|---------------------------------|---------------------|
| Lido Beach | 805 | \$12,948 | \$8,947,344 |
| Point Lookout | 269 | \$7,604 | \$1,497,978 |
| TOTAL | 1,074 | — | \$10,445,322 |

Source: FEMA Housing Assistance Program database as of 6/23/13. Zip code based data. Zip code boundaries may not coincide exactly with NYRCR Community boundaries for Lido Beach and Point Lookout. Income information is self-reported.

Water was as high as 15 inches deep on Lido Boulevard and about 18 inches deep inside businesses along Lido Boulevard, which is at an elevation of about 7 feet. Homes and businesses were flooded to varying depths throughout Lido Beach and Point Lookout. The pump station in Lido Beach and restrooms and maintenance buildings at Lido Beach Town Park and Town Park at Point Lookout were damaged. The elementary and middle schools sustained flood damage during Superstorm Sandy. The dune system was breached by the storm in several locations, allowing floodwaters into both communities. In Lido Beach, the primary frontal dune was completely destroyed from Maple Boulevard to Biarritz Street.

Table I-2: DHAP Damage Registrations for Renter-Occupied Housing

| Location | No. of Valid Registrations | Units with Moderate Damage | Units with Major/Substantial Damage | Total Approved Individuals and Households Program Amount |
|---------------|----------------------------|----------------------------|-------------------------------------|--|
| Lido Beach | 143 | 35 | 30 | \$396,303 |
| Point Lookout | 136 | 37 | 18 | \$221,592 |
| TOTAL | 279 | 72 | 48 | \$617,895 |

Source: FEMA Housing Assistance Program Database as of 6/23/13. Zip code based data. Zip code boundaries may not coincide exactly with NYRCR Community boundaries for Lido Beach and Point Lookout. Income information is self-reported.

Lido Towers (Figure I-7), a five-story condominium building on the beach at the western end of Lido Beach, had flooding that reached the ceiling of the first floor, with 18 first-floor apartments damaged or destroyed. Sandy also destroyed the building’s electrical system and elevators.²⁵ Damage was so severe at Lido Towers that the structure remained uninhabitable for over a year after the storm.

Structures in Lido Beach and Point Lookout including the high school also sustained wind damage. The roof of the elevated high school and some windows were damaged by wind, not by flooding.

National Grid shut off gas service on the island for safety for several days. Long Island Power Authority began to restore electricity to Lido Beach and Point Lookout 11 days after the storm and power was not fully restored for at least 2 weeks.²⁶

The storm did not disrupt the supply of potable water, which is derived from an aquifer approximately 1,500 feet below ground. However, the storm significantly damaged the wastewater treatment plant in the City of Long Beach that serves part of Lido Beach. According to the Committee, cesspools in the remainder of Lido Beach and throughout Point Lookout failed to



function properly as a result of inundation, causing wastewater to back up into basements.



Figure I-7: Lido Towers, September 2013
URS Corporation

Floodwaters from Superstorm Sandy were forced through bayfront stormdrain outfalls into the stormwater drainage system in Lido Beach and Point Lookout, adding to the volume of floodwaters in the street, which hindered access to evacuation routes for residents. Residents of Lido Beach and Point Lookout believe that the storm caused some stormwater conveyance structures, including underground pipes and drainage basins, to fill with sand and others to collapse or break. The stormwater drainage system no longer conveys water to outfalls located on the bayfront of the Island as intended and since Sandy, streets have flooded during relatively minor rainstorms.

Superstorm Sandy accelerated erosion in several locations within the project areas including the unprotected northeastern and southeastern tips of the island in Point Lookout, along the edge of the Lido Beach Passive Nature Preserve, and at the western edge of the Lido Beach Golf Club where there is no bulkhead.

Storm tides destroyed docks at the East Marina (on Bayside Drive) and West Marina (in the Energy Park) in Point Lookout (Figure I-8). It was reported that there were at least 40 submerged vessels within Reynolds Channel deposited or sunk due to the storm.²⁷ The storm also deposited debris in the Lido Beach Passive Nature Preserve.



Figure I-8: East Marina, Point Lookout, October 2012
Courtesy, Kate Murray

C. Critical issues

Since Superstorm Sandy, the Town of Hempstead, on behalf of Lido Beach and Point Lookout, has applied for and utilized FEMA funding to implement the following actions:

- Repair of public facilities at the Point Lookout Town Park;
- Repair of parks and recreation facilities at the Point Lookout Beach District Park;
- Repair of Long Beach schools in Lido Beach;
- Repair of Lido Boulevard pump station in Lido Beach; and

- Repair of private homes and places of business.

FEMA Public Assistance funding has helped address some of the issues facing the communities today; however, multiple critical issues remain to be addressed. A list of critical issues within the NYRCR Community was developed through research and analysis. The list of critical issues was vetted and expanded both by the Committee and residents during several Committee Meetings, two Public Engagement Events, and through community feedback received through the NY Rising website. The public engagement process is described in Section V of this plan.

These critical issues are addressed more thoroughly in the assessment of risk and needs in Section II.

- **Tidal flooding and tidal surge:** At the time of Superstorm Sandy, tidal inundation significantly affected Lido Beach and Point Lookout, damaging the stormwater system infrastructure, roadways, marine structures, homes, and other buildings.

As mentioned in Section I.B, "Description of storm damage," the storm tide was observed at the USGS high-water mark of 10.2 feet in some areas.²⁸

Although tidal surge from large storms, such as Superstorm Sandy, is a critical issue, focus on the frequent flooding that occurs as a result of smaller storms, nor'easters, and moon tides overwhelming the stormwater system is also vital to addressing the issues within the communities.

Lido Beach and Point Lookout frequently have tidal surge and flooding during full moons – locally known as moon tides. During moon tides, inundation from both the ocean and bay cause flooding as water is forced back into the stormwater system through bayfront stormdrain outfalls, and overwhelms the system.

This more common or nuisance flooding results in standing water or pooling on street surfaces, which can impede evacuation and emergency response and affects homes and structures located at low elevations.



Figure I-9: Ponding at catch basin after minor rainstorm, Regent Drive at Reynolds Drive, Lido Beach, November 2013
URS Corporation

- **Stormwater drainage:** The combination of tidal surge and rain events, as identified by the Committee, places added pressure on an already overburdened stormwater drainage system.

Several causes of stormwater drainage issues were identified by the Committee and merit further study. The issues are as follows:

- The stormwater drainage system is outdated and pipes are undersized. According to Committee members, the drainage system was not originally developed for the amount of development in the area today.
- Impervious surfaces that prevent water from percolating into the ground have increased over time and further overburden the overall system. Development of structures, parking lots, and roads prevents water from being absorbed into the ground and causes water to flow into the stormwater conveyance system.
- Because of the limited slope and low elevation of Lido Beach and Point Lookout, the drainage system is ineffective in multiple areas and does not move water away from structures and roadways and into the bay as intended. Multiple roadways are

specifically subject to frequent pooling and nuisance flooding as a result of this ineffective drainage (Figure I-9).

- Stormwater inlets, catch basins, gutters, and outfalls require consistent maintenance and cleanout. In areas of Point Lookout, additional catch basins may be necessary.
- Outfalls along the bay are unprotected, allowing water, sand, and debris to be forced back into the stormwater system, which further stresses the system.
- Green infrastructure and other current Best Management Practices are not being extensively utilized to decrease consistent and nuisance flooding.
- Communities need detailed information about the demands made on the stormwater drainage system.



Figure I-10: Lack of vegetation on dunes, Lido Beach, September 2013
URS Corporation

The stormwater infrastructure system in Lido Beach and Point Lookout requires significant upgrades to address both tidal and rain event flooding. Further study and analysis of the overall system are required to address these issues.

- **Natural and hard shoreline infrastructure system breaches:** Natural and hard shoreline infrastructure systems lack uniformity. Protection from storm inundation was negatively affected by breaches in the dune systems caused by Superstorm Sandy, gaps in the hard shoreline infrastructure systems such as the revetment in Point Lookout, and a lack of protection from increasing erosion in several areas including the marsh, Point Lookout, and the western end of the Lido Beach Golf Course. The NYRCR Planning Committee identified the following issues:

- Perimeter dune system breaches: Breaches caused by Hurricane Irene and Superstorm Sandy in the perimeter dune system and a lack of dune vegetation (Figure I-10) resulted in increased flooding caused by tidal and water inundation during the storm.
- Hard infrastructure gaps: Hard shoreline infrastructure, such as existing bulkheads, does not provide sufficient protection from tidal surge. Although bulkheads are provided in some areas, a continuous protective system that is uniform in both height and length is lacking. Gaps in the shoreline infrastructure system result in costly protection measures such as sandbagging that are relatively ineffective in protecting the area against tidal flooding. Lastly, there is an area along the western bay side of the Town of Hempstead owned Lido Beach Golf Course that is eroding due to a break in the bulkhead. To provide protection from erosion and flooding, the bulkhead system at the golf course should be continuous.
- Erosion and lack of revetment: The easternmost area of Point Lookout requires additional protection from tidal surge and is also eroding. The revetment along Jones Inlet has provided storm protection for Point Lookout over the past several decades (Figure I-11), but the revetment does not extend to the northern end of the inlet, which leaves an expansive area open to tidal inundation. The revetment was also damaged during Superstorm Sandy, leaving it weakened and vulnerable to additional damage and failure. The Lido Beach Passive Nature Preserve also has an erosion problem, which can be accelerated during storm events. Because the Passive Nature Preserve protects the last salt marsh

on the Barrier Island, loss of marsh areas is of particular concern to residents.



Figure I-11: Rubble revetment, Point Lookout, September 2013
URS Corporation

- **Emergency response services and systems protections:** The Lido–Point Lookout Fire District implements emergency response measures that are effective during and after storms and emergencies. The critical issue is evacuation of the Barrier Island preceding storms and emergencies. The Committee has determined that evacuation of the island before disasters is the first step in effectively protecting the safety, health, and welfare of the Community’s residents. This issue is addressed by stressing evacuation as the number one, crucial step to ensuring safety and the foundation upon which to build protection and save lives. Effective emergency response also requires protection of the buildings that house emergency responders and equipment. Emergency response in the Community is largely the responsibility of the Lido–Point Lookout Fire District, which operates out of three buildings: two in Point Lookout and one in Lido Beach. An alternative power source is critical during emergencies to ensuring safety and maintaining continuity of operations of the firehouses during and after storm events. Elevation of electrical, mechanical, and plumbing

equipment, particularly the emergency generators that provide backup power in the event of an outage, is key to the ability of first responders to provide emergency response during and after a storm event.

- **Energy, including electricity and gas systems protections:** As stated in Section I.B, Description of storm damage, residents went without power for approximately 2 weeks following Superstorm Sandy. Energy and communications are critical issues for the community. Although evacuation is stressed as the number one priority for the Community preceding disasters, the NYRCR Planning Committee recognizes the need to restore energy and communication systems as soon as possible so residents can return to normal activities. Both the NYRCR Planning Committee and the public indicated that energy and communications were significantly affected during and after the storm. Alternative energy and alternative or redundant communication systems are necessary for providing emergency and basic services in the aftermath of another storm that leads to prolonged power outages.

D. Community vision

To begin the process of addressing the stated critical issues and developing a plan that provides guidance and direction for future protection and resiliency of Lido Beach and Point Lookout, the Planning Committee developed a community vision statement through the visioning process.

Visioning is an interactive process for setting goals, planning, and problem solving. The purpose of the Vision Statement is to provide an overarching goal for community recovery and resiliency strategies and projects and be aligned with regional goals for economic development. To create a Community Vision Statement, the Committee was asked to describe the unique qualities inherent in their communities. Based on the Committee’s input, a draft Vision Statement was created. The draft Vision Statement was presented to the community and Committee during the first Public Engagement Event in October 2013.

Feedback from the Public Engagement Event and through the NY Rising website resulted in the creation of two draft Vision Statements. The two draft Vision Statements were condensed into a single vision by the NYRCR

Planning Committee during a subsequent committee meeting and the final Vision Statement for Lido Beach and Point Lookout was approved by the NYRCR Planning Committee during the committee meeting on November 22, 2013.

Vision Statement for the Communities of Lido Beach and Point Lookout

Point Lookout and Lido Beach will continue to be vibrant island residential communities that provide a healthy environment and resilient infrastructure and maintain a high quality of life for residents and visitors by preserving natural resources, providing beautiful beaches and other recreational opportunities, and maintaining a working waterfront.

E. Relationship to regional plans

The communities of Lido Beach and Point Lookout have unique qualities and issues, yet they are also part of a regional system of communities. Local and regional systems affect one another. It is important to understand the relationships and connections that exist, including shared challenges and issues.

To develop this plan, local and regional planning documents were reviewed for information relevant to Lido Beach and Point Lookout including the Town of Hempstead Building Zone Ordinance. Documents with a regional focus included documents written before and after Superstorm Sandy and were in various stages of planning and execution. Many of the recommendations in this plan are consistent with strategies proposed in the regional plans briefly summarized below.

Long Island South Shore Estuary Reserve: Comprehensive Management Plan (2001)²⁹

- The vision this plan is to preserve, protect, and restore the ecosystem of the Long Island South Shore Estuary Reserve. The goals are to reduce nonpoint and point-source pollution, improve the

estuarine health of the bay, restore and protect coastal habitats, and increase open space preservation.

Nassau County Hazard Mitigation Plan (2007)³⁰

- This plan contains historical data on hazard impacts to the communities, long-term erosion projections and flood zones, and hazard mitigation opportunities through capital improvements.

Sustainable Strategies for Long Island 2035 (2010)³¹

- This plan proposes policies and strategies to help communities prepare for economic, social, and environmental change. Strategies include developing a climate change resilience plan that addresses sea level rise and coordinating emergency preparedness across jurisdictions.

Strong Island – The Story of a Region’s Recovery and Resurgence (2013)³²

- The Long Island Regional Economic Development Council (LIREDC) recently prepared this plan that addresses critical issues post-Superstorm Sandy in the region.

Cleaner Greener Long Island Regional Sustainability Plan (2013)³³

- This plan identifies regional priorities that are relevant to the NYRCR planning process. Key regional priorities for sustainability include reduction of the duration of power outages, enhancement of energy efficiency, use of alternative sources of energy, and planning for sea level rise.

Regional issues and challenges are described in more detail in Section I.F, but include:

- Storm and tidal surge from the ocean and the bay;
- Gaps, and breaches in soft and hard infrastructure systems;
- Inadequate and/or inefficient stormwater drainage systems;
- Expansive impervious surfaces and a lack of green spaces;
- Power and energy sources damaged and down during and after storms and a lack of alternative power generation;

- Communication systems failure during and after the storm and a lack of alternative or redundant communication systems;
- Medical and emergency response limitations;
- Sanitary sewer backups and other issues related to the operation of the Bay Park Sewage Treatment Plant in the City of Long Beach;
- Housing stock inadequacies, including a lack of affordable and rental housing; and
- Economic development and small business needs.

Identifying issues and challenges on a regional scale has paved the way to initiate additional regional coordination, actions, and projects. Some of the projects included in the NYRCR Plan cross political jurisdictions and require coordination on a regional basis.

The NYRCR Lido Beach/Point Lookout Planning Committee has also been involved in discussions with the following entities that merit consideration of regional coordination as a result of connections beyond the political boundaries of the NYRCR Plan:

- New York State including the State Agency Review Team that has been involved in development of this plan;
- Town of Hempstead;
- City of Long Beach;
- Village of Atlantic Beach;
- East Atlantic Beach;
- Village of Island Park;
- Nassau County;
- U.S. Army Corps of Engineers (USACE);
- New York State Department of Environmental Conservation; and
- National Grid and Long Island Power Authority/Public Service Electric and Gas Company (LIPA/PSEG).

The Committee has learned that the USACE is implementing a \$178 million dollar “Atlantic Coast of Long Island: Jones Inlet to East Rockaway Inlet Long

Beach Island, New York Coastal Storm Risk Assessment Project.” This project provides a beach berm, dune, and groin system to reduce the potential for future storm damage along approximately 35,000 linear feet of shoreline along the barrier island. The project will provide 11 timber dune walkovers and seven vehicle access ways. At a minimum, the project will result in beach berms or higher berms at various points along the Point Lookout and Lido Beach coast and rehabilitation of the two groins at Point Lookout. A 5,000-foot-long dune will be constructed along Nickerson Beach in Lido Beach but the existing berm there will remain undisturbed to allow for bird nesting and foraging areas for piping plovers and least terns.³⁴

In addition, the Committee has learned that the Town of Hempstead has moved forward with work to fill breaches in the dunes with sand provided from the USACE, collected by dredging Jones Inlet. The Town has also purchased plants appropriate for planting on the dunes this spring.

Further, in considering regional perspectives, a meeting was held to bring together the south Nassau County NYRCR Planning Committee Co-Chairs. On December 5, 2013, representatives from the Nassau County NYRCRs (Atlantic Beach / East Atlantic Beach, Long Beach, Lido Beach, and Barnum Island / Oceanside / Village of Island Park / Harbor Isle) held a workshop to discuss issues of regional interest and concern. These issues included coastal protection for the bayfront and oceanfront, stormwater management, green infrastructure, the design of streets, water/wastewater, and microgrid systems. The purpose of the workshop was to provide an educational context for the Nassau County NYRCR Planning Committees to discuss the benefits and applicability of resilient and protective measures and provide examples of models that have worked well in other areas.

F. Regional perspectives

Mitigating the risk of damage from future storms to increase resiliency will require regional as well as local actions. Lido Beach and Point Lookout are part of the Town of Hempstead and follow its development codes. Although the Town has many of its own capabilities and authorities, it is still dependent on other entities, including utility companies (e.g., electric, natural gas) for some services. Several of the issues that are discussed in this Lido Beach/Point Lookout NYRCR Plan cross political jurisdictions and will need to be coordinated regionally.

Neighboring municipalities and communities on the barrier island include the Village of Atlantic Beach and the unincorporated areas of East Atlantic Beach, which are part of the Town of Hempstead, and the City of Long Beach. Coordination with these communities and those across Reynolds Channel (e.g., Village of Island Park, Oceanside) may help provide economies of scale to obtain needed resources for regional projects such as larger regional coastal protection projects, improvements to established evacuation routes, stormwater improvements, implementation of microgrid systems, improvements in emergency services, and potential alternative power generation. For example, it may be possible for jurisdictions in the region to work collaboratively to:

- Develop a NYRCR-wide green stormwater infrastructure strategy;
 - Restore natural habitat areas adversely affected by storm events;
 - Prepare a coordinated evacuation plan;
 - Improve the natural environment through more effective treatment of wastewater;
 - Further investigate the feasibility of alternative power generation and micro-distribution systems;
- Develop a regionally based tidal surge protection program that combines natural solutions, such as marshland restoration, aquatic vegetation, oyster reefs, and others, along with barrier systems;
 - Secure backup power sources and protect transmission and distribution facilities that are still vulnerable;
 - Install smart meters on homes and businesses to better monitor energy usage and to build a smart grid;
 - Maintain and enhance the oceanfront dunes and develop a plan for resiliency on the bayfront;
 - Develop and implement a plan to ensure uninterrupted cellular telephone service during a storm or emergency; and
 - Develop a regional emergency radio broadcast or crowdsourcing system to facilitate communication with residents when telecommunications and traditional media outlets are unavailable, and Coordinate with the City of Long Beach to ensure continued operation of sewage lift station located on Regent Drive in Lido Beach. The sanitary sewage system of Lido Beach is tied into the sanitary sewage system of the City of Long Beach.



Section II: Assessment of risk and needs

Section II:

Assessment of risk and needs

Section II consists of a risk assessment of the assets in the New York Rising Community Reconstruction (NYRCR) Community of Lido Beach/Point Lookout that were identified and determined to be vulnerable to natural hazards (Section II.A) and the resilience and revitalization needs and opportunities (Section II.B).

A. Description of community assets and assessment of risk

Addressing risk to flooding and coastal erosion requires an understanding of hazard severity in relation to people and property, hazard mapping, and identification of at-risk assets and their vulnerability. This section describes the at-risk assets that were identified in the NYRCR Community of Lido Beach/Point Lookout and the assessment of risk to these assets.

In the context of this planning process, risk was defined as a combination of hazard, exposure and vulnerability, and a software tool created by the New York State Department of State (NYS DOS) was used to calculate risk values. Using current conditions and future goals and strategies, the NYRCR Planning Committee for Lido Beach/Point Lookout (Committee) assessed the impact of hazards on assets by performing a risk analysis using this risk assessment tool. The process helped identify methods to mitigate the potential for damage from future hazards.

Recovery support functions

In accordance with the National Disaster Recovery Framework, the Lido Beach/Point Lookout NYRCR Plan addresses the needs, risks, and opportunities related to the six Recovery Support Functions: Community Planning and Capacity Building, Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources.

Recovery Support Functions (RSFs)

Community Planning and Capacity Building: How the community will restore or enhance its ability to organize, plan, manage, and implement its recovery.

Economic Development: How the community will restore economic and business activities and develop new economic opportunities.

Health and Social Services: How the community will restore and improve essential health and social services, including those for vulnerable populations.

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

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

Natural and Cultural Resources: Natural and cultural resource management from a risk reduction and economic development context.

Residents of Lido Beach and Point Lookout are located on a barrier island and are isolated from the larger portion of the Town of Hempstead located on mainland Long Island. Being located on a barrier island between Reynolds Channel and the Atlantic Ocean makes both communities vulnerable to a variety of storm events. The isolation and vulnerability have fostered an independent spirit and self-reliance. The NYRCR Planning Committee (Committee) and residents focused on the six Recovery Support Functions, knowing that response and recovery would come from within their own Community and that support for resiliency would come from outside their Community.

Community Planning and Capacity Building

Capacity building is important to both communities, particularly communication between residents, visitors, and first responders before and after storm events. Building capacity comes from training and empowering organizations and individuals to respond to situations. This includes taking measures to strengthen ways to communicate to individuals, such as implementing reverse 911, subscribing to text message notification services, and expanding local websites and newsletters. Communication during non-emergency times was expressed by residents as also important, especially emphasis on educating residents and visitors on the importance of evacuation and how to evacuate safely, flood mitigation information, and information on green infrastructure.



Figure II-1: Public Engagement Event, Lido Beach, October 2013
URS Corporation

Economic Development

During Committee meetings and Public Engagement Events (Figure II-1), residents expressed a desire to limit economic development to its current level and to focus on the residential, recreational, and natural resources of their community, which they feel are the keys to maintaining a high quality of life. Residents are supportive of strategies that increase resiliency in the existing commercial development within their communities and help expedite recovery after an event.

Health and Social Services

Protection of schools, critical facilities (Figure II-2), and the facilities that serve socially vulnerable populations within the community was cited as an important concern of residents during asset identification, strategy development, and project selection.

Housing

The major concern of residents was protecting their homes. All residential areas in the NYRCR Community were identified by the communities as

important assets. Strategies and projects identified for protecting homes also coincide with protecting the community at large, an indicator of how important "community" is to the residents.

Infrastructure

Improvements and protection of the stormwater system was a key concern of residents. The aging stormwater system was damaged by Superstorm Sandy, and even small rain events are enough to flood streets, which can hinder egress along evacuation routes and roads leading to those routes for both residents and first responders. Stormwater system overloading by small rain events also causes flooding in residences located near catch basins.

Natural and Cultural Resources

With numerous parks situated along the beach and marinas on the bay, residents enjoy a variety of water-oriented recreational activities. Residents are also aware of the necessity of protecting natural resources such as the dunes and the Lido Beach Passive Nature Preserve, understanding that in turn, these natural features also protect them and offer a habitat to terrestrial and aquatic wildlife.

i. Description of community assets

An asset is a resource or critical facility whose loss or impairment would compromise any essential cultural, social, economic, or environmental function of the community. Assets can be, but are not limited to, people, community services, natural resources, or physical locations.

The identification of assets in the Community consisted of two steps. First, the Committee identified assets in five of the six Recovery Support Functions (Economic Development, Health and Social Services, Housing, Infrastructure, and Natural and Cultural Resources) and for socially vulnerable populations. The residents of Lido Beach and Point Lookout then vetted and expanded the list of assets during the first Public Engagement Event in October 2013. Asset locations were mapped and the locations were verified by the Committee.



Figure II-2: Point Lookout Fire Station is an example of a Health and Social Services Asset, September 2013
URS Corporation

Assets and the associated asset classes and subcategories are listed in Table II-1. Asset locations are shown in Figure II-3. Most of the assets north of Lido Boulevard were affected by Superstorm Sandy flooding from the bay, while assets south of Lido Boulevard were affected by ocean flooding.

The Community identified a large number of assets, many of which share functional commonalities that put them into the same risk category. Therefore, some assets were grouped by risk category to simplify the assessment process, as shown in Table II-1. The grouping decisions were based on flood sources, distance to shorelines, and proximity to other assets.

The Community assets in each Recovery Support Function and the assets critical to support socially vulnerable populations are as follows:

- **Economic Development:** A majority of the economic assets are in Point Lookout, including the Point Lookout Commercial District, the East and West Marinas, and other local businesses along the Bay. In Lido Beach, several businesses along Lido Boulevard are also included on the asset list.

- **Health and Social Services:** Health and social services assets include fire stations and the rescue company, schools, and the U.S. Post Office in Point Lookout. These assets are considered critical facilities for the community, especially during emergencies.
- **Housing:** Housing assets include neighborhoods within Lido Beach and Point Lookout. This includes single-family residential neighborhoods and multi-family housing at Lido Towers and Lido Townhouses.
- **Infrastructure:** Infrastructure assets located in the NYRCR Community include potable water systems, stormwater, and energy-related facilities, such as the compressed natural gas (CNG) fueling facility and the Energy Park. The potable water system assets are primarily located in Point Lookout, including several wells, the Water Tower, and the Town Department of Water Facilities. Stormwater systems are split up to correspond to housing neighborhoods. Lido Beach is connected to the sanitary sewage system in the City of Long Beach. Wastewater goes to a pump station on Regent Drive. Wastewater in Point Lookout is via private cesspools / onsite sewage treatment systems.
- **Natural and Cultural Resources:** The Community includes a wide range of natural and cultural assets. These include park and recreational areas along both the ocean and bay sides of the Community, preservation areas, and religious assets. These assets are facilities and places that have cultural significance to the Community.
- **Socially Vulnerable Populations:**³⁵ Assets that support vulnerable populations include Camp Anchor, a facility that provides a year-round recreation program dedicated to children and adults with special needs (Figure II-4) and three adult group homes, located on Seaspray Drive in Lido Beach, that are operated by the Brookville Center for Children’s Services and provide an environment in which children in residence are helped to succeed in becoming full participants in their lives and the community. Both assets are mapped in the health and social services group in Figure II-3.

Table II-1: Asset Inventory

| Asset Name | Community | Asset Class (Recovery Support Function) | Asset Subcategory | Critical Facility |
|--|---------------|---|--|-------------------|
| Marvel Dairy Whip | Lido Beach | Economic Development | Restaurants | N |
| Dunes Delicatessen | Lido Beach | Economic Development | Restaurants | N |
| Ted's Fishing Station | Point Lookout | Economic Development | Marina / Water-Based Business | N |
| Scotty's Marina and Fishing Station and Restaurant | Point Lookout | Economic Development | Marina / Water-Based Business | N |
| East Marina | Point Lookout | Economic Development | Marina / Water-Based Business | N |
| West Marina | Point Lookout | Economic Development | Marina / Water-Based Business | N |
| Point Lookout Commercial District | Point Lookout | Economic Development | Small Business | N |
| Lido Beach Fire District Station | Lido Beach | Health and Social Services | Emergency Operations/Response | Y |
| Point Lookout Fire District Station | Point Lookout | Health and Social Services | Emergency Operations/Response | Y |
| Point Lookout Volunteer Fire Company | Point Lookout | Health and Social Services | Emergency Operations/Response | Y |
| Ye Olde Firehouse | Point Lookout | Health and Social Services | Government and Administrative Services | Y |
| U.S. Post Office | Point Lookout | Health and Social Services | Government and Administrative Services | Y |
| Point Lookout Rescue Company | Point Lookout | Health and Social Services | Emergency Operations/Response | Y |
| Fire Dept. Training Facility | Point Lookout | Health and Social Services | Emergency Operations/Response | Y |
| Town Public Safety Facility | Point Lookout | Health and Social Services | Emergency Operations/Response | Y |
| Lido Elementary School / Long Beach Pre-K Center | Lido Beach | Health and Social Services | Schools | Y |
| Long Beach Middle School | Lido Beach | Health and Social Services | Schools | Y |
| Long Beach High School | Lido Beach | Health and Social Services | Schools | Y |
| School District Offices | Lido Beach | Health and Social Services | Schools | Y |
| District school bus parking area | Lido Beach | Health and Social Services | Schools | Y |
| Nike Alternative School | Lido Beach | Health and Social Services | Schools | Y |
| Nike Environmental Center | Lido Beach | Health and Social Services | Schools | Y |
| Camp Anchor | Lido Beach | Health and Social Services | Schools | Y |
| Adult Group Homes | Lido Beach | Health and Social Services | Government and Administrative Services | Y |
| Lido Townhouses | Lido Beach | Housing | Multi-Family Residence | N |
| Lido Towers | Lido Beach | Housing | Multi-Family Residence | N |



Table II-1 (Continued)

| Asset Name | Community | Asset Class (Recovery Support Function) | Asset Subcategory | Critical Facility |
|--|---------------|---|--------------------------------------|-------------------|
| Lido Beach North Housing | Lido Beach | Housing | Single-Family Residence | N |
| Lido Beach Dunes Housing | Lido Beach | Housing | Single-Family Residence | N |
| Lido Beach South Housing | Lido Beach | Housing | Single-Family Residence | N |
| Lido Beach East Housing | Lido Beach | Housing | Single-Family Residence | N |
| Point Lookout Housing | Point Lookout | Housing | Single-Family Residence | N |
| Drinking Water Well #3 | Lido Beach | Infrastructure | Water Supply | Y |
| Town Dept. of Water Facility | Point Lookout | Infrastructure | Water Supply | Y |
| Water Tower | Point Lookout | Infrastructure | Water Supply | Y |
| Drinking Water Well #1 | Point Lookout | Infrastructure | Water Supply | Y |
| Drinking Water Well #2 | Point Lookout | Infrastructure | Water Supply | Y |
| Lido Beach North Stormwater | Lido Beach | Infrastructure | Stormwater | Y |
| Lido Beach Dunes Stormwater | Lido Beach | Infrastructure | Stormwater | Y |
| Lido Beach South Stormwater | Lido Beach | Infrastructure | Stormwater | Y |
| Lido Beach East Stormwater | Lido Beach | Infrastructure | Stormwater | Y |
| Point Lookout Commercial District Stormwater | Point Lookout | Infrastructure | Stormwater | Y |
| Point Lookout Residential Stormwater | Point Lookout | Infrastructure | Stormwater | Y |
| Town of Hempstead Dept. of Conservation and Waterways District | Point Lookout | Infrastructure | Navigable Waterway Facilities | Y |
| Town of Hempstead Dept. of Conservation and Waterways Laboratory | Point Lookout | Infrastructure | Navigable Waterway Facilities | Y |
| CNG fueling facility for school buses | Lido Beach | Infrastructure | Liquid Fuels | Y |
| Town Energy Park | Point Lookout | Infrastructure | Power Supply | Y |
| Lido Beach Synagogue | Lido Beach | Natural and Cultural Resources | Cultural or Religious Establishments | N |
| Point Lookout Community Church | Point Lookout | Natural and Cultural Resources | Cultural or Religious Establishments | N |
| Our Lady of the Miraculous Medal | Point Lookout | Natural and Cultural Resources | Cultural or Religious Establishments | N |
| Bishop Molloy Recreational Center | Point Lookout | Natural and Cultural Resources | Cultural or Religious Establishments | N |



Table II-1 (Continued)

| Asset Name | Community | Asset Class (Recovery Support Function) | Asset Subcategory | Critical Facility |
|---|------------------|--|---------------------------|--------------------------|
| Lido Beach Golf Club | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Town Park Lido Beach West | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Lido Beach District Park | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Lido Beach Town Park | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Town Park at Sands | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Nickerson Beach | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Town Park at Malibu | Lido Beach | Natural and Cultural Resources | Parks and Recreation | N |
| Town Park at Point Lookout | Point Lookout | Natural and Cultural Resources | Parks and Recreation | N |
| Town Dept. of Parks and Recreation Facility | Point Lookout | Natural and Cultural Resources | Parks and Recreation | N |
| Point Lookout Beach District Park | Point Lookout | Natural and Cultural Resources | Parks and Recreation | N |
| Lido Beach Passive Nature Preserve | Point Lookout | Natural and Cultural Resources | Wetlands and Marshes | N |
| Shellfish Nursery | Point Lookout | Natural and Cultural Resources | Hunting and Fishing Lands | N |

Notes:
 Bolded assets are assets for socially vulnerable populations.
 Shading around one or more asset indicates an asset group.



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. Assets were then prioritized based on factors such as importance to the NYRCR Planning Committee, the probability of being affected by flooding, and restoration time following a storm event.

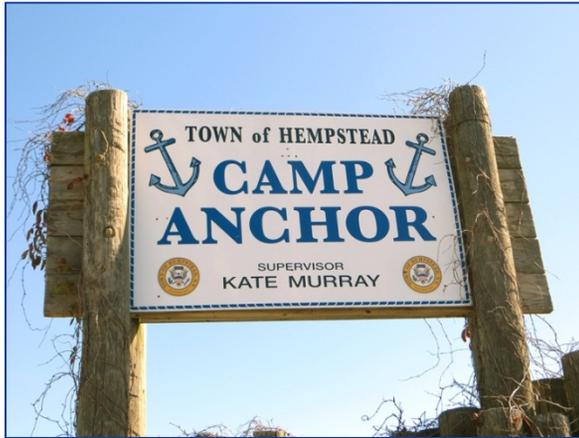


Figure II-4: Camp Anchor, September 2013
URS Corporation

ii. Assessment of risk to assets and systems

The NYS DOS defined risk as extreme, high, or moderate (see Section V.D, Community asset inventory) and these designations were used to evaluate the risk to the identified community assets. The Risk Assessment Map (see Figure II-5) shows that most of the Lido Beach and Point Lookout assets are in an extreme- or high-risk flooding area. Because these communities are located on a barrier island, flooding impacts could be from the ocean or the bay.

A risk assessment was conducted to determine the potential impact of flood and erosion hazards on community assets. The results helped guide the Committee in the selection of proposed strategies and mitigation options to reduce future risk. Recommendations from the Committee, with extensive

input from the public on areas with the highest risk of flooding, were used to supplement the Risk Assessment Map.

Risk assessment methods

Risk can be measured by looking at a combination of hazard, exposure, and vulnerability. One way to compare asset risks is to assign a risk value (or risk score) to each asset. A risk assessment tool developed by NYS DOS was used to quantify risk based on hazard, exposure, and vulnerability. Scores were calculated for each factor (i.e., hazard score, exposure score, and vulnerability score).

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 in an extreme-risk area experience hazards more frequently and with greater impact than those located in a high- or moderate-risk area.

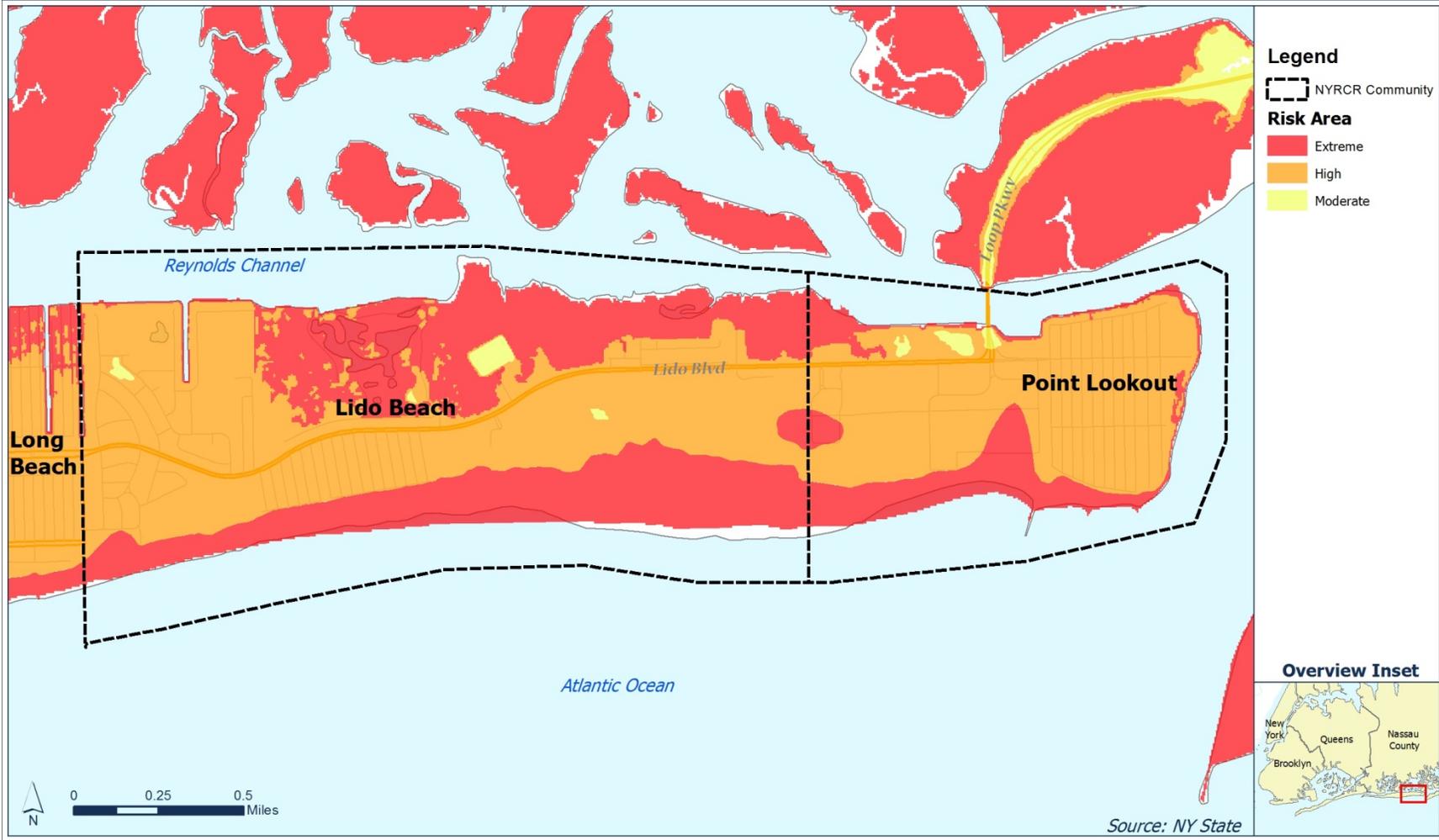
Exposure scores were calculated as an expression of the local topographic and shoreline conditions that tend to increase or decrease the effects of coastal hazards on assets. Multiple landscape attributes were used to calculate a total landscape attribute score as follows:

- 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 the base flood elevation (BFE), eroding, little vegetation; bluff slope unstable, little vegetation; and
- Asset on coastal barrier island or filled wetland.



Lido Beach and Point Lookout

Figure II-5: Risk Assessment Map



Vulnerability scores are an expression of the capacity of an asset to return to service after a storm or recovery time. Assets that can quickly recover have a low vulnerability score. Information used to determine recovery time can be based on direct observation during a storm event or estimated based on the amount of damage to individual assets. For this NYRCR Plan, recovery time and related vulnerability score were estimated based on damages from Superstorm Sandy and validated by the Committee.

The Risk Assessment Tool calculated a risk score using the formula:

$$\text{Hazard} \times \text{Exposure} \times \text{Vulnerability} = \text{Risk}$$

The risk score represents the relative risk of community assets to one another. The scores can range from 1.5 to 75. Assets with risk scores greater than 53 are considered at severe risk, assets with scores 24 to 53 are considered at high risk, assets with scores six to 23 are considered at moderate risk, and assets with scores lower than six are considered to have residual risk.

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. Figure II-7 shows the results of the initial risk assessment of each asset and is color coded for severe, high, and moderate risk scores. The actual risk scores and calculations for each asset are listed in Section V.D, "Community asset inventory."

The total risk scores for Lido Beach and Point Lookout ranged from moderate to severe risk. Eighteen assets had severe risk scores, more than half (37 of the total 62 assets) had high risk scores, and seven assets had moderate risk scores.

Assets with severe risk scores were those at risk of the deepest flooding, with the least exposure protection, and with the longest demonstrated recovery time. The assets with severe risk scores are the stormwater systems and bayfront assets in Point Lookout. All stormwater systems had individual structures within extreme-risk areas and also high vulnerability to flooding. Likewise, a range of asset types in the bayfront area of Point Lookout, including water system assets, economic assets (Figure II-6), and the Point Lookout Rescue Company, were located in extreme-risk areas and had high vulnerability.

Most of the other assets had high risk scores. These assets had relatively high flood depths but were either better protected or had shorter demonstrated recovery times. These assets include housing assets, additional infrastructure assets, and most of the health and social services and natural and cultural resources assets.

Systems can also be assigned scores to compare relative risk. The assessment of risk to systems (primarily infrastructure) highlights the initial risk assessment results for this asset group.

Section V.D. summarizes the results for infrastructure systems in Lido Beach and Point Lookout. All stormwater systems and most of the potable water systems have severe risk scores. This finding is supported by damage to water and stormwater facilities from Superstorm Sandy.



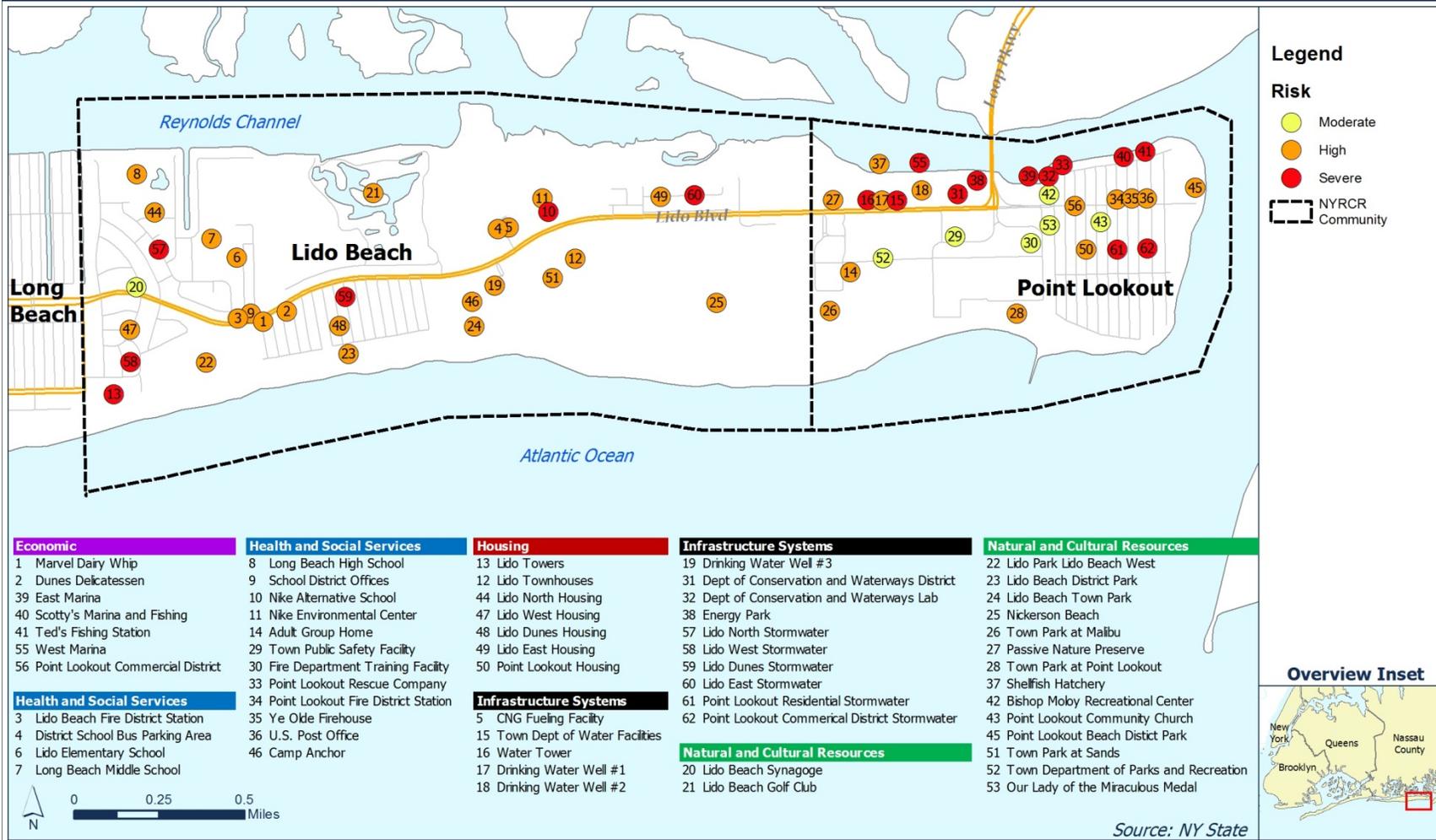
Figure II-6: West Marina, a key economic asset identified by the Committee and the public, Point Lookout, September 2013

URS Corporation



Lido Beach and Point Lookout

Figure II-7: Asset Risk Assessment Scoring Map



B. Assessment of needs and opportunities

This section describes the resilience and revitalization needs and opportunities in Lido Beach and Point Lookout that were identified by the Committee and the Community during Committee meetings in September and October 2013 and the Public Engagement Event in October 2013. The identified needs are based on the Community's observations of Superstorm Sandy's impacts on the assets that were expressed during meetings and in comments posted on the NYRCR website. Opportunities were identified from information gathered by the Committee including information from the public, interviews with Town of Hempstead personnel, and plan review and vetting by the Committee.

The needs and opportunities are locally focused, but mitigating the risk of damage from future storms to increase resilience requires both local action and regional coordination.

Community planning and capacity building

Superstorm Sandy highlighted the importance of pre-storm evacuation and emergency communication between local officials and the Community both before and after the storm. Recovery from the storm focused the Community's attention on issues such as the lack of power and cellular communication after the storm, the delay in Town recovery operations due to lengthy permitting processes, and the potential zoning modifications necessary for increasing resiliency.

Community planning and capacity building needs

Superstorm Sandy had a devastating effect on local services. The Communities suffered power outages and interruption of cellular phone services. Residents and visitors need to understand the importance of evacuation; how to safely evacuate, and that they must evacuate when directed to do so by the County Executive. Residents that did not obey the evacuation order and sheltered-in-place were stranded in their homes without key services (e.g., electricity and cellular communications).

A critical component of the evacuation route is the Loop Parkway bridge over Long Creek. The bridge is susceptible to scour during storm events. In 2011 the bridge was fitted with scour monitors by the New York Department of

Transportation (NYS DOT).³⁶ The Community is concerned with scour sustained during Superstorm Sandy.

The Lido–Point Lookout Fire District's emergency response capabilities are a vital complement to the municipal emergency response infrastructure. Power and other utility outage times and flood damage to electrical and communications equipment at fire stations compromised their ability to provide vital services and communicate important information to residents in the days after the storm.

The lack of reliability of the local communications network was not only inconvenient, but potentially dangerous in the days immediately after Superstorm Sandy. As the Fire District and other entities tried to communicate vital information to Community residents, many individuals were unable to access these communications and instead resorted to traveling to the Lido–Point Lookout Fire District Lido Beach Station and the Lido–Point Lookout Fire District Point Lookout Station to obtain information. Because so many residents were unable to return to their homes immediately after the storm, and reported difficulty accessing useful information about recovery activities, the Community expressed a strong need for systematic method to communicate emergency information to residents before and after the storm as well as to communicate with other municipalities, the County, and the State.

Residential recovery efforts have been slowed by the Town of Hempstead zoning regulations that restrict the allowable distance (30 feet or approximately 2.5 stories) from the existing grade of the road to the peak of a roof, which makes elevating a two-story house and remaining in compliance with zoning nearly impossible. Zoning regulation modifications are necessary.³⁷

Municipal recovery efforts have stalled during the permitting process with New York Department of Environmental Conservation (NYS DEC). The established process for obtaining a permit from the NYS DEC for land-water interface projects, such as for bulkheads, revetment, or dredging, has been very time-consuming for the local government. An expedited process should be created for obtaining permits required by New York State.

Community planning and capacity building opportunities

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

- Build upon existing evacuation education and outreach to expand the scope of the program to include information about flood insurance, structural elevation, green building practices, and information on coastal protection.
- The Loop Parkway bridge over Long Creek is part of a NYS DOT project to retrofit the existing scour monitoring system to provide more accurate reporting on tidal conditions and flow around bridge footings.³⁸
- Long Island Power Authority (LIPA) will improve the resiliency of the power grid by elevating Sandy-damaged substations, burying strategic power circuits, and other improvements to how power moves through the grid. Upgrades will minimize outages and allow for faster recovery post-event.³⁹
- The Energy Park and Town of Hempstead Department of Conservation and Waterways has the ability to function off the electrical grid.
- The Town of Hempstead has a robust alternative energy program and has teamed with LIPA to offer "Solar Seminars" for residents to educate themselves on alternative energy.
- Long Beach School District and Nassau County both have reverse-911 systems. The Fire District may be able to tie into one of those systems to communicate information to residents.
- As part of the recovery process, the Town of Hempstead Building Department has eliminated the need to obtain a variance to increase home foundation height and overall home height to comply with Federal Emergency Management Agency (FEMA) flood height guidelines.
- The NYS DEC has issued a General Permit for the coastal areas of Long Island, including reconstruction of shoreline erosion structures that were functional before Superstorm Sandy, repair or reconstruction of existing public infrastructure, regrading of eroded

dunes, and replacing sand or other material equal to that lost to the storm at the toe of eroded dunes

Economic development

Lido Beach and Point Lookout have a limited amount of commercial development, and both communities are built-out, which severely limits development potential. Through Committee Meetings and Public Engagement Events, both communities indicated a desire to limit economic growth and maintain their residential character. The commercial development along the bay and the small commercial districts were identified by both communities as important assets.

Economic development needs

Small businesses struggled to rebuild a steady customer base after Sandy (Figure II-8). There is a need for building a larger customer base, which could include residents and visitors. It took almost 8 months for the only grocery store in Point Lookout to reopen after being damaged by Superstorm Sandy.⁴⁰



Figure II-8: Commercial development, Point Lookout, September 2013
URS Corporation

A key component of the Community's Vision Statement, the waterfront provides recreation and economic benefits to the communities, but enhanced and expanded docking space is needed. The East Marina in Point Lookout supports two commercial fishing boat slips and one commercial dive boat slip. Point Lookout is considered a secondary maritime center by the Long Island South Shore Estuary Reserve Council.⁴¹ Secondary maritime centers support primarily local resources, including wholesale and retail fish markets, packing companies, and seafood restaurants.⁴² The commercial fishing fleet that operates out of Point Lookout is one of the largest commercial fishing fleets in the Long Island South Shore Estuary Reserve.⁴³ Superstorm Sandy caused significant damage to dock structures (Figure II-9) and sank many watercraft in Reynolds Channel, negatively impacting commercial fishing operations. Removal of submerged debris and watercraft in Reynolds Channel is needed to safely allow for travel within the waterway.



Figure II-9: West Marina, Point Lookout, September 2013
URS Corporation

Economic development opportunities

Economic opportunities to improve the economic viability and commercial opportunities in Lido Beach and Point Lookout are:

- Construction of aesthetically pleasing gateways at entry points to welcome residents and visitors. Point Lookout has one gateway located on Lido Boulevard at the base of the Loop Parkway.

Welcome gateways are a form of social branding that can enhance a sense of community among residents, attract visitors, and create a sense of place, which aids economic development activities.

- The Long Island South Shore Estuary Reserve Council maintains a current list of grant opportunities to improve water quality; create economic activities; implement green infrastructure projects, and conduct education and outreach
- The Point Lookout Chamber of Commerce is a non-profit organization whose mission is to promote the business community in Point Lookout by creating job opportunities through stimulating industrial and commercial growth. The Chamber of Commerce aids local businesses by assisting with marketing and promotion and conducting education and outreach.

Housing

Lido Beach and Point Lookout are primarily residential communities (Figure II-10). Almost every housing unit had some amount of damage caused by Superstorm Sandy. More than 1,000 total displaced homeowners in Lido Beach and Point Lookout registered with FEMA's Disaster Housing Assistance Program for assistance with housing rental payments. Housing repairs were paid for by flood insurance payments, loans, and the savings and earnings of property owners.



Figure II-10: Bellmore Avenue, Point Lookout, September 2013
URS Corporation

Housing needs

Residents indicated during meetings of the NYRCR Planning Committee in September 2013 that they are not generally in favor of increasing tourism or public access to beaches, preferring to keep traffic to a minimum so that streets remain safe for walking and biking. Moreover, neither Lido Beach nor Point Lookout is identified in the Nassau County Master Plan as a “target growth area.”⁴⁴ Nor is the Community listed in the New York Metropolitan Transportation Council Plan 2040 – Regional Transportation Plan as a “desired growth area.”⁴⁵ There is a need to protect homes from flooding while maintaining the character of the existing neighborhoods.

Flooding caused power outages throughout Lido Beach and Point Lookout. Residents were without power for up to 2 weeks after the storm. An alternative source of electricity or a backup source of power is needed to avoid similar outages in the future.

Housing opportunities

- The Town of Hempstead is very proactive in aiding repair and replacement of residential structures by waiving several building department fees; extending hours of construction permitted in neighborhoods; and providing information on licensed electrical and plumbing contractors.
- Building owners and homeowners should be encouraged to seek opportunities to increase energy efficiencies and sustainability as buildings and homes are rebuilt.
- The three Town of Hempstead owned adult group homes in Lido Beach have pioneered the use of solar panels for power generation. Information on the use of solar panels at the homes could provide information to homeowners in Lido Beach and Point Lookout on the panel sizes that are appropriate for single-family homes and on how to secure solar panels to withstand hurricane force wind (Figure II-11).



Figure II-11: Solar photovoltaic panels on roof of adult group home, Lido Beach, September 2013
URS Corporation

- The Energy Master Plan of the Town of Hempstead Conservation and Waterways Division proposes the development of a microgrid that could provide a limited amount of electric power to homes and businesses in Point Lookout.⁴⁶

Health and social services

Medical services on the Barrier Island were provided by the Long Beach Medical Center, which was severely damaged by Superstorm Sandy with floodwater fully inundating the basement level and flooding the first floor with 4 feet of water.⁴⁷⁵

The public schools that serve Lido Beach and Point Lookout are operated by the Long Beach School District: Lido Elementary School / Long Beach Pre-K Center, Long Beach Middle School, Long Beach High School, and the Nike Alternative School and Environmental Center (Figure II-12). The school complex is located in Lido Beach to the north of Lido Boulevard, with access through the Lido North neighborhood and from Lido Boulevard. The school district offices are also located along Lido Boulevard. The Community identified all school buildings as assets.



**Figure II-12: Long Beach Middle School,
Lido Beach, September 2013**
URS Corporation

Emergency response in Lido Beach and Point Lookout is provided by the Lido–Point Lookout Fire District, which operates out of three facilities: a fire station in Lido Beach, a fire station in Point Lookout, and the Point Lookout Rescue Company. The fire stations were identified by the community as important assets.

Socially vulnerable populations in the NYRCR Community are served by Camp Anchor and the adult group homes on Seaspray Drive in Lido Beach. Camp Anchor is a recreational facility that serves Hempstead residents with special needs (both children and adults). Colloquially known as “the adult group homes,” three single-family residences are operated by the Association for the Help of Retarded Children to provide services to a socially vulnerable population. The residences are utilized by the Children’s Residential Program to provide services to individuals on the Autism Spectrum with the goals of helping children become happy, functional adults who feel connected to their community and are empowered to make choices in as many areas of their life as possible.⁴⁸ The three residences serve 25 residents. The Community identified Camp Anchor and the adult group homes as important assets.

Health and social services needs

The Long Beach Medical Center closed due to damage from Superstorm Sandy and is now in bankruptcy. Efforts have been initiated by South Nassau Communities Hospital to purchase facility's real estate and operating assets, but whether the center will reopen as a hospital remains unclear.⁴⁹ Consequently, residents must travel at least 10 miles off the barrier island through a heavily trafficked road corridor to the next-closest hospital, South Nassau Communities Hospital, which is a hardship for those needing emergency care. According to the Lido–Point Lookout Fire Department Commissioner, when the department responds to calls that require hospitalization for victims, a round trip to the South Nassau or Nassau University Medical Center takes 2 to 3 hours, as compared to the 5-minute trip to Long Beach Medical Center.⁵⁰ If no hospital opens on the barrier island, the Community has expressed the need for an emergency care center to be established on-island.

Long Beach School District buildings (e.g., Long Beach Elementary / Pre-K Center, Long Beach Middle School, Long Beach High School, Long Beach School District offices) were damaged by Superstorm Sandy. Children were unable to return to their school for several months after the storm. In some

cases, they were moved to other school locations while post-storm construction was underway. The School District has made modifications to protect critical components from flooding and should continue to examine further opportunities to protect its facilities.

The emergency response facilities in Lido Beach and Point Lookout are older, ground-level structures and are at risk to flood damage. Flooding inside the Lido Beach Fire Station reached 4 feet in depth, destroying electrical, mechanical, and plumbing equipment. The Point Lookout Fire Station suffered similar damage to its utility systems and equipment, but was not as heavily damaged as the Lido Beach Fire Station. Although both fire stations have back-up emergency generators to maintain electrical power during storm events, Superstorm Sandy destroyed the generators, leaving both fire stations without power after the storm. The Point Lookout Rescue Company building is located on the bay and was extensively damaged by Superstorm Sandy. Currently, the Fire District is operating out of the Lido Beach and Point Lookout Fire Stations, with the Rescue Squad and its ambulance sharing space in the Point Lookout Fire Station.⁵¹

Adequate services and programming must be available for the socially vulnerable populations served by the adult group homes and Camp Anchor.

Health and social services opportunities

- Medical providers have expressed an interest in opening an urgent care or emergency care center on the island. Residents from all communities on the barrier island are working to make their voices heard to bring emergency medical care back to the Long Beach Medical Center through public forums; “die-in” protests, and an online petition to the Governor to reopen the hospital as full-service facility.⁵⁴
- The Long Beach School District is floodproofing its facilities by relocating mechanical, electrical, and plumbing equipment to the second floor or placing equipment in watertight locations below grade. All of the schools, except the Long Beach High School, have already installed wind protection measures on windows. The District has applied for a FEMA grant to replace the weaker High School windows.⁵³

- The Lido-Point Lookout Fire District is currently planning to renovate the Lido Beach and Point Lookout Fire Stations to improve resiliency to coastal storms. Installation of wind-resistant roofs and windows, elevation of structures, wet floodproofing (elevating utilities and emergency generators above anticipated flood levels and allowing water to temporarily inundate the building) or temporary flood barriers could reduce the damage from flooding in the future.
- The adult group homes and Camp Anchor were protected during Superstorm Sandy by the dune system along the oceanfront in Lido Beach.

Infrastructure

Superstorm Sandy highlighted three main infrastructure needs: improvements to the stormwater drainage system, the sanitary sewer system in Lido Beach, and to coastal erosion protection measures in both communities.

Infrastructure needs

Superstorm Sandy overwhelmed the stormwater system. Residents reported pockets of standing water throughout Point Lookout and in front of the Lido Beach Fire Station for up to 5 days after the storm. Clogged storm drains and pipes limited the effectiveness of existing stormwater sewers (Figure II-13). Flooding was exacerbated by water being forced through the open storm drain outfalls along the bayfront, back into the stormwater system, and up through catch basins onto neighborhood streets. The stormwater management system was not designed to meet current and future risk needs and flooding occurs on key roads like Lido Boulevard, which serves as the evacuation route prior to and during large storms for Lido Beach, Point Lookout, and portions of the City of Long Beach. Neighborhood streets contribute to ponding throughout the Community. Older streets are not graded to shed runoff to the stormwater system. Ocean Boulevard in Lido Beach is graded to shed water into the dune system and not onto lateral streets.



Figure II-13: Catch basin at Long Beach High School, November 2013
URS Corporation

The sanitary sewer system in Lido Beach was also heavily impacted by Superstorm Sandy. The Lido Towers and roughly 220 residences in the western portion of Lido Beach are connected to the City of Long Beach sewage system. A pump station on Regent Drive pumps sewage to the Long Beach wastewater treatment plant. Sandy inundated the Regent Drive pump station, damaging components and rendering the pumps inoperable. Sewer mains are old and many have deteriorated to the point where sewage has infiltrated the groundwater.⁵⁴ Superstorm Sandy stressed and further damaged sewer pipes. Point Lookout is not on a sanitary sewer system. Wastewater in Point Lookout is discharged into cesspools and septic tanks. During Superstorm Sandy, septic tanks in Point Lookout overflowed the system, releasing sewage into the groundwater and backing up into residences. Pathogens released into surface and groundwater may pose a human and environmental health risk.

Lido Beach and Point Lookout are protected by hardened shorelines along the bayfront and partially along Jones Inlet. Many private homeowners, business owners, and public facilities along the canals and bayfront have installed bulkheads for erosion protection and to afford some degree of protection from high water and waves. The effectiveness of bulkheads in providing protection from high water is dependent upon continuous system constructed to a consistent elevation. When bulkheads are overtopped, they can trap water, which can damage structures located behind the bulkheads.

Point Lookout is partially protected from coastal erosion and flooding along Jones Inlet by a stone revetment. The revetment extends from the southern tip of Point Lookout, but does not extend to the northern tip of the community, leaving residences at the eastern end of Bayside Drive vulnerable to coastal erosion. The revetment was severely damaged by Superstorm Sandy, hindering its ability to provide protection from flood or erosion.

Infrastructure opportunities

- A stormwater drainage system study that includes mapping of areas that experience frequent, nuisance flooding from tidal and rain events may identify ways to repair and retrofit the existing stormwater drainage system to function better in future storms.
- Mechanical modifications to the existing stormwater drainage system, such as the installation of backflow preventers, may improve performance.
- Residents and business owners may have opportunities to work with the Town of Hempstead and Nassau County to increase the number of inspections and the speed of repairs of stormwater drainage systems along roadways maintained by either governmental entity.
- Regrading lateral streets throughout the Community to shed runoff into the stormwater system could be done in conjunction with stormwater system improvements.
- The City of Long Beach and Bay Park are discussing ways to improve their wastewater treatment plants, which may provide an opportunity for Lido Beach and Point Lookout to use their facilities and support a regional project.
- Supporting the potential conversion of the Long Beach Water Pollution Control Plant to a lift station that transfers sewage to the Bay Park Sewage Treatment Plant is an opportunity to update aging infrastructure and reduce vulnerability.
- Raising bulkheads in coordination with the Town of Hempstead and City of Long Beach should provide protection against storm surge and erosion.
- Repairing or reconstructing bulkheads should provide protection against storm surge and erosion along canals and the bayfront.

- The revetment or hard protection on the east side of Point Lookout could be extended to the northeastern tip of the Community to reduce the potential for erosion and provide flood protection.
- The revetment should be repaired to improve flood protection and erosion control and provide flood protection.

Natural and cultural resources

Natural resources and recreational opportunities are very important to Lido Beach and Point Lookout, as evidenced by their inclusion in the Vision Statement developed by the Community. Committee members and residents identified town parks, marinas, the beaches and dune system, and the marsh as community assets.

Natural and cultural resources needs

Coastal erosion is a significant problem in Lido Beach and Point Lookout. Littoral drift moves sand from the eastern to the western end of the barrier island, away from the Community's beaches. Superstorm Sandy accelerated erosion, resulting in roughly 294,000 cubic yards of sand lost from the beaches of the Barrier Island.⁵⁵

The primary frontal dune of the dual-dune system that provided protection to Lido Beach was damaged during Hurricane and Irene and destroyed during Superstorm Sandy from Maple Boulevard to Biarritz Street (Figure II-14). The storm surge also opened breaches in the dune system, resulting in significant flooding from the oceanfront of both communities. Salt marshes have been largely filled and developed in the NYRCR Community. A 185-acre salt marsh, the Lido Beach Passive Nature Preserve, exists on the north side of Lido Beach and is protected from development by regulation. Areas of the marsh that interface with Reynolds Channel suffered some erosion due to Superstorm Sandy.



Figure II-14: Remaining sand dune, Point Lookout, September 2013
URS Corporation

Natural and cultural resources opportunities

- The U.S. Army Corps of Engineers is beginning a coastal risk management project to conduct beach renourishment in 5-year intervals over a 50-year period; construct an engineered dune system along Lido Beach, Point Lookout and the City of Long Beach; rehabilitate existing groins/jetties; and construct four new groins/jetties in Point Lookout.⁵⁶
- The Town of Hempstead has initiated a program to increase dune plantings along the oceanfront to reduce the potential for erosion.
- Dune breaches are currently being filled with sand by the Town of Hempstead. Once a breach is filled, vegetation is planted to provide stability and erosion resistance.
- Residents and business owners may support the Town of Hempstead's efforts to work with the New York Department of Environmental Conservation to permit revitalization of marshlands.
- The Town of Hempstead is investigating the changes in marshes, small islands, and natural protection systems. The study may provide valuable information about trends and opportunities for protecting these resources.
- The marsh provides protection from flooding by providing open space that slows and stores floodwater.



Section III: Reconstruction and resiliency strategies

Section III: Reconstruction and resiliency strategies

Strategies and associated actions were developed through NYRCR Planning Committee Meetings and three Public Engagement Events, an online survey, an asset inventory, a risk assessment, and a needs and opportunities analysis for Lido Beach and Point Lookout. A Community Vision was established by the Planning Committee and through a public engagement visioning exercise conducted on September 24, 2013, which reflects the Community's goals, objectives, and strategies. Metrics such as resiliency, time frame, and technical feasibility were used to advance the strategies into a series of capital projects, feasibility studies, policy implementation, and regional cooperation initiatives for recovering and rebuilding from the impacts of Superstorm Sandy and Hurricane Irene. These strategies are intended to make the NYRCR Community more resilient, while mitigating potential future damage from storm events.

A. Reconstruction and resiliency strategies

Developing reconstruction and resiliency strategies and the projects that will be used to implement those strategies was a community-driven process. When the Committee and residents developed a Vision Statement for Lido Beach and Point Lookout, they were taking the first step toward increasing resiliency by setting goals: maintain a high quality of life, protect residents and structures within the community, and protect and respect the natural features of their community.

The next step toward developing strategies involved the identification by the Committee and Community of important community assets; the location of the assets, and the development of a description of the damage inflicted on the assets by Superstorm Sandy.

Understanding the vulnerabilities of key assets is vital to developing strategies and projects that will protect and improve the resiliency of the assets. Based on knowledge gained from the visioning process, data collected from the community asset inventory, the needs and opportunities assessment, and the risk assessment, the Committee and Community identified strategies for consideration in developing the NYRCR Lido Beach/Point Lookout Plan.

The Committee, with guidance from the Community, prioritized identified strategies according to agreed-upon metrics such as time frame, contribution to asset resiliency, technical feasibility, and community priority. The strategy descriptions are followed by a brief summary of projects that implement the strategies for each goal in Tables III-1 through III-3. Projects are categorized as Proposed and Featured Projects. For the purposes of the NYRCR planning process:

- Proposed Projects are proposed for funding through the community's allocation of Community Development Block Grant–Disaster Recovery (CDBG-DR) funding; and
- Featured Projects are innovative projects where an initial study or discrete first phase of the project is proposed for CDBG-DR funding or other identified funding.

Strategy 1: Increase protection from coastal storms

The NYRCR Planning Committee and residents have consistently identified revetment reconstruction throughout the planning process as top priority. The eastern border of Point Lookout faces Jones Inlet. Point Lookout is vulnerable to erosion due to ocean currents and tidal processes. The rock revetment absorbs the energy from storm surge, reducing flood impacts on residences, and protects the coast from erosion. However, the revetment was damaged by Superstorm Sandy and Hurricane Irene and is not providing complete protection. The revetment does not extend to the northeast corner of Point Lookout, which is vulnerable to wave impacts and shoreline erosion.

A dune system was present behind the revetment to provide protection from storm surge, erosion, and subsidence; however, the dune system was destroyed by Superstorm Sandy.⁵⁷ Superstorm Sandy contributed to further erosion of the shoreline in the northeast corner of Point Lookout that is not protected by the revetment. Shoreline erosion threatens the foundations of housing along Bayside Drive. If the northeast end of Point Lookout is left unprotected, erosion could damage foundations and lead to structural collapse of houses.

Dune restoration is a major concern for the Committee and residents, who realize that the dune provided substantial protection to residences before it was breached by Superstorm Sandy. Residents are aware of the planned

U.S. Army Corps of Engineers (USACE) project to restore the dune, but the project is in the final stages of planning and residents feel there is an urgency to the project: the sooner the dune breaches are filled and repaired, the more growing time the dune plantings will have to create a stronger, more cohesive dune that will provide better protection.

The Town of Hempstead received sand from a USACE dredging project and is currently filling the breaches with dredged sand. The Town also purchased 200,000 dune grass plantings. The dune grass will be planted this spring and will serve to anchor and accumulate sand and create an environment for other plants to colonize, eventually helping to form a cohesive dune.

Table III-1: Strategy 1 – Proposed Projects

| Strategy: Increase protection from coastal storms | | | | |
|---|---|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Revetment Repair and Reconstruction | Construct sections of rock revetment at northeast end of Point Lookout for protection of homes, businesses, and recreational facilities | \$3,800,000 | Proposed | Yes |
| Repair Dunes & Construct Dune Walkovers | Fill breaches and repair dunes to prevent tidal surge from flooding streets, homes, and businesses; construct walkovers to provide beach access | \$4,600,000 | Proposed | Yes |

Strategy 2: Improve stormwater drainage

The Community identified the need to improve the stormwater system infrastructure as one of the most important strategies for achieving resiliency for residents and businesses in the community.

The stormwater system was damaged during Superstorm Sandy, which overwhelmed the system, filling pipes with sand and forcing water back through the system due to tidal infiltration at the outfalls along the bayfront. Residents report that system is now so damaged that it is overwhelmed by minor rain events, causing ponding in neighborhoods and along Lido Boulevard, which is the evacuation route for residents of Lido Beach, Point

Lookout, and the City of Long Beach as well as the main commercial corridor for Lido Beach and Point Lookout.

The Town has installed sand and debris filters in catch basins throughout Lido Beach and Point Lookout. The filters were cleaned out by a contractor, under Town supervision, after Superstorm Sandy.⁵⁸ Filters are generally cleaned out by the Town when residents report blockage of catch basins.⁵⁹

The Committee and residents identified known problem spots in the stormwater system, which are captured in the projects in Table III-2. One of the major issues identified is the need to conduct an assessment of the stormwater system to identify specific problems and design a solution to



resolve those problems. An opportunity exists to conduct such a study as part of the Superstorm Sandy recovery and resiliency efforts.

Additional stormwater drainage concerns involve the large amount of impervious surfaces in the parking lots of the Town Parks that line the

beach. There may be opportunities to utilize stormwater management best practices to improve drainage at the parking lots and decrease the stress on the stormwater system due to runoff.

Table III-2: Strategy 2 – Proposed and Featured Projects

| Strategy: Improve stormwater drainage | | | | |
|--|---|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Tidal Backflow Prevention and Stormwater Treatment | Prevent tidal water from infiltrating low-lying areas at stormwater outfalls that are partially or fully submerged during high tides and storms, causing flooding. Reduce contaminants discharged from outfalls. | \$800,000 | Proposed | Yes |
| Drainage Improvements (Phase 3A) | Comprehensive stormwater study to identify improvement areas to reduce flooding along evacuation routes, primary roadways, low-lying areas, and economic corridors Section 3A (along Lido Boulevard from Maple Boulevard to Harrogate Street, Lido Beach) will be the first phase of construction. | \$5,900,000 | Proposed | Yes |
| Alternate Stormwater Opportunities | Conduct an analysis of the stormwater management system in the vicinity of the Town Parks and Nickerson Beach. Design and construct stormwater management systems at key project locations in Town Parks based on recommendations of stormwater management system study. | \$10,000,000 | Featured | Yes |
| Encourage Stormwater Capture during Sidewalk Replacement | Install stormwater management system under sidewalks when sidewalks are replaced | \$300,000 | Featured | Yes |



Strategy3: Increase resiliency of critical facilities

Lido Beach and Point Lookout are served by three fire stations (Lido–Point Lookout Fire District Lido Beach Station, Lido–Point Lookout Fire District Point Lookout Station, and the Point Lookout Rescue Company), which provide first response during normal day-to-day operations as well as for storm events. Keeping the fire stations functional for response during and recovery after storm events is critical for protecting the lives and safety of all residents in the community, and the lives and safety of first responders themselves.

All three fire stations were damaged by flooding caused by Superstorm Sandy. The Point Lookout Rescue Company, located on the bayfront along Reynolds Channel (see Figure II-3), was heavily damaged by flooding, rendering the facility unusable.⁶⁰ The Rescue Company facility has been

decommissioned by the Fire District and is not in use.⁶¹ The Lido Beach and Point Lookout Fire Stations have been repaired and are operational.

Ultimately, the Fire District would like to reconfigure the Point Lookout Fire Station to enlarge the truck room to fit an ambulance as well as fire vehicles, add a second story to the building to contain the communications equipment; relocate emergency equipment and apparatus above flood levels; and relocate the emergency electrical generator to the roof.⁶² The Fire District would like to demolish and rebuild the Lido Beach Fire Station in the same location. The new fire station would contain resiliency measures to protect the building from coastal storms. Until the Fire District is able to realize its project, the two existing fire stations are still vulnerable to damage by coastal storms. Increasing the resiliency of the existing fire stations is needed to ensure the continuation of the critical services (e.g., fighting fires, emergency medical response) to Lido Beach and Point Lookout.

Table III-3: Strategy 3 – Proposed Project

| Strategy: Increase resiliency of critical facilities | | | | |
|--|--|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Critical Facility Resiliency | Provide resiliency enhancements to fire service buildings and secure critical facilities with resiliency enhancements and flood protection | \$400,000 | Proposed | Yes |



Strategy 4: Meet communication needs pre-event

Emergency communication is a key need and vital concern for residents. Although reverse-911 systems have been established by Nassau County, the Town of Hempstead and the Long Beach School District, these systems do not provide all residents of Lido Beach and Point Lookout with information specific to the conditions on the barrier island.

Often, the barrier island is isolated from the larger portion of Long Island and Nassau County. Local reverse-911 capability is needed on-island to

communicate specific conditions of Lido Beach and Point Lookout. Coordinating a reverse-911 system on the island in the Lido–Point Lookout Fire District for all residents of Lido Beach and Point Lookout would communicate actual conditions on the ground to all residents and allow for dissemination of evacuation orders and other emergency information before and after an event.

Table III-4: Strategy 4 – Proposed Project

| Strategy: Meet evacuation needs pre-event | | | | |
|--|---|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Evacuation Education and Outreach Program and Lifeline Safety Plan | Develop a Lifeline Safety Plan and establish a program for providing regular education and outreach about emergency evacuation; includes development of a reverse-911 system for the Lido–Point Lookout Fire District | \$500,000 | Proposed Project | Yes |



Strategy 5: Promote evacuation

The primary means of storm protection for residents and visitors to Lido Beach and Point Lookout is pre-disaster evacuation. Residents of both communities understand the importance of evacuation; however, not all residents or visitors followed evacuation orders during Superstorm Sandy. By failing to evacuate, residents and visitors put themselves at risk and also endanger first responders who may be called upon to provide fire, rescue, or medical response during and after a storm event.

Outreach and education are needed to encourage residents and visitors to evacuate when ordered to do so and inform them how to safely evacuate. Lido Boulevard is the evacuation route off the barrier island to mainland Long Island. Residents and visitors need to understand that if they do not leave when the evacuation order is issued, they may not be able to leave later because of flooding or debris obstructing Lido Boulevard, bridges, and secondary roadways.

Another facet of evacuation preparedness planning is ensuring that evacuation routes and secondary roads to critical facilities and public transportation are clear, well-lit, and clearly identified.

Residents who did not obey the evacuation order prior to landfall of Superstorm Sandy were stranded on the barrier island during and after the

storm. Electrical power to both Lido Beach and Point Lookout was non-functional after the storm. The only facility with power was of the Town of Hempstead Department of Conservation and Waterways and Town Energy Park, located in Point Lookout, which is powered by alternative energy sources. Cellular communication towers and equipment throughout the communities were damaged by the storm, increasing the isolation of stranded residents.

The fire stations functioned as information centers where residents could go to get up-to-date information on conditions within Lido Beach and Point Lookout and in the other communities on the Barrier Island.

Residents are aware that Town facilities and critical facilities will offer aid during and after an event to the best of their ability and with the resources on-hand and provide information on response and recovery efforts. However, the emphasis should be on evacuation and residents removing themselves from danger, not on relying on Town facilities that are not designed or designated as community assistance centers.

Table III-5: Strategy 5 – Proposed Project

| Strategy: Promote evacuation | | | | |
|--|---|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Evacuation Education and Outreach Program and Lifeline Safety Plan | Develop a Lifeline Safety Plan and establish a program for providing regular education and outreach about emergency evacuation; includes development of a reverse-911 system for the Lido–Point Lookout Fire District | \$500,000 | Proposed Project | Yes |



Strategy 6: Increase resiliency of salt marsh to coastal erosion

The Lido Beach Passive Nature Preserve is the last salt marsh on the Barrier Island. The marsh is vulnerable to erosion, particularly during storm events, and suffered shoreline loss due to Superstorm Sandy. The marsh provides protection on the bayfront of Lido Beach by maintaining open space for

floodwater storage and conveyance. The marsh also provides significant habitat for shorebirds and is part of the Atlantic Flyway, a coastal migration route for shorebirds.

Table III-6: Strategy 6 – Featured Project

| Strategy: Increase resiliency of salt marsh to coastal erosion | | | | |
|--|--|----------------|------------------------------|------------------------|
| Project Name | Short Project Description | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
| Shoreline and Marsh Restoration and Open Space Protection | Provide stabilization of the shoreline of the Lido Beach Passive Nature Preserve and Tidal Salt Marsh with creation of natural habitat | \$3,200,000 | Featured Project | No |

Strategy 7: Increase resiliency of power grid

In addition to flooding homes, Superstorm Sandy interrupted the power supply to Lido Beach and Point Lookout. Residents who did not obey the evacuation order were stranded in their homes without electricity.

As a result of Sandy, continuity of power supply to residences and faster restoration of power post-event was a serious concern for the Committee. Increasing the resiliency of the power supply to residences, businesses, and facilities in Lido Beach and Point Lookout can be accomplished in many ways. The Town Energy Park in Point Lookout provides a model for energy efficiency and resiliency and remained fully functional after Superstorm Sandy. The Town Energy Park is located at the Town’s Department of Conservation and Waterways Facility, which also operates on a combination of solar, wind, and geothermal power.

Residential alternative energy is encouraged and supported by the Town of Hempstead. The Town has implemented a Residential Energy Star Homes code that requires new homes to receive a specific rating on the Home Energy Rating Index, a sliding scale used to evaluate the energy efficiency of

a home.⁶³ The Town also offers Solar PV (photovoltaic) and Home Efficiency Educational Seminars (a joint program with Long Island Power Authority and Renewable Energy Long Island), expedites the permitting process for residential solar energy installation, and charges a flat fee for residential solar power projects.⁶⁴ Many residents in Lido Beach have made use of the Town’s alternative energy incentives and solar PV cells are visible on the roofs of homes throughout Lido Beach, including the adult group homes.

Strategy 8: Support a regional solution for medical services

The NYRCR Planning Committee and residents are concerned about the lack of medical facilities on the barrier island. The only hospital on the barrier island was the Long Beach Medical Center, which served all five communities on the island when in operation. The Long Beach Medical Center was a 162-bed facility that provided medical and surgical services and outpatient programs.⁶⁵ Floodwaters from Superstorm Sandy inundated basement areas of the hospital, rendering the electrical, mechanical, and plumbing systems inoperable.⁶⁶ The Long Beach Medical Center has been closed since October 2012. Residents seeking urgent medical care need to travel to South Nassau



Communities Hospital in Oceanside, an 8- to 10.7-mile drive for residents of Lido Beach and Point Lookout: a drive that could be as short as 20 minutes or as long as 2 hours depending on traffic conditions, as reported by residents and the Committee.

The Long Beach Medical Center has been closed since Superstorm Sandy and has filed for bankruptcy.⁶⁷ South Nassau Communities Hospital plans to use Federal funding to open an urgent care center at the Medical Center and is looking into purchasing the Medical Center to repair the facility and restore its function as a hospital.⁶⁸

Strategy 9: Provide school children with a safe, supportive, and familiar environment after a storm

The Committee believes that protecting schools is vital to community resiliency. Disaster recovery is often an extremely stressful experience for children. Returning to familiar situations and environments as quickly as possible during disaster recovery can reduce stress by providing a familiar safe, supportive environment.

The Long Beach High School is located on the bayfront but is elevated, which protected the building from flood-related damage. However, some windows were broken and portions of the roof were damaged by wind. The Long Beach Elementary School / Pre-K Center, Long Beach Middle School, and District offices were inundated and damaged by floodwater.

The Long Beach School District has received funding for recovery and resiliency improvements from Federal agencies and programs such as the Federal Emergency Management Agency's Public Assistance Program. The School District is in the process of floodproofing school facilities; relocating mechanical, electrical, and plumbing equipment above flood levels; and installing wind-protective measures on windows.⁶⁹





Section IV: Implementation – Project Profiles

Section IV:

Implementation – Project Profiles

The NY Rising Community Reconstruction (NYRCR) Program has allocated to the NYRCR Lido Beach/Point Lookout up to \$6 million (Lido Beach: \$3 million; Point Lookout: \$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 (CBAs), 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 NYRCR Community's (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 Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in the NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in the NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented.

This section provides a complete project profile for each Proposed or Featured Project identified by the NYRCR 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 Lido Beach/Point Lookout Plan.

The Proposed and Featured Projects are some of the implementation mechanisms for the Reconstruction and Resiliency Strategies described in Section III. These projects represent actions that are recommended by the Committee to be implemented in the near future to build resiliency and fulfill other important Community goals.

Projects of regional significance are noted in the project profiles. Regional significance can mean that a Proposed or Featured Project protects an asset that is used by several communities (e.g., reduce flooding on an established evacuation route) or it is the Community's part that spans several communities (e.g., a community restores the dunes on their part of a barrier island).

Initially, the project descriptions consisted of a basic project description that included a preliminary scope of work, the Recovery Support Function beneficiaries of the project (i.e., public/private, local/regional), and basic cost categories. The projects underwent an initial feasibility and funding evaluation in which various sources of funding for the projects were explored. The Planning Committee used the input from the Public Engagement Events, including online surveys, to make decisions about which projects to select as Proposed or Featured. The results of the Community Public Engagement Events are documented in more detail in Section V, but the overall results were generally consistent with the Planning Committee's selection of projects.

In addition to providing a detailed description of each project, the profiles include information on two important elements used by the Committee to evaluate the value of each project, a cost-benefit analysis and a risk-reduction analysis. The benefits were presented with qualitative descriptions that demonstrate how the projects assist the 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 CBA is a tool that is used to calculate and compare the benefits and costs of a project. The CBA provides decision-makers with a framework for comparing projects (i.e., anticipated cost of implementation versus total expected benefits) and determining whether the benefits of a particular project outweigh the costs. The results of the CBA were used in two ways in the NYRCR planning process: (1) to help the Committee prioritize projects, and (2) to guide project selection for implementation based on the most cost-beneficial means for providing resiliency to the assets identified by the community.

Because the NYRCR Program is a community-driven process, the CBA is focused on identifying project costs and benefits that clearly relate to the communities that the Committee represents. Community and Committee input, informed by a true understanding of local conditions, needs, and community values, plays a crucial role in the selection of projects for implementation. The risk reduction benefits are described in terms of how much a Proposed or Featured Project would lower the vulnerability scores, described in Section II, of key community assets. The additional benefits of a project are described in qualitative terms that explain how a project would 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 an estimated cost for implementing the project. Factors contributing to the lifecycle costs of the project (e.g., operation and maintenance costs) are described in general terms. The CBA cannot forecast costs or benefits with complete certainty, but it provides the community with a practical understanding of the potential estimated costs of project implementation and the potential benefits that could accrue to the community with the project in place.

The cost of implementing a project is only one aspect of the justification of funding the project. Another important variable is the future cost of not implementing projects. While the lost-opportunity costs of not implementing a project do not always lend themselves to quantification, they are no less

important to the analysis and are therefore addressed qualitatively. Lost-opportunity costs include:

- Economic loss to residents and 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 (e.g., vehicles, residences) and public infrastructure resulting from frequent recurring flooding and future storm events.

Project benefits

The types of benefits considered in the CBA include:

- **Risk reduction:** 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").⁷⁰
- **Economic:** Project's potential to help minimize economic costs and reduce the time it takes for the local economy to rebound from a storm event and to increase its economic growth. Economic data include, where applicable, an estimate of permanent jobs secured/added; relationship to, and/or furtherance of, regional economic development plan goals; potential for additional economic activity; and the net effect on local municipal expenditures.⁷¹
- **Health and social services:** Qualitative information was provided on the population benefits of improved access to health and social service facilities including public safety services and the degree to which essential health and social service facilities are able to provide services to a community during a future storm or weather event as a result of the project.
- **Environmental protection:** Benefits include the protection of crucial environmental assets or high-priority habitat, threatened and endangered species, migration, or habitat connectivity; any cleanup resulting from the project; creation of open space; and green

infrastructure that contributes to flood mitigation and community resiliency.

Risk-reduction analysis

A risk-reduction analysis estimates the extent to which a Proposed or Featured Project would lower the flood risk to the identified community critical assets and population. The analysis used information from the risk assessment described in Section II to determine the risk of an asset before the project is implemented and then risk reduction is estimated by determining how much the Proposed or Featured Project would lower the vulnerability score.

A. Proposed Projects

Proposed Projects are proposed for funding through a community’s allocation of CDBG-DR funding. The Committee developed and selected the Proposed Projects based on input from residents during multiple Public Engagement Events and comments received through the NYRCR Program website. The locations of the Proposed Projects are depicted on Figure IV-1. The projects are not ranked.

The Proposed Projects are as follows:

- Revetment Repair and Reconstruction;
- Tidal Backflow Prevention and Stormwater Treatment;
- Drainage Improvements;
- Repair Dunes and Construct Dune Walkovers;
- Critical Facility Resiliency; and
- Evacuation and Education/Outreach Program and Lifeline Safety Plan.

The project criteria symbols are:



Figure IV-1: Proposed Projects



- | | |
|---|--|
| Recreational Facilities | Revetment Repair and Reconstruction |
| Parking Lots | Tidal Backflow Prevention and Stormwater Treatment |
| Residential Areas | Drainage Improvements |
| Lido Beach Passive Nature Preserve | Repair Dunes and Construct Dune Walkovers |
| Schools | Critical Facility Resiliency |
| | Evacuation Education/Outreach Program and Lifeline Safety Plan |



Revetment Repair and Reconstruction

Point Lookout

Issue: Storm surge flooding and erosion control

Repair and reconstruction of the revetment along Jones Inlet in Point Lookout to protect residences in Point Lookout was established as a top priority for the Committee during the first NY Rising Community Reconstruction (NYRCR) Planning Committee Meeting in September 2013 (Figure IV-2). The revetment and its landward dune were damaged by Superstorm Sandy. The storm also accelerated coastal erosion beyond where the revetment ends at the northeast corner of Point Lookout. Due to damages sustained during the storm, the revetment is not providing complete protection. The revetment along Jones Inlet functions as a barrier that absorbs wave energy, reflects waves, and reduces wave run-up during storm events. Until the revetment is repaired, houses along Mineola Avenue adjacent to the Point Lookout Beach District Park will be vulnerable to damage from waves and surge generated by coastal storms. A portion of the revetment should be buried under its landward dune to help prevent localized scour landward of the revetment. Portions of the landward dune were destroyed by Superstorm Sandy, rendering the area landward of the revetment vulnerable to scour.

The area to the north of the revetment is subject to an ongoing process of coastal erosion along Jones Inlet, resulting in shoreline retreat, reducing the distance between the water and structures on Bayside Drive and increasing the vulnerability of residences and businesses to coastal erosion. If nothing is done to halt the process of erosion, the foundations of residences and businesses could be undermined, leading to structural



Figure IV-2: Existing stone revetment, looking north
URS Corporation



Cost Estimate

\$3,800,000



Timeline

18 to 24 months





collapse and threatening the life safety of the occupants. The process of erosion occurring at the northeast end of Point Lookout also causes loss of open space in the Point Lookout Beach District Park. Eventually, if left unprotected, erosion along Jones Inlet in the area of the Park will encroach upon additional residences on Mineola Drive.

A site visit was conducted to assess the condition of the existing revetment and the unprotected area along the western shore of Jones Inlet. The existing revetment extends from a stone jetty at the southeast corner of the island to another groin situated at the southern extreme of the crescent of beach at the northeast corner. The revetment is in generally good repair, and faced with larger armor stone in the portion along the southeast corner to the extension of Beech Street. From Beech Street to the extension of Lido Boulevard, the revetment is unimproved with a smaller size of facing stone. From Lido Boulevard to its northern extremity, the revetment is in poor repair and generally consists of randomly stacked sections of concrete rubble.

The U.S. Army Corps of Engineers (USACE) is implementing coastal restoration work in communities impacted by Superstorm Sandy. In Point Lookout, the USACE is proposing to rehabilitate roughly 640 linear feet of the revetment and improve the groins/jetties.⁷²

This project proposes extending the existing revetment north to the end of Jones Inlet and west around the tip of Point Lookout along Reynolds Channel (Figure IV-3, 4). Prior to beginning the design phase of this project, a hydrogeologic and hydraulic analysis and an existing conditions inspection

should be conducted to understand the processes affecting the area to be protected by the new revetment section and to help design the new section of revetment to tie into the existing revetment system. The new revetment system should be designed to be rock rubble construction to match the existing revetment system. Construction activities should also include filling the landward area protected by the new revetment section with sand and planting grasses or other vegetation to promote soil cohesion and create a stable land mass. Depending on the design, some new open space could be created as a result of this project. The project would result in the protection of residential and commercial structures and the life safety of the occupants on Bayside Drive, Mineola Avenue, and of the existing open space at the Point Lookout Beach District Park.

Short description:

Construct section of rock revetment at northeast end of Point Lookout for protection of homes, businesses, and recreational facilities.

Key project elements (may include, but are not limited to):

- Perform a hydrogeologic and hydraulic engineering study;
- Inspect the condition of the existing revetment system;
- Design and construct rock revetment; and
- Fill landward area behind the revetment with sand and plant with native grasses.

| Key project locations | Early action items | Related projects |
|---|---|--|
| <ul style="list-style-type: none"> • Northeast corner of the Barrier Island, Point Lookout | <ul style="list-style-type: none"> • Perform a hydrogeologic and hydraulic engineering study • Conduct an analysis of the existing revetment system • Identify regulatory actions (e.g., permitting, land use, zoning) | <ul style="list-style-type: none"> • USACE Atlantic Coast of Long Island Jones Inlet to East Rockaway Inlet Long Beach Island, New York Coastal Storm Risk Management Project |





Benefits/co-benefits derived from the project

- **Health, social, and public safety services:** This project would protect existing residential assets from damage by waves, flooding and shoreline erosion, which may threaten the life safety of occupants. Economic resiliency: This project may encourage an increase in recreational economic activity at Point Lookout Beach District Park and in the commercial district, protecting the existing ball fields and recreational facilities at the Park. This project could reduce current expenditures by the Town of Hempstead (Town) to maintain the current shoreline after erosion events, and allow those funds to be captured and spent on other important projects and programs. The project would protect existing businesses along Bayside Drive, which should provide economic stability and encourage job retention.
- **Environmental protection:** Existing open space would be protected – the creation of a vegetated area in the sand fill behind the revetment could provide habitat for shorebirds. Open space at the Point Lookout Beach District Park functions as an area of floodwater conveyance and storage during storm events. Depending on the design, additional open space may be created as a result of this project, potentially increasing the area available for floodwater storage. The revetment face can function to absorb and reduce wave energy, which may provide additional protection to residences along Bayside Drive and Mineola Avenue.

Cost-benefit analysis

- The total estimated project cost of \$3.8 million is an investment that should yield high returns while reducing government expenditures for recovery project costs due to future storm events for temporary shoreline restoration activities.
- The economic benefits of this project also include the avoided future costs from damage to personal property (e.g., buildings and their contents) and public property (e.g., recreational equipment and

landscaping) that will likely result from continued shoreline erosion and flooding if this project is not implemented.

- If this project is not built, the Community will likely incur significant, recurring financial costs because the residential structures along Bayside Drive and Mineola Avenue that were damaged by flooding from Superstorm Sandy will continue to be at high risk and the Town of Hempstead will have to continue to replenish the sand along the shoreline and fund temporary erosion-control measures there. Further, if this project is not constructed, future storm flooding and erosion will eventually threaten houses on Mineola Ave and reduce open space at the Point Lookout Beach District Park.
- With proper maintenance, revetments generally have a long useful life and provide good return on investment. Benefits would likely extend for the useful life of the revetment.

Risk-reduction analysis

The repair/reconstruction of the revetment at the northeast end of Point Lookout should reduce the vulnerability to coastal erosion for 31 housing units and one commercial structure, protect an estimated population of more than 100 persons, and protect open space and recreational facilities in the Point Lookout Beach District Park.⁷³ Structures located along east end of Bayside Drive and on Mineola Drive are currently vulnerable to flooding and erosion. These structures are in danger of being flooded and having their foundations undermined, which could lead to their collapse and serious injuries to occupants. Shoreline erosion is also reducing open space in the Point Lookout Beach District Park, shrinking space for recreational activity and eventually threatening additional residences on Mineola Avenue.

The risk assessment performed for assets in the northeast corner of Point Lookout estimated that they were at severe to high risk due to vulnerability to erosion and flooding. If this project is implemented, asset risk is estimated to be moderate because, although the risk from erosion would be reduced, the potential for flooding will still exist. However, by protecting and possibly increasing the open space in Point Lookout Beach District Park, this project may provide some flood protection to residential structures by functioning as





Revetment Repair/Reconstruction

an area of flood conveyance and storage. Additional flood protection may be provided by the revetment's ability to absorb and reduce wave energy.

Regulatory requirements

Federal requirements: USACE – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act

State requirements: New York State Department of Environmental Conservation – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

Town of Hempstead



Figure IV-3: Example of stone revetment construction

Rosanna Arias, FEMA Media Library

Figure IV-4: Revetment Repair and Reconstruction



Tidal Backflow Prevention and Stormwater Treatment



Issue: Tidal flooding infiltration and pollution discharge through stormwater outfalls

The NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) reported numerous problems with the stormwater system in both Lido Beach and Point Lookout. Alleviating flooding due to stormwater issues has been a top priority for the Committee since the first Planning Committee Meeting in September 2013 and was reaffirmed by the Community during all three Public Engagement Events. The stormwater system drains to the bay through outfalls located in the Lido North neighborhood and the Lido East neighborhood in Lido Beach, and the Town of Hempstead Conservation and Water Facility and Energy Park in Point Lookout. Outfalls are open and unprotected, and tend to backflow with water during high tide and elevated tides at the full and new moons. Tides force water into the outfalls and back through the stormwater system, resulting in flooding along secondary streets that lead to evacuation routes and critical facilities.

Floodwaters from Hurricane Irene and Superstorm Sandy were forced through bayfront storm drain outfalls into the stormwater drainage system in Lido Beach and Point Lookout, adding to the volume of floodwaters in the street. The floodwaters hindered access to evacuation routes for residents and first responders.

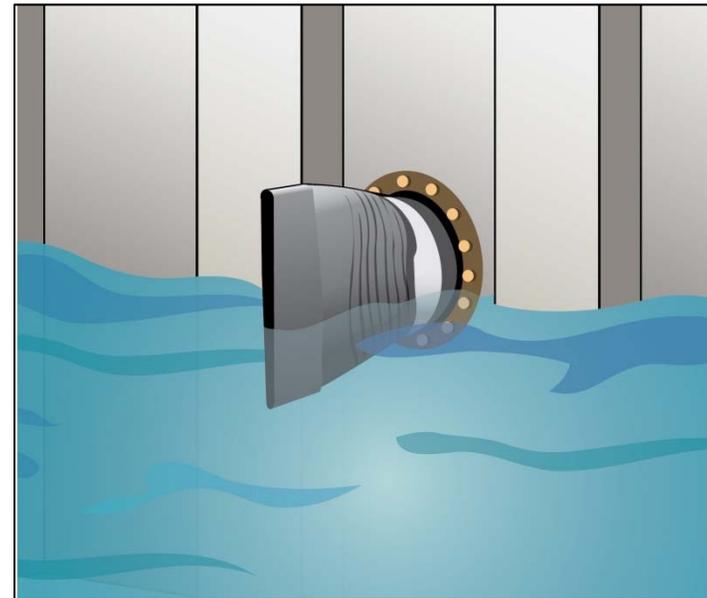


Figure IV-5: Example of outfall backflow prevention
URS Corporation



Cost Estimate

\$800,000



Timeline

2 to 5 years





Tidal Backflow Prevention and Stormwater Treatment

This project includes installing backflow prevention devices on stormwater outfall pipes (Figure IV-5) and catch basin inserts to improve water quality.

Short description:

Prevent tidal water from infiltrating low-lying areas at stormwater outfalls that are partially or fully submerged during high tides and storms, causing flooding; reduce contaminants discharged from outfalls.

Key project elements (may include, but are not limited to):

- Install backflow prevention devices at outfalls; and
- Install pollution control devices.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** Residents of Lido Beach, a population that includes numerous diverse, socially vulnerable individuals, and first responders would benefit from the stormwater system protection that this project would provide, which would help alleviate flooding on emergency routes and secondary routes that provide access to critical facilities, residences, and commercial buildings.
- **Economic resiliency:** By reducing flooding on secondary streets and along evacuation routes, this project may allow for continued operation of public services and businesses during storm and tidal events, which in turn could provide economic stability and encourage

the retention of the roughly 2,000 jobs within the project area.⁷⁴ The reduction in pollution conveyed to Reynolds Channel that should result from this project may help to improve water quality, making Hempstead Bay more attractive to recreational activities and potentially encouraging an increase in economic activity in existing commercial marine assets at Point Lookout.

- **Environmental protection:** This project may reduce pollution to Reynolds Channel, Hempstead Bay, and the Lido Beach Passive Nature Preserve from stormwater runoff. The improvement in the quality of stormwater discharges into the local watershed may result in an improvement in the water quality of Hempstead Bay and the Lido Beach Passive Nature Preserve.

Cost-benefit analysis

- The stormwater flooding issues that this project addresses require continual attention from the Town of Hempstead. Implementing this project would likely reduce ongoing costs incurred due to tidal backflow into the stormwater system through the stormwater outfalls for cleanout and repair of damages to the stormwater system after major storm events.
- This project should have a good return on investment as backflow prevention devices have an expected useful life of 20 to 30 years with proper maintenance.

Key project locations

- As indicated on Project Area Map (Figure IV-6)

Early action items

- Develop an implementation strategy in coordination with Nassau County and the Town of Hempstead
- Coordinate with Nassau County to potentially capture project funding through the Environmental Bond Act
- Identify ownership (municipality) of potential outfall and catch basin locations

Related projects

- Drainage Improvements
- Alternative Stormwater Opportunities
- Encourage Stormwater Capture During Sidewalk Replacement





Risk-reduction analysis

The installation of tidal backflow prevention devices should increase the resiliency of the existing stormwater system and reduce vulnerability to flooding along secondary roads and evacuation routes that provide egress for roughly 460 housing units;⁷⁵ the Lido Elementary School / Long Beach Pre-K Center; the Long Beach Middle School and High School in Lido Beach; the Town of Hempstead Department of Water Facilities; the Town of Hempstead Department of Conservation and Waterways Facility; and the Town Energy Park and the West Marina in Point Lookout. This project also corresponds to a reduction in flood risk to a population of roughly 2,300 people located in the Lido North and Lido East neighborhoods, schools, and Town facilities.⁷⁶

The risk assessment performed for assets located in the project area estimates a severe to high risk due to vulnerability to flooding. If this project is implemented, asset risk is estimated to be reduced to moderate because, although this project should reduce risk to flooding, there is still potential for flooding due to other issues with the stormwater system that could be addressed in the Drainage Improvements project, and vulnerability to bayfront flooding of assets located on the water and one the edge of the tidal marsh.

Regulatory requirements

Federal requirements: U.S. Army Corps of Engineers – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act; Coastal Zone Management Act

State requirements: New York State Department of Environmental Conservation – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

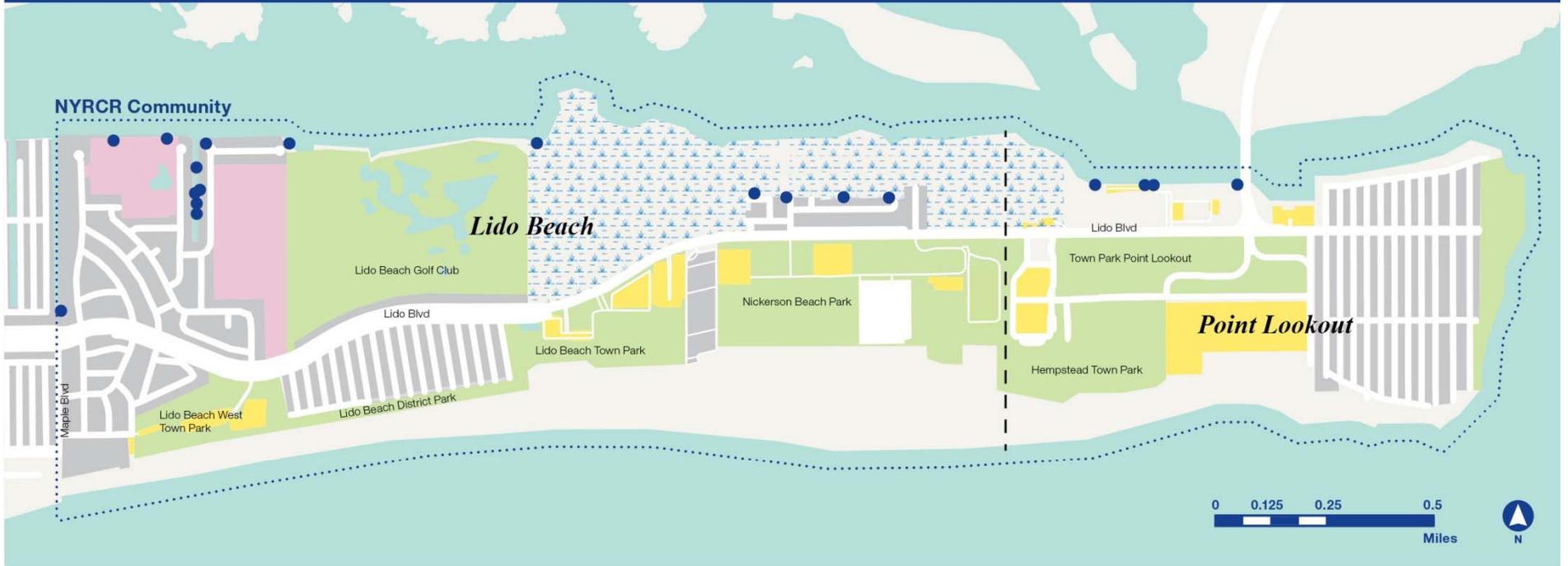
Nassau County, Town of Hempstead

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





Figure IV-6: Tidal Backflow Prevention and Stormwater Treatment



- Recreational Facilities
- Parking Lots
- Residential Areas
- Lido Beach Passive Nature Preserve
- Schools
- Drainage Outfalls as Surveyed by Nassau County Field Personnel





Drainage Improvements

Issue: Tidal and stormwater flooding

The NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) reported numerous problems with the stormwater system in both Lido Beach and Point Lookout. Alleviating flooding due to stormwater issues and increasing the resiliency of the stormwater system has been a top priority for the Committee since the first Planning Committee Meeting in September 2013 and was reaffirmed by the NYRCR Community (Community) during all three Public Engagement Events.

A site visit was conducted after a light rain to observe the function of the stormwater system on November 22, 2013. Ponding was observed in the area around catch basins in several locations throughout the Community (see Figures I-9 and II-12). Additional site visits were made on January 7 and January 9, 2014 in Lido Beach and Point Lookout to examine the existing conditions of Lido Boulevard. The Committee had identified three areas of continual flooding during storm events. Lido Boulevard from the Loop Parkway is a concrete pavement roadway, three lanes in each direction, which extends into the City of Long Beach at Maple Avenue. Catch basins were observed at the curbs at a uniform distance of approximately one every 250 feet on both sides of the roadway. The concrete pavement exhibited areas of wear and spalling of the concrete and sewer manholes in the travel way and have not settled in relation to the surrounding pavement. Due to the cold ambient temperatures at the time of the site visit, there was no precipitation and therefore no flooding was observed.

The stormwater system in the Community was overwhelmed by the volume of water due to storm surge and tidal flooding from Hurricane Irene and Superstorm Sandy. The volume of water caused flooding in secondary streets and along evacuation routes, rendering them impassable. The extra water forced through the stormwater system at the outfalls, adding to the existing volume of water in the streets and causing some stormwater conveyance structures to fill with sand and others to collapse or break.

This project consists of a comprehensive analysis of the stormwater system, the construction of stormwater system improvements along the section of Lido Boulevard from Maple Boulevard east to Harrogate Street (Location 3A). It also proposes phased improvements (Figure IV-7) to the stormwater system at the six locations that the Committee and residents identified as the worst areas of flooding (Figure IV-8). The results of the comprehensive analysis of the stormwater system would be used as the basis for the design of stormwater system improvements in Location 3A and subsequent phases of construction. Implementation of the stormwater improvements at each of the six locations is phased to allow for flexibility in scheduling construction of system improvements to coincide with the availability of funding and at the discretion of the applicant. Location 3A was chosen as the first site for construction during this project because Lido Boulevard is a major roadway and serves as the primary evacuation route for Lido Beach and portions of the City of Long Beach.



Cost Estimate

\$5,900,000



Timeline

2 to 5 years (Study & Location 3A)



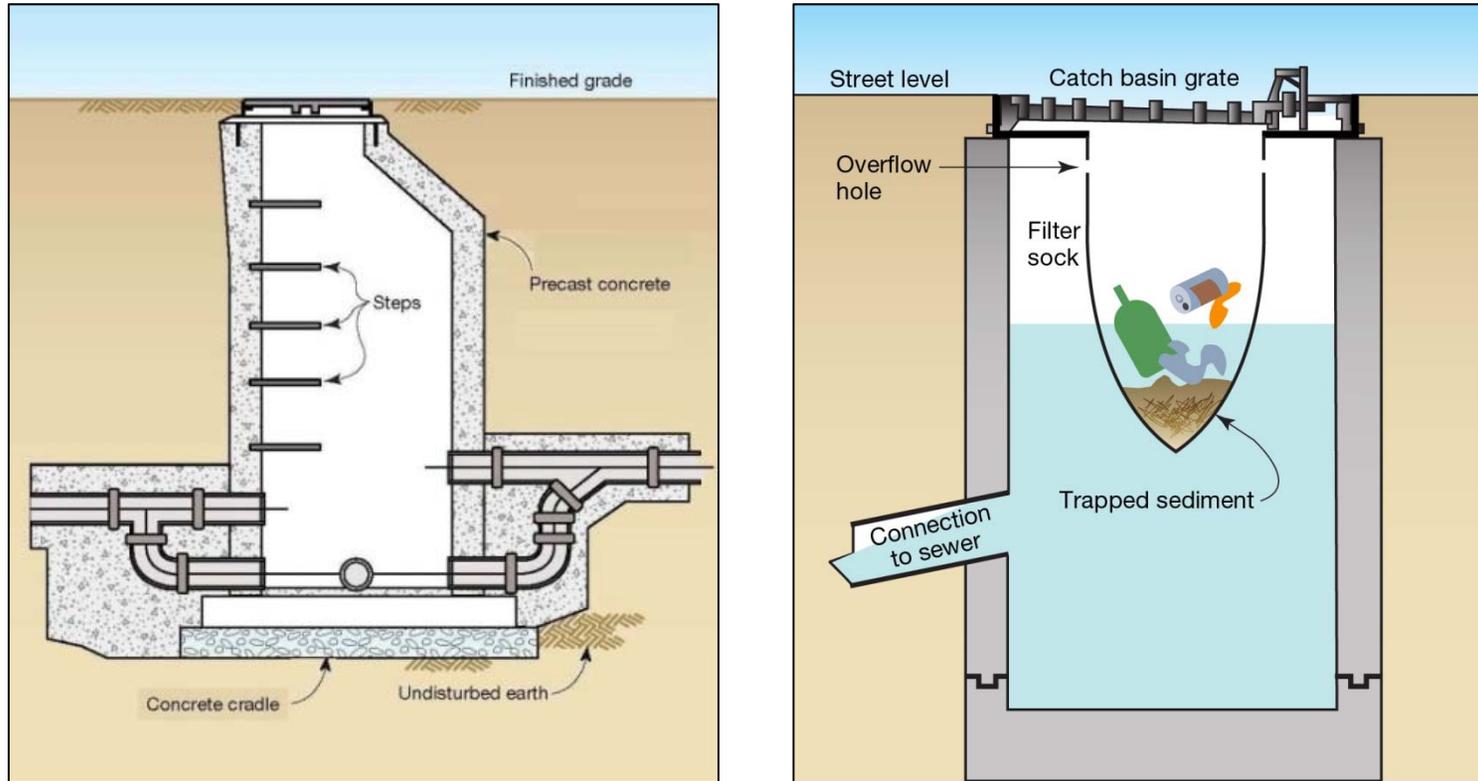


Figure IV-7: Example of potential stormwater system improvements

Adapted from
http://www.engr.psu.edu/phrc/Land%20Development_files/August%2024,%202020
http://www.nyc.gov/html/dep/html/flooding/catch_basin_images.shtml

Short description:

Conduct a comprehensive analysis of the stormwater system to identify improvement areas and implement phased improvements to reduce flooding along evacuation routes, secondary roadways, low-lying areas, and economic corridors beginning with Location 3A: Lido Boulevard section from Maple Boulevard to Harrogate Street, Lido Beach. Construction of additional phases of improvements at Locations 3B through 3D (see Project Area Map, Figure IV-8) is at the discretion of the applicant.

Key project elements (may include, but are not limited to):

- Conduct comprehensive analysis of stormwater drainage system to identify hydrologic capacity;
- Inspect existing condition of system;
- Identify and clean/clear blockages;
- Digitize system and prioritize repairs; and

- Design and construct improvements to the stormwater drainage system at priority Location 3A, Lido Boulevard section from Maple Boulevard to Harrogate Street, Lido Beach (see Figure IV-7).

blockage and reduce floodwater obstruction of Lido Boulevard, a major evacuation route, allowing residents and visitors to Lido Beach and adjacent areas of the City of Long Beach to safely evacuate and allowing first responders access to four neighborhoods, the school complex, and the commercial district of Lido Beach.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** This project should alleviate flooding due to stormwater system overloading and

| Key project location | Early action items | Related projects |
|---|---|--|
| <ul style="list-style-type: none"> • Location 3A: Lido Boulevard section from Maple Boulevard to Harrogate Street, Lido Beach <p>Key project locations (additional phases of work)</p> <ul style="list-style-type: none"> • Location 3B: Lido Boulevard from Prescott Street to 750 Lido Boulevard, Lido Beach (proposed phase) • Location 3C: Lido Boulevard from Parkside Drive to Mineola Avenue, Point Lookout (proposed phase) • Location 3D: Ocean Boulevard from Allevard Street to Harrogate Street, Lido Beach (proposed phase) • Location 3E: Regent Drive, Lido North neighborhood, Lido Beach (proposed phase) • Location 3F: Lido North neighborhood, Lido Beach (proposed phase) | <ul style="list-style-type: none"> • Identify regulatory actions (e.g., permitting, land use, zoning) • Determine ownership and maintenance agreements • Conduct a comprehensive analysis of the stormwater drainage system on roadways owned by Nassau County and the Town of Hempstead | <ul style="list-style-type: none"> • Tidal Backflow Prevention and Stormwater Treatment • Alternative Stormwater Opportunities • Encourage Stormwater Capture During Sidewalk Replacement |

- **Economic resiliency:** This project would help reduce flooding along Lido Boulevard, the major thoroughfare of the NYRCR Community and an evacuation route. Specifically, the first phase of this project would affect the area along Lido Boulevard from Maple Drive to Harrogate Street, an area that encompasses the entrance to several neighborhoods, the Lido Beach–Point Lookout Fire District Lido Beach Fire Station, the entrance to the school complex, and the commercial district in Lido Beach. By reducing flooding in the vicinity of these important economic assets, storm events should cause less disruption in the lives of the individuals living and working in the

area and less disruption in service/business hours in the commercial district, which in turn could encourage economic stability and job retention. According to the U.S. Census Bureau, the project area is the locus of 1,200 to 1,900 jobs.⁷⁷

- **Environmental protection:** New catch basins with inserts should capture some pollution from stormwater runoff, which would likely improve the water quality of the local watershed. Without the catch basins, untreated stormwater would otherwise discharge to Hempstead Bay and Lido Beach Passive Nature Preserve.

Cost-benefit analysis

- The total estimated project cost of \$5.9 million for the stormwater system analysis and construction of improvements in Location 3A is an investment that would yield high returns while reducing government expenditures for future storm events.
- The cost of the comprehensive stormwater system analysis is included in the cost to construct improvements in Location 3A, allowing for economies of scale in the cost of subsequent phases, which only need include the cost to construct stormwater system improvements and design.
- The stormwater flooding issues that this project addresses at Location 3A require continual attention from the Town of Hempstead. Implementing this project would likely reduce ongoing costs incurred for repair or replacement of damaged pipes and other system components, and cleanout of catch basins after minor rainstorms and major storm events. Construction of additional phases of this project would improve more areas of the stormwater system, increasing the cost benefits due to losses avoided (e.g., the economic benefit of avoiding future costs from damage).
- Stormwater system improvements generally have a long useful life with proper maintenance. Benefits should extend to the end of the useful life of the system components.

Risk-reduction analysis

This project for the stormwater system analysis and construction of improvements in Location 3A should increase the resiliency of the existing stormwater system and reduce vulnerability to flooding along evacuation routes and secondary roads that provide egress to more than 700 housing units in Lido Beach neighborhoods.⁷⁸ These roads also provide access to the Lido Elementary School / Long Beach Pre-K Center, the Long Beach Middle School, and the Long Beach High School in Lido Beach, and represent the primary evacuation route for a portion of the population of the City of Long Beach. This project also corresponds to a reduction in flood risk to a

population of more than 2,000 people located in the Lido Beach, the City of Long Beach, schools, and Town facilities.⁷⁹

The risk assessment performed for assets located in the project area estimated assets to have severe to high risk due to vulnerability to flooding. If this project is implemented, asset risk should be reduced to moderate because, although this project does reduce risk due to flooding, there is still the potential for flooding due to the vulnerability of bayfront assets on the water.

Regulatory requirements

Federal requirements: U.S. Army Corps of Engineers – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act; Coastal Zone Management Act

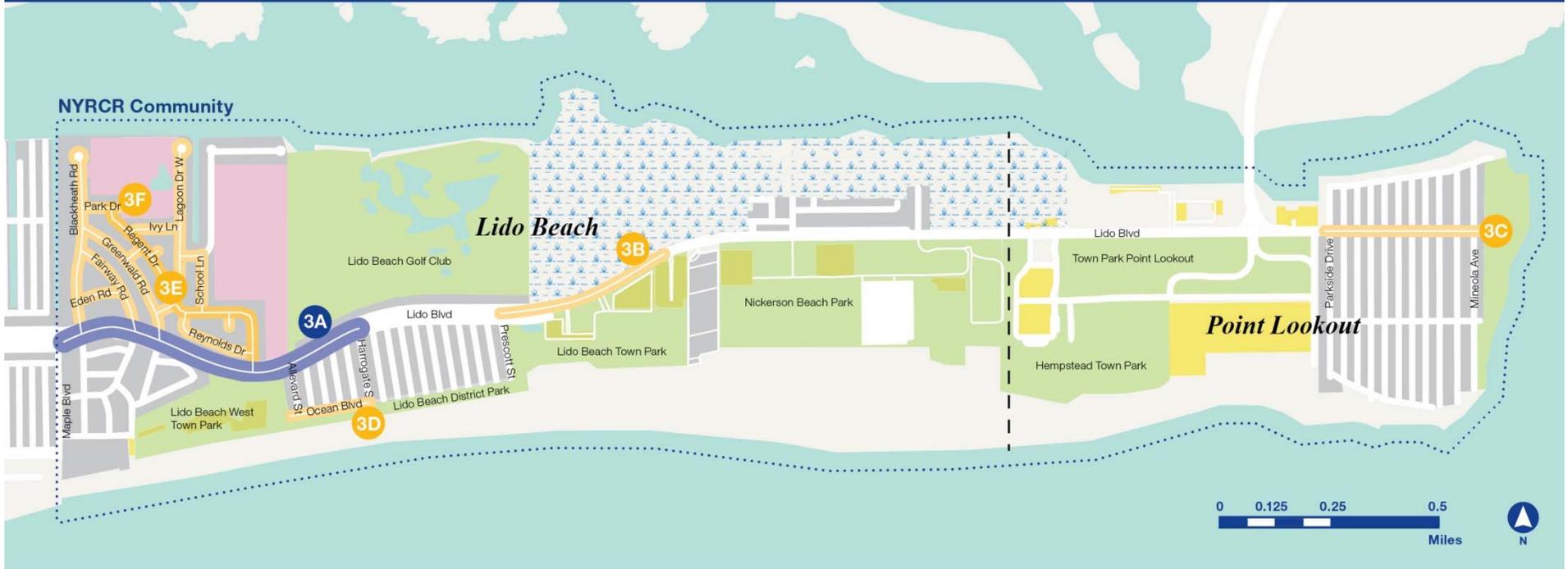
State requirements: New York State Department of Environmental Conservation (DEC) – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

Nassau County, Town of Hempstead

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

Figure IV-8: Drainage Improvements



- Recreational Facilities
- Parking Lots
- Residential Areas
- Lido Beach Passive Nature Preserve
- Schools

- 3A — Project location: Lido Boulevard (Maple Boulevard to Harrogate Street)
- 3B — Additional phase of work: Lido Boulevard (Prescott Street to 750 Lido Boulevard)
- 3C — Additional phase of work: Lido Boulevard (Parkside Drive to Mineola Avenue)
- 3D — Additional phase of work: Ocean Boulevard (Alleward Street to Harrogate Street)
- 3E — Additional phase of work: Regent Drive (Lido North neighborhood)
- 3F — Additional phase of work: Lido North neighborhood

Repair Dunes and Construct Dune Walkovers



Issue: Storm breaches and coastal protection

The importance of the maintaining a complete dune system with no breaks or gaps was established as a top priority for the NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) during the first Planning Committee Meeting in September 2013. The dune system on the oceanfront of the Lido Beach and Point Lookout provided protection from storm surge to residences, businesses, and public facilities during Hurricane Irene and Superstorm Sandy. However, when the storm breached the dunes, flooding occurred and damaged residential structures. During a site visit to the dunes in September 2013, Town of Hempstead employees were observed installing protective fencing on the seaward side of the dunes at Lido Beach West Town Park and replanting bare areas. In March 2014, the Town of Hempstead began filling dune breaches with sand, provided by a U.S. Army Corps of Engineers (USACE) dredging of Jones Inlet, and planting grasses to stabilize the infill areas.

The USACE has planned improvements to the dunes along the Atlantic Coast of Long Beach Island from Jones Inlet to Rockaway Inlet. Planned improvements include nourishment and construction of a dune, rehabilitation of existing groins and construction of new groins, and beach renourishment.⁸⁰ The work is phased with the final phase being the portion of this project that will include dune and berm reconstruction and construction of 11 dune pedestrian and seven vehicle crossovers to provide beach access. The project will be completed in 39 months.⁸¹ The Committee is aware of ongoing the Town of Hempstead and future USACE



Figure IV-9: Example of existing accessible dune walkover, September 2013
URS Corporation



Cost Estimate

\$4,600,000



Timeline

2 to 3 years





Repair Dunes and Construct Dune Walkovers

projects involving dune improvement. The Committee also recognizes that time is a key factor in dune establishment and is concerned that ongoing projects might not be extensive enough to create a cohesive dune system.

This project, repairing the dunes and constructing dune walkovers (Figure IV-9), involves filling the areas of the dunes that were breached by Superstorm Sandy. The intent would be to create a monolithic dune system to protect the oceanfront areas of the Community from storm surge (Figure IV-10).

Filling dune breaks includes placing sand; installing fencing on the seaward side to trap sand and stabilize bare surfaces; and planting vegetation to provide additional stability, promote dune growth through sand accumulation, and create habitat for shorebirds and other wildlife. In addition to dune repair, this project includes constructing accessible walkovers to provide access to the beach to residents and visitors. Because of the protection provided by a complete dune system, the Committee felt it would be prudent to repair the dunes as soon as possible, rather than wait until 2016 when the USACE dune construction is scheduled to occur.

Short description:

Fill breaches and repair dunes to prevent storm surge from flooding streets, homes, public facilities, and businesses and construct walkovers to provide beach access.

Key project elements (may include, but are not limited to):

- Inspect condition of dunes to identify locations of breaks and areas requiring repair;

- Align design of dune reconstruction and walkovers with USACE Atlantic Coast of Long Island Jones Inlet to East Rockaway Inlet Long Beach Island, New York Coastal Storm Risk Management Project (February 2014);⁸²
- Design and construct dune improvements; and
- Design and construct accessible dune walkovers.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** The project would protect more than 1,800 residents; roughly 1,100 housing units, critical facilities, and public facilities; and socially vulnerable populations at Camp Anchor and the three adult group homes on Seaspray Drive in Lido Beach by restoring the dune system, which can provide protection from flooding due to storm surge.⁸³
- **Economic resiliency:** This project would help retain full-time and seasonal jobs by protecting the businesses in the residential district of Lido Beach and the facilities at the Town parks and Nickerson Beach, which equate to more than 2,000 jobs.⁸⁴

| Key project locations | Early action items | Related projects |
|---|---|---|
| <ul style="list-style-type: none"> • Dune system along oceanfront of Lido Beach and Point Lookout (see Figure IV-10) | <ul style="list-style-type: none"> • Conduct an analysis of existing conditions • Coordinate with Town of Hempstead and USACE • Identify regulatory actions (e.g., permitting, land use, zoning) | <ul style="list-style-type: none"> • USACE Atlantic Coast of Long Island Jones Inlet to East Rockaway Inlet Long Beach Island, New York Coastal Storm Risk Management Project • Town of Hempstead Beach Renourishment Project |





Repair Dunes and Construct Dune Walkovers

- **Environmental protection:** The dune system is a major natural resource for the Community. Dune restoration would ensure the continued health of this resource, which provides protection from storm surge and a nesting habitat for shorebirds. Restoration of dune breaches and construction of walkovers should provide protection for shorebird habitat by creating a natural area that is unbroken and undisturbed by pedestrians. The walkovers would also allow continued access to the beaches.

Cost-benefit analysis

- The total estimated project cost of \$4.6 million is an investment that would yield high returns while reducing government expenditures for future storm events.
- The economic benefits of this project also include the avoided future costs from damage to personal property (e.g., buildings and their contents) and public property (e.g., recreational equipment and landscaping) that may result from future storms if this project is not implemented.
- Protection of Community assets should reduce recovery costs after a storm event.
- Once reconstructed, the dunes would be self-sustaining and would need only light maintenance such as replacing dune fencing or replanting areas where initial plantings do not thrive. The walkovers would have an expected useful life of 10 years if constructed of wood and maintained, and 40 years if constructed of recycled plastic lumber and maintained.

Risk-reduction analysis

The Federal Emergency Management Agency observed that wide, high dune systems provided significant protection from Superstorm Sandy's storm surge.⁸⁵ By filling breaches to create an unbroken dune system, this project should provide protection from storm surge to residents in the Lido West neighborhood, the Lido Towers, the Lido Dunes neighborhood, the Lido Townhouses, and residents of Point Lookout. It

would protect businesses; public facilities; the town parks in Lido Beach, Point Lookout, and Nickerson Beach; Camp Anchor; and the adult group homes in Lido Beach.

This project should reduce the vulnerability of the socially vulnerable population at the adult group homes on Seaspray Drive and Camp Anchor to flooding and storm surge.

The risk assessment performed for assets located in the project area estimated assets as having severe to high risk due to vulnerability to flooding. If this project is implemented, asset risk should be reduced to moderate because, although this project does reduce risk due to flooding and storm surge, there is still the potential for flooding if the dune is overtopped or breached.

Regulatory requirements

Federal requirements: USACE – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act

State requirements: New York State Department of Environmental Conservation – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

Town of Hempstead





Figure IV-10: Repair Dunes and Construct Dune Walkovers





Critical Facility Resiliency

Lido Beach and Point Lookout

Issue: Storm-related flooding at critical facilities

Resiliency of emergency services was a concern for the NY Rising Community Reconstruction (NYRCR) Community (Community). The only first responder in the Community is the Lido–Point Lookout Fire District, which has three facilities. The Lido Beach fire station is located on Lido Boulevard at 72 Regent Drive (Figure IV-11). Two fire stations are located in Point Lookout: the Point Lookout fire station on 102 Lido Boulevard, which is also the headquarters of the Fire District (Figure IV-12), and the Point Lookout Rescue Company on 18 Bayside Drive, which is located on Reynolds Channel (Figure IV-13).

All three facilities were damaged by flood during Superstorm Sandy. The Lido Beach Fire Station and the Point Lookout Fire Station were inundated by 4 feet of water, damaging backup electrical generators and other electrical, mechanical, and plumbing equipment. Flooding also severely damaged the Point Lookout Rescue Company, rendering the building uninhabitable. The storm also hindered operations at all three fire stations in the Community. During the first site visit to the Community in September 2013, the Lido Beach Fire Station and the Point Lookout Fire Station had been repaired and were fully functional. The Rescue Squad and its equipment and vehicles have relocated into the two remaining fire stations.



Figure IV-11: Lido–Point Lookout Fire District, Lido Beach Station
URS Corporation



Figure IV-12: Lido–Point Lookout Fire District, Point Lookout Station
URS Corporation



Figure IV-13: Point Lookout Volunteer Fire Company
URS Corporation



Cost Estimate

\$400,000



Timeline

18 to 24 months





The Lido–Point Lookout Fire District is seeking to renovate its two remaining functioning facilities to increase resiliency and operational capability, and the provision and installation of elevated emergency generators is the highest need (Figure IV-14). This project involves the electrical generators and may also include elevating electrical, mechanical and plumbing system components, and critical information technology equipment as resiliency upgrades to protect electrical systems and to enable the equipment to function throughout a severe storm. Additional retrofits to increase resiliency to damage by coastal storms include, but are not limited to: adding manually installed floodshields at the pedestrian and vehicle bay doorways of all three fire stations; sealing the lower building walls to prevent water infiltration; and retrofitting roofs, windows, and doors to provide protection from high winds.

Short description:

Provide resiliency enhancements to fire service buildings and secure critical facilities with resiliency enhancements and flood protection.

- Key project elements (may include, but are not limited to): Provide and install electrical generators above the base flood elevation (BFE);
- Relocate interior and exterior mechanical, electrical, and plumbing equipment above the BFE, and
- Consider additional elements that may include, but are not limited to:

- Design and construct storm protection for critical facilities;
- Install brackets and gaskets for flood shields at pedestrian and vehicle bay doors and metal flood shields;
- Install roof coverings rated for wind speeds of 90 miles per hour or greater;
- Install single-glazed impact-resistant windows; and
- Install hurricane-proof vehicle bay doors.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** Increasing the resiliency of critical facilities would allow first responders to provide Community-wide support throughout both Lido Beach and Point Lookout during and after a storm event to the general population and to the socially vulnerable population at the adult group homes on Seaspray Drive and Camp Anchor. This project should provide protection to the entire population of Lido Beach and Point Lookout, a total of more than 4,116 people.⁸⁶
- **Economic resiliency:** Not applicable
- **Environmental protection:** Not applicable

| Key project locations | Early action items | Related projects |
|---|---|--|
| <ul style="list-style-type: none"> • Lido Point Lookout Fire District, Lido Beach Station, 72 Regent Drive, Lido Beach • Lido Point Lookout Fire District, Point Lookout Station, 102 Lido Boulevard, Point Lookout | <ul style="list-style-type: none"> • Conduct an assessment of the existing fire stations for vulnerability to flooding | <ul style="list-style-type: none"> • Evacuation Education/Outreach Program and Lifeline Safety Plan |





Cost-benefit analysis

The economic benefits of this project include the avoided future costs from damage to fire stations (e.g., buildings and their contents) and public property that may result from future storms if this project is not implemented.

Risk-reduction analysis

The Lido–Point Lookout Fire District Stations in Lido Beach and Point Lookout, and the Point Lookout Rescue Company, are the only first responders in the Community. The project would protect these three critical facilities from wind and flood during storm events, to allow for their continued operation post-event, and would protect the personnel at the stations.

By enhancing the resiliency of the fire stations, this project should reduce the risk to the population of both communities by allowing for continued operation before and after storm events and faster recovery after storm events.

The risk assessment performed for the fire stations estimated severe risk for the Point Lookout Rescue Company, which is located along Reynolds Channel, and high risk for the two stations on Lido Boulevard, due to vulnerability to flooding. If this project is implemented, asset risk is estimated to be reduced to moderate because, although this project does reduce risk due to flooding, all three fire stations are still vulnerable to flooding from storm events that exceed the level of protection provided by the flood shields.

Regulatory requirements

Local requirements: Town of Hempstead Building Zone Ordinance

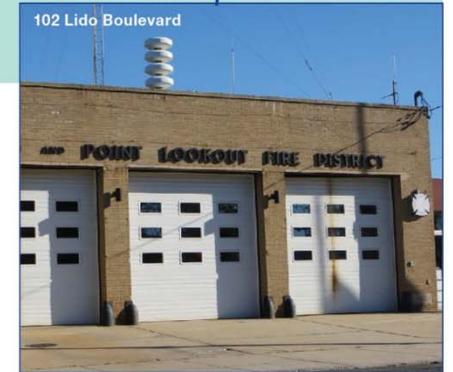
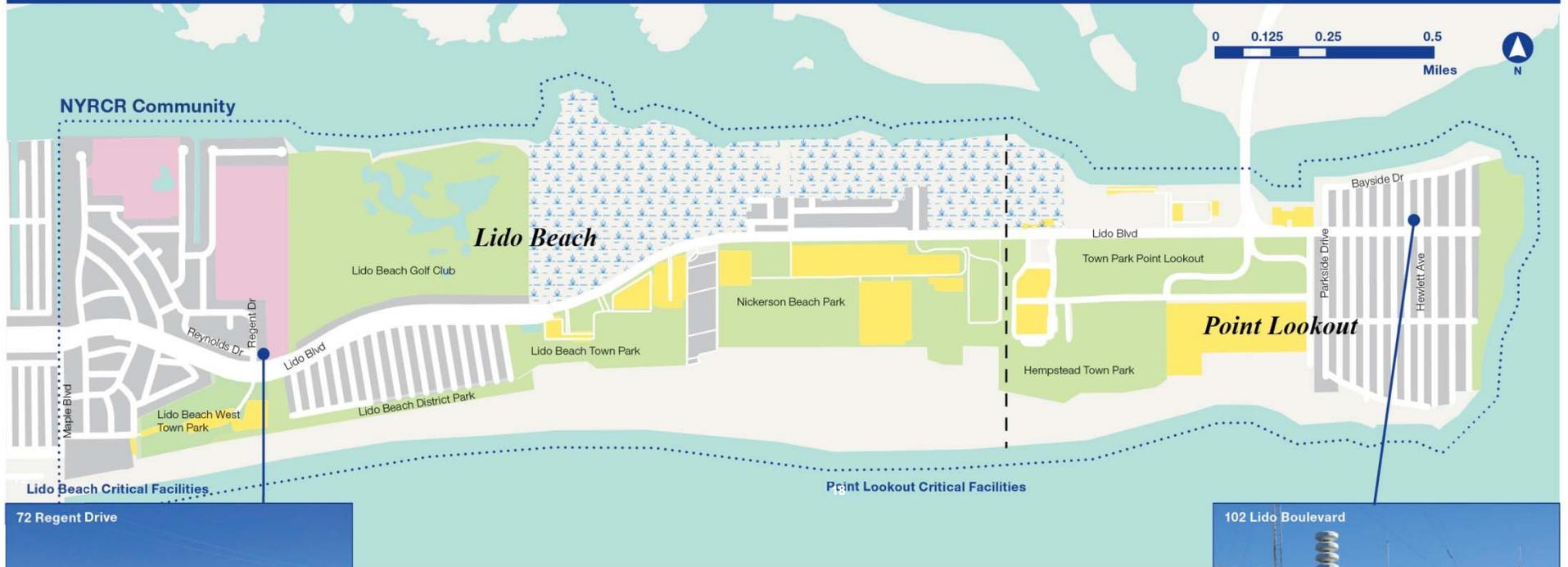
Jurisdiction

Lido–Point Lookout Fire District





Figure IV-14: Critical Facility Resiliency



- Recreational Facilities
- Parking Lots
- Residential Areas
- Lido Beach Passive Nature Preserve
- Schools
- Critical Facilities



Evacuation Education/Outreach Program and Lifeline Safety Plan



Lido Beach & Point Lookout

Issue: Life safety

Located on a barrier island, residents of Lido Beach and Point Lookout often experience isolation after storm events. Superstorm Sandy flooded Lido Boulevard and secondary roads, rendering them impassable for extended periods; cellular communication was rendered non-functional, leaving residents with no contact off-island; and utility service was disrupted and not restored until 2 weeks after the storm. Despite the issue of an evacuation order, not all residents evacuated before the onset of the storm even when ordered to do so. Lido Boulevard is the major evacuation route for Lido Beach, Point Lookout, and portions of the City of Long Beach (Figure IV-15).

Reverse-911 systems exist at the town and county levels and for the Long Beach School District to provide information to residents. However, the systems do not provide *all* residents of Lido Beach and Point Lookout with information on the conditions on the barrier island. A reverse-911 system is needed on-island in the Lido–Point Lookout Fire District to provide information for all residents of Lido Beach and Point Lookout, not just those with children attending Long Beach District schools. The reverse-911 system could be used to communicate actual conditions on the ground to residents of Lido Beach and Point Lookout, who are remotely located from County facilities.

This project, the Evacuation Education/Outreach Program and Lifeline Safety Plan, involves comprehensive emergency planning measures to increase the effectiveness of evacuation by improving conditions along evacuation routes, creating a Lifeline Safety Plan to establish procedures for coordinating resources related to evacuation, educating residents on the importance of evacuating when told to do so and how to evacuate safely, promoting the New York State Citizen Preparedness Corps Program, and establishing a reverse-911 system through the Lido–Point Lookout Fire District for the residents of Lido Beach and Point Lookout who are sometimes isolated from the larger portion of Long Island and Nassau County during storm events.

Short description:

Develop a Lifeline Safety Plan and establish a program for providing regular education and outreach about emergency evacuation.

Key project elements (may include, but are not limited to):

- Develop a Lifeline Safety Plan that includes:
 - Identification of lifeline roads;
 - Identification of post-event priority debris removal on lifeline roads;



Cost Estimate

\$500,000



Timeline

2 to 5 years





- Identification of post-event priority power restoration on lifeline roads;
 - Development of a Memorandum of Agreement with cellular phone service providers to provide post-event operational cell-phone tower coverage;
 - Assessment of need for, locations of, and installation of solar-powered street lights at key intersections/roadways;
 - Creation of uniform lifeline signage;
 - Identification of roadways that need to be raised to prevent blockages from flooding obstructions during evacuation; and
 - Identification and development of connections to public transportation along lifeline roads.
- Prioritize a phased implementation plan for the Lifeline Safety Plan;
 - Develop and implement an education and outreach program to educate residents and visitors on the importance of evacuation and how to evacuate safely, and provide information on flood mitigation and green infrastructure; and
 - Conduct outreach to promote the New York State Citizen Preparedness Corps Program.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** This project should improve the access of all residents to emergency/evacuation information, provide public education and outreach on how to safely evacuate and the evacuation routes, and through the implementation of a reverse-911 system, convey information before and after a storm event. A reverse-911 system could provide an enhanced ability to communicate emergency information to socially vulnerable populations to allow residents extra time for self-evacuation or assisted evacuation. This project also promotes the New York State Citizen Preparedness Corps Program, through which training is provided to residents to give them the tools and resources they need to prepare, respond, and recover from any type of disaster.⁸⁷
- **Economic resiliency:** Not applicable
- **Environmental protection:** Not applicable

| | | |
|---|---|--|
| <p>Key project locations:</p> <ul style="list-style-type: none"> • Community-wide | <p>Early action items:</p> <ul style="list-style-type: none"> • Identify local lifeline roads leading to critical facilities and regional evacuation routes • Establish a reverse-911 system through the Lido–Point Lookout Fire District and coordinate with Nassau County and the City of Long Beach • Identify the existing Memorandum of Agreement with other emergency responders on Long Beach Island and Nassau County | <p>Related projects:</p> <ul style="list-style-type: none"> • Critical Facility Resiliency |
|---|---|--|





Cost-benefit analysis

- This project could help reduce pre-event emergency costs by improving the efficiency of the evacuation process.
- This project may also reduce recovery costs post-event if outreach successfully convinces residents to evacuate prior to a storm and by promoting training so that residents are better prepared and more self-sufficient and less reliant on Town resources post-event.

Risk-reduction analysis

This project would reduce the risk to the communities of Lido Beach and Point Lookout before and after a storm event by providing accurate emergency information, clear evacuation routes, clear connections to evacuation routes, emergency lighting at key intersections, and connections to transportation along lifeline roads. This project would also reduce risk to the neighboring community of Long Beach, whose citizens also use Lido Boulevard as an evacuation route.

By improving access and identification of lifeline roads / evacuation routes and implementing a reverse-911 system for Lido Beach and Point Lookout, this project would reduce risk to all populations including visitors as well as residents and socially vulnerable populations.

The education and outreach aspect of this project, particularly the promotion of the New York State Citizen Preparedness Corps Program, could help residents to achieve a greater degree of personal resiliency to disasters and also reinforces the need for evacuation as the primary means of storm protection.

Regulatory requirements

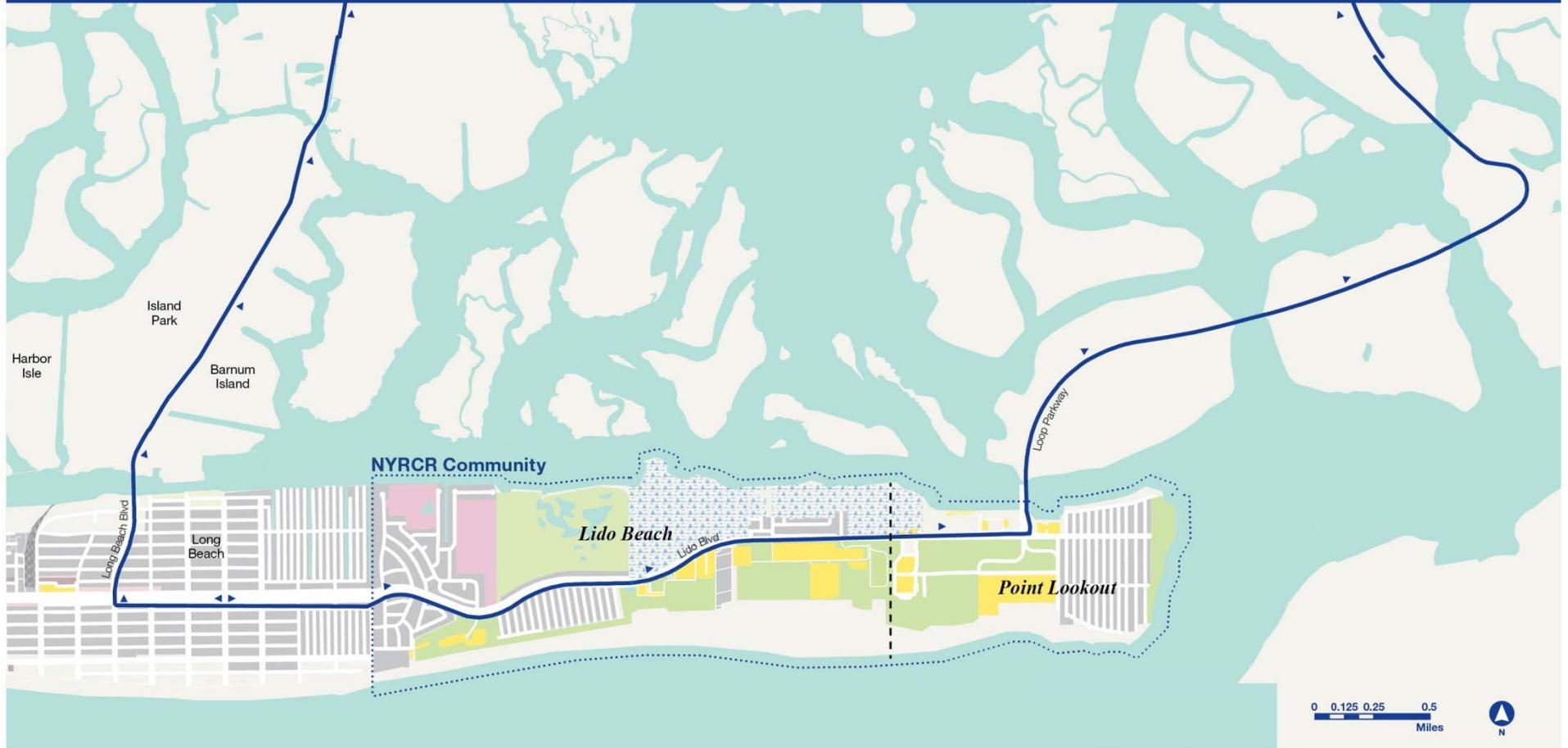
Not applicable

Jurisdiction

Nassau County, Town of Hempstead



Figure IV-15: Nassau County OEM Evacuation Routes



- Recreational Facilities
- Residential Areas
- Schools
- Parking Lots
- Lido Beach Passive Nature Preserve
- Nassau County OEM Evacuation Routes

B. Featured Projects

Featured Projects are innovative projects in which an initial study or discrete first phase of a project is proposed for CDBG-DR or other identified funding, or regulatory reforms or other programs that do not involve capital expenditures. The Committee developed and selected three Featured Projects based on input from residents during multiple Public Engagement Events and comments received through the NYRCR Program website. The order of the projects is random and no preference should be inferred on the part of the Community. The locations of the featured projects are depicted in Figure IV-16.

The Featured Projects are as follows:

- Alternative Stormwater Opportunities;
- Shoreline and Marsh Restoration and Open Space Protection; and
- Encourage Stormwater Capture During Sidewalk Replacement.

The project criteria symbols are:



Housing



Community
Planning
& Capacity
Building



Economic



Natural &
Cultural
Resources



Health &
Social
Services



Infrastructure

Figure IV-16: Featured Projects



- Recreational Facilities
- Parking Lots
- Residential Areas
- Lido Beach Passive Nature Preserve
- Schools
- Stormwater Capture and Retention (encourage stormwater capture during sidewalk replacement community-wide)
- Shoreline and Marsh Restoration and Open Space Protection



Alternative Stormwater Opportunities

Lido Beach & Point Lookout

Issue: Localized flooding due to stormwater system capacity issues

In addition to projects whose purpose is to repair and improve the functionality of the stormwater system in Lido Beach and Point Lookout, the NY Rising Community Reconstruction (NYRCR) Planning Committee (Committee) also considered stormwater management best practices to reduce the volume of water discharged into the stormwater system to help prevent overloading of the system and reduce on-street flooding. The best practice selected to help alleviate the strain on the stormwater system is to capture stormwater runoff from the impermeable surfaces in the NYRCR Community (Community) to reduce the stress on the stormwater system by storing stormwater on-site and allowing it to slowly discharge into the ground, rather than discharge into the stormwater system.

The largest amount of impermeable surfaces in the Community is the paved area of parking lots in the Town Parks. Impermeable surfaces are hard, paved surfaces that block rainfall from infiltrating into the ground, causing the water to run off the pavement, which can add to the volume of stormwater, overwhelm stormwater systems, and introduce pollutants (e.g., gasoline, oil, anti-freeze) into the stormwater system. The stormwater system in Lido Beach and Point Lookout was overwhelmed and damaged by floodwaters from Superstorm Sandy. This project, Alternative Stormwater Opportunities, seeks to reduce the volume of

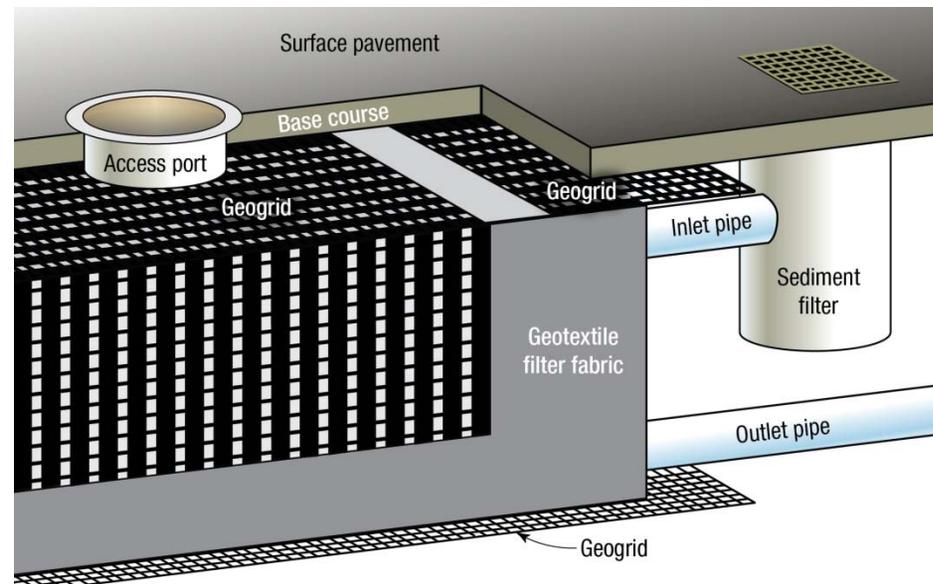


Figure IV-17: Example of stormwater management system
URS Corporation



Cost Estimate

\$10,000,000



Timeline

2 to 5 years





water that flows into the stormwater system during storm events by conducting a hydrologic analysis of the stormwater system in the vicinity of the Town Parks and Nickerson Beach and determining the best practice for stormwater management of runoff from the parking lots (Figure IV-17). After determining a best practice, the stormwater management system would be installed at one or more of the following locations listed under Key Project Locations and depicted on the Project Area Map (Figure IV-18).

Project work could also involve installing manholes, catch basins, pump stations, storm sewers, and porous pavement.

Short description:

Conduct an analysis of the stormwater management system in the vicinity of the Town Parks and Nickerson Beach. Design and construct stormwater management systems at key project locations in Town Parks based on recommendations of stormwater management system.

Key project elements (may include, but are not limited to):

- Analyze the stormwater system at project location(s) selected for improvement to identify hydrologic capacity;
- Inspect the existing conditions of the stormwater system in each project area; and

- Design and construct stormwater management systems.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** The adult group homes are adjacent to the parking lot of the Town Park at Malibu. The project could decrease the potential for ponding or flooding at the adult group homes by managing stormwater runoff rather than discharging into and overloading the stormwater system.
- **Economic resiliency:** The project could allow for a faster recovery time from storm events, which would allow commercial recreational areas to resume operations sooner than if the project were not implemented. Faster commercial recovery encourages economic stability and could result in the retention of roughly 350 jobs.⁸⁸
- **Environmental protection:** The stormwater management systems constructed would likely include a treatment system to filter contaminants and sediment (e.g., oil, gasoline) from runoff, discharging cleaner water into the ground.

| Key project locations (in no particular order) | Early action items | Related projects |
|--|---|---|
| <ul style="list-style-type: none"> • Location 1A: Lido Beach Town Park • Location 1B: Town Park at Sands • Location 1C: Nickerson Beach • Location 1D: Town Park at Malibu • Location 1E: Point Lookout Town Park | <ul style="list-style-type: none"> • Determine the ownership and maintenance agreements at each location • Inspect the existing conditions of the stormwater system in each project area • Conduct a hydrologic analysis of the stormwater system • Identify regulatory actions | <ul style="list-style-type: none"> • Tidal Backflow Prevention and Stormwater Treatment • Drainage Improvements • Encourage Stormwater Capture During Sidewalk Replacement |





Cost-benefit analysis

- By reducing the burden on the stormwater system, this project would reduce the costs to the local government for cleaning out catch basins, repairing the stormwater system, and cleaning up after localized flooding and storm events like Superstorm Sandy.
- Stormwater system improvements generally have a long useful life with proper maintenance. Benefits should extend to the end of the useful life of the system components.

Risk-reduction analysis

Implementing this project could reduce the risk that the existing stormwater system will be overwhelmed during storm events and could reduce the risk of flooding at the adult group homes and the Lido Townhouse neighborhood because this project would manage runoff from the large, impervious areas of the parking lots at the Town Parks and Nickerson Beach.

Assets located in the project area were estimated to have high to moderate risk due to vulnerability to flooding. If this project is implemented, asset risk is estimated to be reduced to moderate for all parks because, although this project should reduce risk to flooding due to stormwater system overload, there is still the potential for flooding to occur to facilities at the parks from the ocean if the dune is overtopped or breached.

Regulatory requirements

Federal requirements: U.S. Army Corps of Engineers – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act; Coastal Zone Management Act

State requirements: New York State Department of Environmental Conservation – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

Nassau County (Nickerson Beach), Town of Hempstead





- Recreational Facilities
- Residential Areas
- Project Locations – 1A: Lido Beach at Town Park
- Parking Lots
- Lido Beach Passive Nature Preserve
- 1B: Town Park at Sands
- 1C: Nickerson Beach
- 1D: Town Park at Malibu
- 1E: Point Lookout Town Park

Shoreline and Marsh Restoration and Open Space Protection



Lido Beach

Issue: Shoreline erosion

The NY Rising Community Reconstruction Community highly values its natural resources and views them as important assets that contribute to a high quality of life. The Lido Beach Passive Nature Preserve (the Preserve) is the last remaining salt marsh on the Barrier Island. The salt marsh is an essential element of the South Shore's ecosystem. The marsh is also part of the Atlantic Flyway and is inhabited by several species of waterfowl at different times of the year, depending on migration patterns. Maintaining the current acreage of the Preserve is important because the marsh provides open space for floodwater storage and conveyance, as well as a significant habitat for shorebirds. The marsh shoreline is vulnerable to erosion, particularly during storm events, and suffered shoreline loss due to Superstorm Sandy.

This project seeks to create a living shoreline to strengthen and stabilize the marsh shoreline from the West Marina in Point Lookout to the Lido Beach Golf Course in Lido Beach (see Figure IV-19).

Methods to strengthen and stabilize the marsh may include, but are not limited to:

- Installation of hard, hybrid structures (e.g., fiber logs);
- Installation of oyster bags in front of the fiber logs to protect against wave attenuation;
- Seeding fiber logs with shellfish cultch to prevent the erosion;

- Planting marsh grasses on and behind the logs to encourage soil retention and accumulation behind the logs, and
- Seeding the oyster bags with oyster cultch to provide filtration and improve water quality.

Short description:

Provide stabilization of the shoreline of the Lido Beach Passive Nature Preserve and Tidal Salt Marsh through the creation of a natural habitat.

Key project elements:

- Conduct a marsh revitalization study to identify and assess the best method and materials for shoreline stabilization; and
- Design and construct recommended environmental enhancements in early spring to maximize growing season of the cultch and plantings.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** Not applicable.
- **Economic resiliency:** Not applicable.
- **Environmental protection:** This project would protect the shoreline of the Preserve from erosion caused by events like Superstorm Sandy. If the oyster bags and oyster cultch are used to provide protection from wave attenuation, a secondary effect of this project would be to filter



Cost Estimate

\$3,200,000



Timeline

18 to 24 months





Shoreline and Marsh Restoration and Open Space Protection

contaminants from the surrounding waters. Existing open space could be expanded by this project, depending on how successfully the marsh shoreline fills in behind the fiber logs if that type of protection is utilized in this project. This project would protect the last salt marsh on the Barrier Island.

Cost-benefit analysis

Hardening the marsh edge using natural methods would be a self-sustaining method of erosion control. Maintenance would only be needed if the plantings do not take and need replacement. Therefore, this project should reduce local government expenditures for ongoing marsh-edge maintenance activities such as reseeding shellfish cultch and replanting bare spots with new plantings.

Risk-reduction analysis

This project would reduce the risk of erosion to the Lido Beach Passive Nature Preserve, the last salt marsh on the Barrier Island, a significant

shorebird habitat and important part of the South Shore ecosystem of Long Island.

The open space of the marsh provides conveyance and storage of floodwater and can reduce impacts due to flooding in populated areas.

Regulatory requirements

Federal requirements: U.S. Army Corps of Engineers – Section 404 of Clean Water Act; Section 10 of Rivers and Harbors Act

State requirements: New York State Department of Environmental Conservation – Excavation and Fill in Navigable Waters; 401 Water Quality Certification; Tidal Wetlands; Coastal Erosion Management; New York State Department of State – Coastal Consistency Concurrence

Jurisdiction

Town of Hempstead

Key project locations

- Lido Beach Passive Nature Preserve

Early action items

- Conduct a marsh revitalization study to assess environmental enhancements

Related projects

- None





Figure IV-19: Shoreline and Marsh Restoration and Open Space Protection



- Recreational Facilities
- Parking Lots
- Residential Areas
- Lido Beach Passive Nature Preserve
- Schools
- Shoreline and Marsh Restoration and Open Space Protection



Encourage Stormwater Capture during Sidewalk Replacement



Issue: Localized flooding due to limited stormwater system capacity

In addition to projects whose purpose is to repair and improve the functionality of the stormwater system in Lido Beach and Point Lookout, the NY Rising Community Reconstruction (NYRCR) Planning Committee also considered stormwater management best practices to reduce the volume of water discharged into the stormwater system to help prevent overloading of the system and reduce on-street flooding. The best practice selected to help alleviate the strain on the stormwater system is to capture stormwater runoff from the impermeable surfaces in the NYRCR Community (Community) to reduce the stress on the stormwater system by storing stormwater on-site and allowing it to slowly discharge into the ground, rather than discharging it into the stormwater system. Similar to paved road and parking lots surfaces, sidewalks are another example of impermeable surfaces located throughout in the Community. Impermeable surfaces are hard, paved surfaces that block rainfall from infiltrating into the ground and causing the water to run off the pavement, which can add to the volume of stormwater, overwhelm stormwater systems, and introduce pollutants (e.g., gasoline, oil, anti-freeze) into the stormwater system. The stormwater system in Lido Beach and Point Lookout was overwhelmed and damaged by floodwaters from Superstorm Sandy.

This project seeks to reduce the volume of water that flows into the stormwater system by capturing and retaining runoff from sidewalks throughout Lido Beach and Point Lookout. Prior to beginning sidewalk



Figure IV-20: Example of stormwater management system best practice underneath sidewalk

New York Rising Best Practices Workshop, 12/5/2013



Cost Estimate

\$300,000

Estimated cost to replace one section of sidewalk and install a stormwater management system for an area of 1,320 feet in length by 4 feet in width.



Timeline

1 year, ongoing





replacement, a study should be performed to identify the most effective best practice for stormwater management. As sections of sidewalk are replaced during routine life-cycle maintenance, this project would encourage the replacement of existing impervious surfaces with porous paving and the installation of a stormwater management system beneath the sidewalks (Figure IV-20). The porous paving would allow stormwater to percolate down to a collecting area, where it can be filtered and slowly discharge into the ground, rather than run off into the existing stormwater system.

Short description:

Install a stormwater management system under sidewalks when they are replaced to allow stormwater runoff to be captured and stored until it infiltrates into the ground.

Key project elements (may include, but are not limited to):

- Conduct a study to determine most effective stormwater management system;
- Install a stormwater management system; and
- Use porous pavement when replacing sidewalks.

Benefits/co-benefits derived from project

- **Health, social, and public safety services:** Not applicable
- **Economic resiliency:** Not applicable
- **Environmental protection:** This project would capture and collect stormwater, filtering out contaminants and allowing rainwater to

slowly infiltrate into the ground. The stormwater management system would filter contaminants (e.g., oil, gasoline) and sediment from rainwater.

Cost-benefit analysis

- Hydrologic study would be used to determine the most cost-effective stormwater management system utilized during sidewalk replacement.
- The project would leverage sidewalk replacements to decrease the burden to the stormwater system and thereby decrease the costs of maintaining and repairing the system.
- Stormwater management systems generally have a long useful life with proper maintenance.

Risk-reduction analysis

This project would reduce impacts to the stormwater system by capturing rainwater and slowly discharging the water into the system.

Regulatory requirements

Local requirements: Town of Hempstead Building Zone Ordinance

Jurisdiction

Town of Hempstead

Key project locations

- Community-wide

Early action items

- Conduct a study to determine most effective stormwater management system

Related projects

- Tidal Backflow Prevention and Stormwater Treatment
- Drainage Improvements
- Alternative Stormwater Options





Section V: Additional materials

Section V:

Additional materials

The additional materials in Section V consist of Additional Resiliency Recommendations (Section A), a list of all of the projects that are included in the Lido Beach and Point Lookout NY Rising Community Reconstruction (NYRCR) Plan (NYRCR Plan) (Section B), a description of the public engagement process that was part of the development of the NYRCR Plan (Section C), information about the NYRCR Community (Community) assets that were identified by the NYRCR Planning Committee (Committee) (Section D), endnotes (Section E), and glossary (Section F).

A. Additional resiliency recommendations

An Additional Resiliency Recommendation is a resiliency project or action that is not categorized as a Proposed or Featured Project but a project the NYRCR Planning Committee (Committee) would like to highlight. These

projects are important to the Committee and many of them have contributed to the resiliency of the barrier island.

The Additional Resiliency Recommendations are identified in Table V-1 and are categorized by strategy, project name, project description, responsible party, and association with regional projects. The responsible party or parties have not been identified.

Including these projects in the NYRCR Plan will help the Committee implement these projects in the future.

Table V-1: Additional Resiliency Recommendations

| Strategy | Project Name | Short Description | Estimated Cost | Regional Project (Y/N) |
|--|---|---|-----------------------------|------------------------|
| Increase protection from coastal storms | Residential Bulkhead Replacement Program | Establish a program for bulkhead repair/replacement for residents | \$125,000 | Yes |
| Increase protection from coastal storms | Residential Structure Height Restriction Zoning Amendment | Amend zoning ordinance restricting height of residential structures to allow for elevation of existing residences to at least 2 feet above the base flood elevation (BFE) | \$125,000 | No |
| Increase resiliency of power grid | Residential Alternative Energy Installation Encouragement Program | Establish a program to encourage residents to install alternative energy to provide power to their residences; includes education and outreach component | \$125,000 | Yes |
| Increase resiliency of power grid | Expand Alternative Power Generation and Storage at Town of Hempstead Department of Conservation & Waterways / Energy Park | Increase sources for alternative energy generation, add energy storage, install smart meters, and upgrade electrical grid components | \$2,000,000 to \$5,000,000 | Yes |
| Increase resiliency of power grid | Microgrid Pilot Project in Point Lookout | Install microgrid in Point Lookout to increase Community resiliency | \$5,000,000 to \$10,000,000 | Yes |
| Increase protection from coastal storms | Flood Protection at Lido Beach Golf Club | Close gap in bulkhead system and tie to existing bulkhead system at Harbor Drive | \$2,000,000 | Yes |
| Increase protection from coastal storms | Gateway Creation and Community Enhancement | Create welcome gateways in two location in Lido Beach and one location in Point Lookout | \$100,000 | No |
| Increase protection from coastal storms | Debris Removal from Reynolds Channel | Remove watercraft in Channel submerged by Superstorm Sandy | \$2,000,000 to \$5,000,000 | Yes |
| Increase protection from coastal storms | Utilities Elevation at Adult Group Homes, Seaspray Drive, Lido Beach | Elevate heating, ventilation, and air conditioning (HVAC) air handling units, electrical meters, and other equipment located at ground level to 1 foot above the BFE | \$2,000,000 | No |
| Increase resiliency of critical facilities | Addition and Renovation of Lido–Point Lookout Fire District Stations at 72 Regent Dr., Lido Beach and 102 Lido Blvd., Point Lookout | Renovate and expand two fire stations to install flood protection retrofits and improvements to electrical, mechanical, and plumbing systems; potential wind retrofits; and to accommodate relocated equipment and vehicles from the Rescue Squad | \$5,000,000 to \$10,000,000 | No |
| Improve stormwater drainage | Convert Ocean Boulevard to Sidewalk, Allevard Street to Harrogate Street, Lido Beach | Reconstruct Ocean Boulevard from Allevard Street to Harrogate Street and convert to pedestrian route; regrade and construct sidewalk to shed runoff into the stormwater system | Less than \$10,000,000 | No |
| Improve stormwater drainage | Regrade Lateral Streets | Regrade secondary and tertiary roadways as part of overall stormwater reconstruction program throughout the Community | Less than \$10,000,000 | No |
| Promote evacuation | Support NYS DOT Repair of Loop Parkway Bridge | Provide support on as-needed basis for repair of scour at Loop Parkway bridge over Reynolds Channel | Less than \$10,000,000 | Yes |

B. Master table of projects

The Proposed Projects, Featured Projects, and Additional Resiliency Recommendations identified during the development of the NYRCR Plan are listed in Table V-2. The projects are categorized according to strategy, project name, project description, reconstruction strategies, estimated cost, and association to regional projects.



Table V-2: Proposed Projects, Featured Projects, and Additional Resiliency Recommendations

| Reconstruction and Resiliency Strategy | Project Name | Short Description | Project Category | Estimated Cost | Regional Project (Y/N) |
|--|--|---|------------------|----------------|------------------------|
| Increase protection from coastal storms | Revetment Repair/Reconstruction | Construct sections of rock revetment at northeast end of Point Lookout for protection of homes, businesses, and recreational facilities | Proposed Project | \$3,800,000 | Yes |
| Improve stormwater drainage | Tidal Backflow Prevention and Stormwater Treatment | Prevent tidal water from infiltrating low-lying areas at stormwater outfalls that are partially or fully submerged during high tides and storms, causing flooding. Reduce contaminants discharged from outfalls. | Proposed Project | \$800,000 | Yes |
| Improve stormwater drainage | Drainage Improvements (Phase 3A) | Comprehensive stormwater study to identify improvement areas to reduce flooding along evacuation routes, primary roadways, low-lying areas, and economic corridors Section 3A (along Lido Boulevard from Maple Boulevard to Harrogate Street, Lido Beach) will be the first phase of construction. | Proposed Project | \$5,900,000 | Yes |
| Increase protection from coastal storms | Repair Dunes & Construct Dune Walkovers | Fill breaches and repair dunes to prevent tidal surge from flooding streets, homes, and businesses; construct walkovers to provide beach access | Proposed Project | \$4,600,000 | Yes |
| Increase resiliency of critical facilities | Critical Facility Resiliency | Provide resiliency enhancement to emergency service buildings and secure critical facilities with resiliency enhancements and flood protection | Proposed Project | \$400,000 | No |
| Meet communication needs pre-event | Evacuation Education and Outreach Program and Lifeline Safety Plan | Develop a Lifeline Safety Plan and establish a program for providing regular education and outreach about emergency evacuation; includes development of a reverse-911 system for the Lido–Point Lookout Fire District | Proposed Project | \$500,000 | Yes |
| Promote evacuation | | | | | |
| Improve stormwater drainage | Alternative Stormwater Opportunities | Conduct an analysis of the stormwater management system in the vicinity of the Town Parks and Nickerson Beach. Design and construct stormwater management systems at key project locations in Town Parks based on recommendations of stormwater management system study. | Featured Project | \$10,000,000 | Yes |
| Increase resiliency of salt marsh to coastal erosion | Shoreline and Marsh Restoration and Open Space Protection | Provide stabilization of the shoreline of the Lido Beach Passive Nature Preserve and Tidal Salt Marsh with creation of natural habitat | Featured Project | \$3,200,000 | No |
| Improve stormwater drainage | Encourage Stormwater Capture during Sidewalk Replacement | Install stormwater management system under sidewalks when sidewalks are replaced | Featured Project | \$300,000 | Yes |



Table V-2 (Continued)

| Reconstruction and Resiliency Strategy | Project Name | Short Description | Project Category | Estimated Cost | Regional Project (Y/N) |
|--|---|---|--------------------------------------|-----------------------------|------------------------|
| Increase protection from coastal storms | Residential Bulkhead Replacement Program | Establish a program for bulkhead repair/replacement for residents | Additional Resiliency Recommendation | \$125,000 | Yes |
| Increase protection from coastal storms | Residential Structure Height Restriction Zoning Amendment | Amend zoning ordinance restricting height of residential structures to allow for elevation of existing residences to at least 2 feet above the base flood elevation (BFE) | Additional Resiliency Recommendation | \$125,000 | No |
| Increase resiliency of power grid | Residential Alternative Energy Installation Encouragement Program | Establish a program to encourage residents to install alternative energy to provide power to their residences; includes education and outreach component | Additional Resiliency Recommendation | \$125,000K | Yes |
| Increase resiliency of power grid | Expand Alternative Power Generation and Storage at Town of Hempstead Department of Conservation & Waterways / Energy Park | Increase sources for alternative energy generation, add energy storage, install smart meters, and upgrade electrical grid components | Additional Resiliency Recommendation | \$2,000,000 to \$5,000,000 | Yes |
| Increase resiliency of power grid | Microgrid Pilot Project in Point Lookout | Install microgrid in Point Lookout to increase Community resiliency | Additional Resiliency Recommendation | \$5,000,000 to \$10,000,000 | Yes |
| Increase protection from coastal storms | Flood Protection at Lido Beach Golf Club | Close gap in bulkhead system and tie to existing bulkhead system at Harbor Drive | Additional Resiliency Recommendation | \$2,000,000 | Yes |
| Increase protection from coastal storms | Gateway Creation and Community Enhancement | Create welcome gateways in two location in Lido Beach and one location in Point Lookout | Additional Resiliency Recommendation | \$100,000 | No |
| Increase protection from coastal storms | Debris Removal from Reynolds Channel | Remove watercraft in Channel submerged by Superstorm Sandy | Additional Resiliency Recommendation | \$2,000,000 to \$5,000,000 | Yes |
| Increase protection from coastal storms | Utilities Elevation at Adult Group Homes, Seaspray Drive, Lido Beach | Elevate heating, ventilation, and air conditioning (HVAC) air handling units, electrical meters, and other equipment located at ground level to 1 foot above the BFE | Additional Resiliency Recommendation | \$2,000,000 | No |
| Increase resiliency of critical facilities | Addition and Renovation of Lido–Point Lookout Fire District Stations at 72 Regent Dr., Lido Beach and 102 Lido Blvd., Point Lookout | Renovate and expand two fire stations to install flood protection retrofits and improvements to electrical, mechanical, and plumbing systems; potential wind retrofits; and to accommodate relocated equipment and vehicles from the Rescue Squad | Additional Resiliency Recommendation | Less than \$10,000,000 | No |



Table V-2 (Continued)

| Reconstruction and Resiliency Strategy | Project Name | Short Description | Project Category | Estimated Cost | Regional Project (Y/N) |
|--|--|--|--------------------------------------|------------------------|------------------------|
| Improve stormwater drainage | Convert Ocean Boulevard to Sidewalk, Allevard Street to Harrogate Street, Lido Beach | Reconstruct Ocean Boulevard from Allevard Street to Harrogate Street and convert to pedestrian route; regrade and construct sidewalk to shed runoff into the stormwater system | Additional Resiliency Recommendation | Less than \$10,000,000 | No |
| Improve stormwater drainage | Regrade Lateral Streets | Regrade secondary and tertiary roadways as part of overall stormwater reconstruction program throughout the Community | Additional Resiliency Recommendation | Less than \$10,000,000 | No |
| Promote evacuation | Support NYS DOT Repair of Loop Parkway Bridge | Provide support on as-needed basis for repair of scour at Loop Parkway bridge over Reynolds Channel | Additional Resiliency Recommendation | Less than \$10,000,000 | Yes |



C. Public engagement process

To ensure the success of the NYRCR Plan, a public engagement strategy was developed and implemented. The communities of Lido Beach and Point Lookout were provided extensive opportunities for collaboration in three Public Engagement Events between October 2013 and February 2014.

NYRCR Planning Committee process

The Committee held 11 meetings between September 18, 2013, and March 27, 2014. The Committee considered local issues, opportunities and communication strategies, and offered the public opportunities to provide comments at the conclusion of each Planning Committee Meeting.

Meetings open with introductions and a review of an agenda that has been vetted by the State and the Committee prior to the meeting. All meetings are open to the public (see Figure V-1).



**Figure V-1: Committee Meeting
on September 24, 2013**
URS Corporation

At the first Planning Committee Meeting, a presentation was given that reviewed the NYRCR Plan process, key elements and goals, along with the methods for developing a Community vision and conducting outreach. Meetings were used as a platform to communicate information and

Community priorities for assets, strategies, and projects. In general, each meeting had a specific goal related to the NYRCR planning process.

Committee meeting goals included:

- Asset identification;
- Existing conditions of Community assets;
- Superstorm Sandy damage to Community assets;
- Development of a Community Vision Statement;
- Development of resiliency strategies;
- Ongoing or proposed projects in the Town of Hempstead;
- Project development;
- Project selection and prioritization; and
- Format and information to be presented at each Public Engagement Event.

The Committee participated in interactive exercises to develop the Community Vision Statement and identified Community assets and vulnerabilities through a mapping exercise. Information presented to the Committee for review consisted of presentations, the Conceptual Plan, project spreadsheets, and materials produced for the Public Engagement Events.

Public Engagement Events

The Public Engagement Events were designed to solicit feedback from the Community on the NYRCR planning process and deliverables, and conducting outreach through a variety of media and methods.

Meeting notices for Public Engagement Events were posted as follows:

- Website: <http://stormrecovery.ny.gov/nyrcr/community/lido-beach-and-point-lookout>
- *Newsday* (local community newspaper)
- Twitter: @NYStormRecovery
- Facebook: NYStormRecovery

- Emails sent to participants who attended public meetings and residents who provided their email address through the website
- Lawn signs posted in key locations throughout Lido Beach and Point Lookout

Information, door hangers, and flyers were distributed in Lido Beach and Point Lookout and provided in hard copy and electronically to Committee Members, for additional distribution among their residential neighborhoods. Flyers and electronic notices were distributed to the businesses and religious organizations in the both communities.

First Public Engagement Event

The first Public Engagement Event was held on October 15, 2013, at the Town of Hempstead Parks and Recreation Building in Lido Beach and had approximately 44 attendees (Figure V-2). The Public Engagement Event was designed to provide an overview of the NYRCR Program, while engaging Community members in a small group forum discussion about a Community vision, Community assets, vulnerabilities, and strategies for becoming more resilient. NYRCR Planning Committee Co-Chairs opened the meeting with welcoming remarks and an overview of the process to date. The State gave a short presentation on the NYRCR Program.

During an interactive workshop, the Consultant Team facilitated small group discussions about planning for resiliency with the attendees. Two Vision Statements were developed by the public during the meeting.



Figure V-2: Public Engagement Meeting on October 15, 2013
URS Corporation

Second Public Engagement Event

The second Public Engagement Event was held on November 4, 2013, at the Town of Hempstead Parks and Recreation Building in Lido Beach and had approximately 45 attendees. A small group discussion format was used to conduct three interactive sessions to gather information on the effects of Superstorm Sandy, to rank projects for achieving resiliency and for residents to select which innovative strategies to pursue. The first activity was a questionnaire for residents to respond to questions about Superstorm Sandy-related damages in the communities. The second activity involved ranking proposed priority projects under strategies previously identified by the Committee. Strategies and projects were grouped by the six Recovery Support Functions. The third activity was a questionnaire used by residents to rank innovative strategies developed by the committee. During the activities, residents split into small groups that were teamed with a facilitator to respond to questions and guide residents through the questionnaires. The public identified locations of flooding events, issues with post-storm communication due to damaged cellular communications equipment and spotty coverage, and information about disaster recovery immediately after

Superstorm Sandy. The public also recommended additional strategies for resolving the recovery issues they identified during the meeting.

Third Public Engagement Event

The third Public Engagement Event was held on February 20, 2014 at the Bishop Molloy Recreational Center in Point Lookout and had approximately 45 attendees. An Open House Format provided nine project stations that included project boards and were staffed by the Consultant Team, including Subject Matter Experts in civil engineering and coastal protection, and Committee Members to answer questions from the participants.

The meeting opened with brief introductions and an overview of prior Public Engagement Events and results, including the six priority projects and three Featured Projects that would be evaluated during the Public Engagement Event. The public was invited to visit each project board station and use the "Passport" to provide public comments and rank projects.

The project boards contained pictures, criteria rankings, maps, and prompts for the public to identify how much they supported a particular priority or featured project. Participants were handed a Project Evaluation Guide that was their Passport to the projects. The Passport duplicated the project boards and provided a questionnaire and comment space to solicit feedback.

Twenty-nine of the Passports were collected at the end of the night and the information was tallied will be presented to the committee at the 10th Planning Committee Meeting on March 11, 2014.

D. Community asset inventory

The Community asset inventory provided in Table V-5 consists of assets that have been affected by coastal hazards and that may be at risk in future hazard events. Assets whose loss or impairment would compromise essential cultural, social, economic, or environmental functions of the Community are also included. The assets were identified by the Committee during Planning Committee Meetings and from input from the public received at Public Engagement Events.

Assets are categorized according to asset name, risk area, asset class, if the asset is a critical facility, the Community value, landscape attributes, and risk assessment scores. To interpret risk scores, see "Interpreting risk score" following Table V-5. For a description of risk assessment methods, see Section II.A.ii, Assessment of risk to assets and systems.

Table V-3: Community Asset Inventory

| Asset Information | | | | | Landscape Attributes | | | | | | | Risk Assessment | | | |
|--|-----------|--------------------------------|-------------------|-----------------|--|--|--|---|--|---|--|-----------------|----------------|---------------------|------------|
| Asset | Risk Area | Asset Class | Critical Facility | Community Value | Erosion Rate ≥1 foot per Year or Unknown | Waterline Frequently at Shore Defense or Upland Vegetation | Shore Defenses Absent, Not Constructed to Anticipated Conditions, or Deteriorating | Protective Vegetation Between Asset and Flood Source Absent | Dunes Absent, Below BFE, Eroding, Little Vegetation; Bluff Slope Unstable, Little Vegetation | Asset on Coastal Barrier Island or Filled Wetland | Landscape Attribute Score ("Yes" = +0.5) | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
| Drinking Water Well #3 | High | Infrastructure Systems | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 4 | 36 |
| CNG fueling facility for school buses | High | Infrastructure Systems | Yes | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Lido Beach North Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Lido Beach Dunes Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Lido Beach South Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Lido Beach East Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Lido-Point Lookout Fire District Station, Lido Beach | High | Health and Social Services | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 3 | 27 |
| Lido Elementary School / Long Beach Pre-K Center | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Long Beach Middle School | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Long Beach High School | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| School District Offices | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| District school bus parking area | High | Health and Social Services | Yes | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Nike Alternative School | Extreme | Health and Social Services | Yes | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Nike Environmental Center | High | Health and Social Services | Yes | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Camp Anchor | High | Health and Social Services | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 5 | 45 |
| Lido Townhouses | High | Housing | No | Medium | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 4 | 36 |
| Lido Towers | Extreme | Housing | No | Medium | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 5 | 60 |
| Lido Beach North Housing | High | Housing | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Lido Beach Dunes Housing | High | Housing | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Lido Beach South Housing | High | Housing | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Lido Beach East Housing | High | Housing | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Marvel Dairy Whip | High | Economic | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 3 | 27 |
| Dunes Delicatessen | High | Economic | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 3 | 27 |
| Lido Beach Synagogue | High | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 2 | 21 |
| Lido Beach Golf Club | Extreme | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 3 | 41 |
| Town Park Lido Beach West | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Lido Beach District Park | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Lido Beach Town Park | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Town Park at Sands | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Nickerson Beach | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Town Park at Malibu | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Town Dept. of Water Facility | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Water Tower | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Drinking Water Well #1 | High | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 5 | 53 |
| Drinking Water Well #2 | High | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 5 | 53 |
| Town Energy Park | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Point Lookout Commercial District Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Point Lookout Residential Stormwater | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Town of Hempstead Dept. of Conservation and Waterways District | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Town of Hempstead Dept. of Conservation and Waterways Laboratory | Extreme | Infrastructure Systems | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |



Table V-3 (Continued)

| Asset Information | | | | | Landscape Attributes | | | | | | | Risk Assessment | | | |
|---|-----------|--------------------------------|-------------------|-----------------|--|--|--|---|--|---|--|-----------------|----------------|---------------------|------------|
| Asset | Risk Area | Asset Class | Critical Facility | Community Value | Erosion Rate ≥1 foot per Year or Unknown | Waterline Frequently at Shore Defense or Upland Vegetation | Shore Defenses Absent, Not Constructed to Anticipated Conditions, or Deteriorating | Protective Vegetation Between Asset and Flood Source Absent | Dunes Absent, Below BFE, Eroding, Little Vegetation; Bluff Slope Unstable, Little Vegetation | Asset on Coastal Barrier Island or Filled Wetland | Landscape Attribute Score ("Yes" = +0.5) | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
| Lido-Point Lookout Fire District Station, Point Lookout | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Point Lookout Volunteer Fire Company | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Ye Olde Firehouse | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| U.S. Post Office | High | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 3 | 32 |
| Point Lookout Rescue Company | Extreme | Health and Social Services | Yes | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 4 | 54 |
| Lido-Point Lookout Fire District Training Facility | High | Health and Social Services | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 2 | 18 |
| Town Public Safety Facility | High | Health and Social Services | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 2 | 18 |
| Adult Group Homes | High | Health and Social Services | Yes | High | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 4 | 36 |
| Point Lookout Housing | High | Housing | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Ted's Fishing Station | Extreme | Economic | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Scotty's Marina and Fishing Station and Restaurant | Extreme | Economic | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| East Marina | Extreme | Economic | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| West Marina | Extreme | Economic | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 5 | 68 |
| Point Lookout Commercial District | High | Economic | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 4 | 42 |
| Point Lookout Community Church | High | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 2 | 21 |
| Our Lady of the Miraculous Medal | High | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 2 | 21 |
| Bishop Molloy Recreational Center | High | Natural and Cultural Resources | No | Medium | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 3.50 | 2 | 21 |
| Town Park at Point Lookout | Extreme | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 4.00 | 2 | 24 |
| Town Dept. of Parks and Recreation Facility | High | Natural and Cultural Resources | No | Low | No | No | Yes | Yes | Yes | Yes | 2 | 3 | 3.00 | 2 | 18 |
| Point Lookout Beach District Park | Extreme | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 2 | 27 |
| Lido Beach Passive Nature Preserve | Extreme | Natural and Cultural Resources | No | High | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 2 | 27 |
| Shellfish Nursery | Extreme | Natural and Cultural Resources | No | Low | No | Yes | Yes | Yes | Yes | Yes | 2.5 | 3 | 4.50 | 2 | 27 |



Interpreting risk score

| | | 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 | | | | |

| Risk Category | 100-year Event Risk Score | 500-year Event Risk Score | Comment |
|-----------------|---------------------------|---------------------------|--|
| Severe | >53 | >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 | 24 – 53 | 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 | 6 – 23 | 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 | <6 | <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, even 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. |



E. Endnotes

1. U.S. Census Bureau, Table 3: Land Area, Population, and Density, 1990, 4 Apr. 2014 <<http://www.census.gov/population/www/censusdata/files/places/36ny.txt>>.
2. "American Fact Finder," U.S. Census Bureau, 2007-2011, 4 Apr. 2014 <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_5YR_DP04>.
3. Ibid.
4. "Affordable Housing," U.S. Dept. of Housing and Urban Development, 28 Oct. 2013, 4 Apr. 2014 <http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/>.
5. "Lido History," Lido Beach Civic Association, Undated, 4 Apr. 2014 <http://www.lidodunes.org/sandbar_community.php>.
6. "Lido Beach," City Data, 2013, 4 Apr. 2014 <<http://www.city-data.com/housing/houses-Lido-Beach-New-York.html>>.
7. "2010 Population Finder," U.S. Census Bureau, 2013, 4 Apr. 2014 <<http://www.census.gov/popfinder/>>.
8. "American Fact Finder," U.S. Census Bureau, 2007-2011, 4 Apr. 2014 <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_5YR_DP04>.
9. Ibid.
10. "Affordable Housing," U.S. Dept. of Housing and Urban Development, 28 Oct. 2013, 4 Apr. 2014 <http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/>.
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F. Glossary

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| BFE | base flood elevation |
| CBA | cost-benefit analysis |
| CDBG-DR | Community Development Block Grant – Disaster Recovery |
| CNG | compressed natural gas |
| DHAP | Disaster Housing Assistance Program |
| FEMA | Federal Emergency Management Agency |
| HUD | Department of Housing and Urban Development |
| HVAC | heating, ventilation, and air conditioning |
| LIPA | Long Island Power Authority |
| NYS | New York State |
| NYS DEC | New York State Department of Environmental Conservation |
| NYS DOS | New York State Department of State |
| NYS DOT | New York State Department of Transportation |
| USACE | U.S. Army Corps of Engineers |





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