NEW YORK RISING COMMUNITY RECONSTRUCTION PROGRAM

EAST & SOUTH SHORES STATEN ISLAND
CONCEPTUAL PLAN

OCTOBER 2013

FOREWORD

The New York Rising Community Reconstruction (NYRCR) program was established by Governor Andrew M. Cuomo to provide additional rebuilding and revitalization assistance to communities damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. This program empowers communities to prepare locally-driven recovery plans to identify innovative reconstruction projects and other needed actions to allow each community not only to survive, but also to thrive in an era when natural risks will become increasingly common.

The NYRCR program is managed by the Governor's Office of Storm Recovery in conjunction with New York State Homes and Community Renewal and the Department of State. The NYRCR program consists of both planning and implementation phases, to assist communities in making informed recovery decisions.

The development of this conceptual plan is the result of innumerable hours of effort from volunteer planning committee members, members of the public, municipal employees, elected officials, state employees, and planning consultants. Across the state, over 102 communities are working together to build back better and stronger.

This conceptual plan is a snapshot of the current thoughts of the community and planning committee. The plans will evolve as communities analyze the risk to their assets, their needs and opportunities, the potential costs and benefits of projects and actions, and their priorities. As projects are more fully defined, the potential impact on neighboring municipalities or the region as a whole may lead to further modifications.

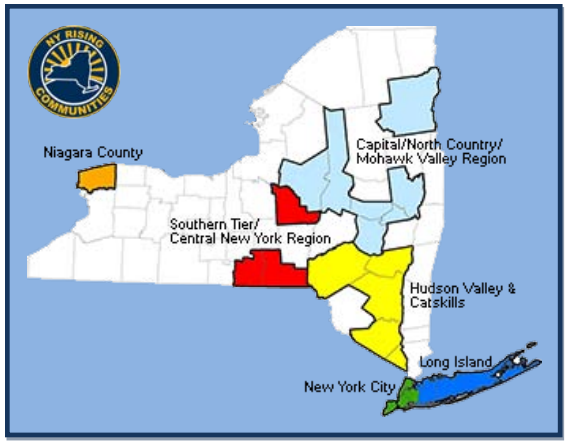
In the months ahead, communities will develop ways to implement additional strategies for economic revitalization, human services, housing, infrastructure, natural and cultural resources, and the community's capacity to implement changes.

Implementation of the proposed projects and actions found in this conceptual plan is subject to applicable federal, state, and local laws and regulations. Inclusion of a project or action in this conceptual plan does not guarantee that a particular project or action will be eligible for Community Development Block Grant – Disaster Recovery (CDBG-DR) funding. Proposed projects or actions may be eligible for other state or federal funding, or could be accomplished with municipal, nonprofit or private investment.

Each NYRCR Community will continue to engage the public as they develop a final plan for community reconstruction. Events will be held to receive feedback on the conceptual plan, to provide an understanding of risk to assets, and to gather additional ideas for strategies, projects and actions.

October 31, 2013

New York Rising Communities



Find out More at:

StormRecovery.ny.gov/
Community-Reconstruction-Program

ACKNOWLEGEMENTS

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INTRODUCTION

As a part of the New York Rising Community Reconstruction (NYRCR) Program, New York State convened the Staten Island Planning Committee for the East and South Shores of Staten Island consisting of 29 residents, leaders from civic organizations, business groups, and professional and non-profit associations. The goal of the Planning Committee is to create a NYRCR Plan, to be completed by March 2014, which will include a long-term vision for the community and implementable projects and actions suggested for the East and South Shores of Staten Island to recover from the damage caused by Superstorm Sandy and reduce the risk posed by extreme weather events in the future. The 30 week schedule for the NYRCR Program is shown in Figure 1. The State has allocated up to $25 million in Community Development Block Grant Disaster Recovery (CDBG-DR) funding from the US Department of Housing and Urban Development (HUD) to fund eligible projects identified in the Staten Island Planning Committee's Final NYRCR Plan.

This Conceptual Plan is the first step in outlining the process undertaken by the Planning Committee to date and provides a roadmap of the next steps that the Planning Committee will take in drafting the NYRCR Plan. This Conceptual Plan summarizes the initial work completed by the Planning Committee, which includes the:

- Creation of a Vision Statement to guide ideas about long-term changes to the community
- Identification of key assets that were damaged by Superstorm Sandy or are at risk in the event of future storms
- Determination of preliminary needs and opportunities for improving the area's resilience to extreme weather and climate change
- Creation of a framework of preliminary key themes and reconstruction strategies to guide the next stages in the NYRCR Plan process
- Creation of a list of preliminary project examples to implement the key themes and reconstruction strategies

Building upon this process, the broad strategies that the Planning Committee has developed will help to inform a more specific set of actions and ultimately, priority projects which will be subject to cost-benefit analysis and community approval. Ultimately, the NYRCR Plan will include strategies for rebuilding and replacing critical facilities, improving resilience against future threats, capitalizing on social and economic assets, and fostering economic growth. In addition, the NYRCR Plan will include a specific set of implementable short, mid and long-term priority projects that respond to the identified strategies.

This Conceptual Plan, developed by the Planning Committee, began with the creation of a Vision Statement to guide ideas about long-term changes to the community. Next, the Planning Committee identified key assets that were damaged by Superstorm Sandy or are at risk in the event of future storms and outlined needs and opportunities for improving the area's resilience to extreme weather and climate change.

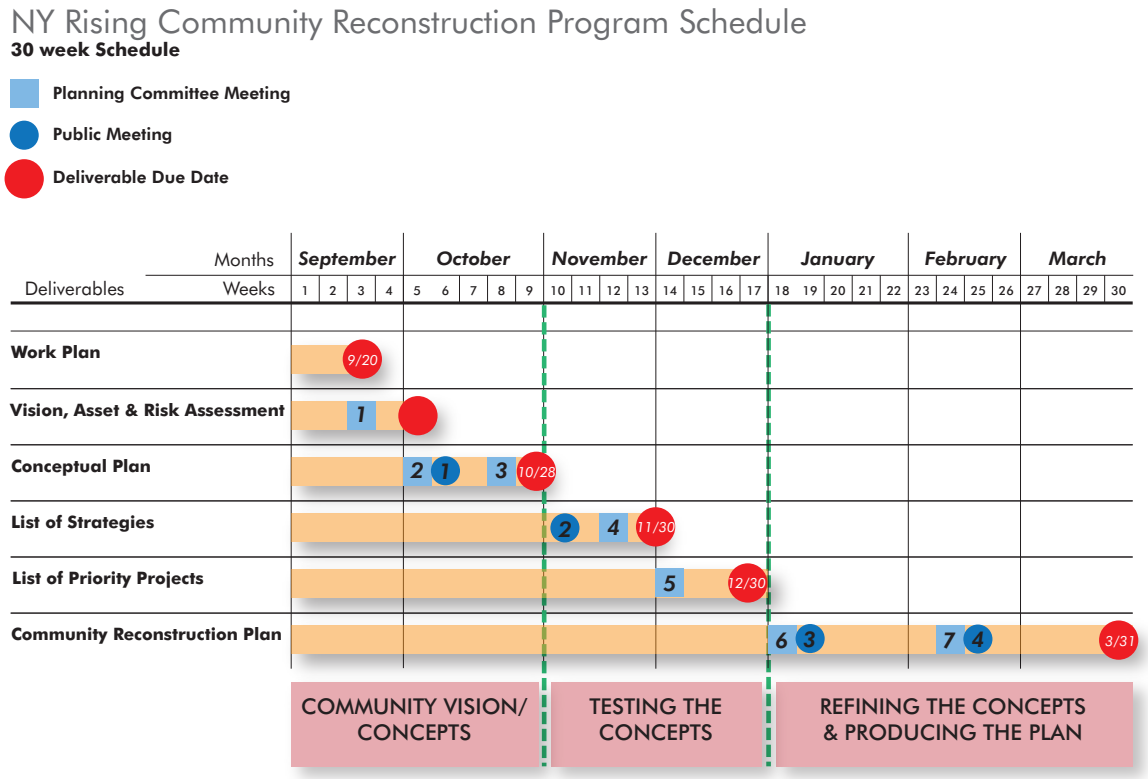
At this stage, the Planning Committee has created a framework of preliminary themes and strategies to guide the next stages of the process as well as identified a preliminary list of potential project examples. The themes and strategies included in this Conceptual Plan will continue to evolve based on input from the Planning Committee, the public and based on research and analysis conducted as part of the NYRCR planning process. In addition, the list of potential project examples, included in Section 5.0, represent a preliminary compilation of ideas that have come out of the NYRCR Planning process thus far. While these ideas represent projects suggested to date by the Planning Committee and public, additional

projects will emerge as the planning process continues. Further, these project examples will be evaluated for funding eligibility and for their ability to mitigate risk, will be evaluated by the Planning Committee and at Public Engagement meetings for support by the community, and evaluated based on their ability to protect critical assets. The final list of projects prioritizes in the NYRCR Plan may include some of the projects identified herein as well as others yet to be identified.

Next Steps

As outlined on the NYRCR Program Schedule (Figure 1), this Conceptual Plan summarizes the first phase of work completed in the NYRCR planning process by the Planning Committee. The next steps in the process are the completion of phase 2: testing the concepts, and phase 3: refining the concepts and producing the NYRCR Plan. The list of preliminary strategies included in this Conceptual plan will continue to be assessed and refined and the Planning Committee will work, in association with the NYRCR Consultant Team and the public, to develop a list of implementable priority projects over the next several months. The Planning Committee will prioritize projects based on a detailed assessment of their ability to mitigate future risk, project costs, cost-benefit analysis, funding eligibility, and implementation strategies. The final reconstruction strategies, priority projects, and implementation measures will be included in the NYRCR Plan.

Figure 1: Program Schedule



EAST & SOUTH SHORES OF STATEN ISLAND

1.0 VISION STATEMENT

1.0 NYRCR VISION FOR STATEN ISLAND

The Planning Committee created a Vision Statement to help guide the East and South Shores in addressing damage caused by Superstorm Sandy, capitalize on social and economic assets to improve the lives of residents, employees and business owners, and rebuild a more resilient community to expand the economy and reduce future risk. This statement was tested and refined based on input received at two public workshop events.

Vision Statement

The East and South Shores of Staten Island are a diverse, yet unified, community with significant natural, cultural and economic assets, and a long tradition of engaged citizens with a strong and unique sense of identity. Building on these strengths, the East and South Shores will come back stronger and build back better after Superstorm Sandy.

Sandy tested the strength of all Staten Islanders, but the devastation experienced on the East and South Shores was particularly acute. While this Plan prioritizes rebuilding the East and South Shores, the vision recognizes that the East and South Shores are inextricably linked with assets and strengths in the rest of the Island and that these key assets are critical to a more resilient future.

Purpose and Goals

This Conceptual Plan aims to prepare the East and South Shores to better handle the impacts of severe storms and sea-level rise. The plan also aims to build capacity within upland areas to ensure that all Staten Islanders are protected prior to, during and following extreme weather events, and to strengthen the physical and social connections between the two. A thoughtful, cohesive plan identifying short, medium and long-term strategies must be developed now in order to reduce future risk. Specifically, the goals of this Plan are to:

- Strengthen local business corridors and improve connections to key economic assets in the North Shore to increase the East and South Shore's ***economic*** resilience to better withstand severe weather events.
- Improve coordination between ***health and social services*** organizations to effectively communicate services to all populations. Resilience is just as much about social programs and education as it is physical infrastructure.
- Provide residents in low-lying and coastal areas with a range of ***housing*** options that are resilient in design and location.

- Rebuild in a way that enhances the area's grey and green ***infrastructure systems*** to withstand future extreme weather events. Reinforce connections to the Island's key regional infrastructure assets.
- Enhance the area's ***natural and cultural resources*** to better withstand storm surges and high winds, and to help control other forms of flooding from heavy rains. Look for additional opportunities to implement green infrastructure for stormwater management (expansion of the Bluebelt), erosion prevention, and restoration of wetlands will also help to better protect the Island from storm damage.
- Bolster the support infrastructure for the East and South Shore's most ***vulnerable populations***, including low-income populations, the elderly, people with disabilities, children and the homeless, to help prepare and evacuate these groups in advance of a storm, track and protect them during the immediate aftermath, and return the community back to normal soon after.

The Planning Committee has determined that city, state and federal efforts to rebuild the East and South Shores - as well as the efforts by the public and private sectors - must be coordinated and Staten Islanders must be engaged throughout process.

EAST & SOUTH SHORES OF STATEN ISLAND

2.0 PUBLIC ENGAGEMENT

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Public engagement is a key focus of the NYRCR process. The public engagement process for Staten Island is structured to encourage the diverse communities of the East and South Shores to provide input and participate in the process of developing a Community Reconstruction Plan that envisions a more resilient and sustainable future built upon a solid base of public support.

The Staten Island Planning Committee has broad representation from the East and South Shores. The Planning Committee is composed of 29 members from neighborhoods across the planning area, including residents, civic leaders, local business and community organization representatives, and other key stakeholders. The Planning Committee has been instrumental in providing input and information to shape this Conceptual Plan and in assisting with the broader Community Engagement Strategy through their constituent and social networks. The Planning Committee has worked to implement a strategy that lowers barriers to participation and has included the participation of a significant number of stakeholders including a representative cross section of the greater public.

The public has been involved in the development of the Conceptual Plan through two primary forums: Planning Committee meetings and Public Open House Workshops.

Planning Committee Meetings

The Community Engagement Strategy has included three Planning Committee meetings focused on the development of this Conceptual Plan.

At the first Planning Committee meeting (September 17, 2013), following a presentation about the program, Planning Committee members agreed to establish working groups based on the program's asset categories with the addition of a working group focused on Public Outreach. Committee members organized into Socially Vulnerable Populations & Health and Social Services; Infrastructure; Economic Resilience; Housing; Natural and Cultural Resources; and Public Outreach Working groups in order to identify assets, discuss issues, and brainstorm ideas for reconstruction strategies. Each of the groups featured a diversity of expertise and geography.

The second Planning Committee meeting (October 2, 2013) included a presentation and discussion that a) reviewed and verified what happened during Superstorm Sandy, b) the Planning Area's asset inventory, c) the

vulnerabilities and risks of the area, and d) the projects that are currently underway or proposed in the area. Following that discussion, the Planning Committee broke out into working groups for two facilitated exercises that focused on the development of a Community Vision and finalization of the Planning Area.

The third Planning Committee (October 24, 2013) meeting focused on a review of the Draft Conceptual Plan.

These meetings have been supplemented with additional meetings of the co-chairs, assorted committee members, and other parties, including a meeting with local news media and public relations contacts to brainstorm outreach strategies.

Public Open House Workshops

In consideration of the size and diversity of the Planning Area, two Public Open House Workshops were held (October 9 and 10, 2013); one each in the East and South shores. The meetings focused on gathering the public's knowledge, experience, and recommendations for the development of the Conceptual Plan. The public was invited to provide input on the Planning Committee's work to date, including its work on the Community Vision, Identification of Community Assets, and Potential Projects.

The Public Open House Workshops were advertised through the Planning Committee's vast network of contacts (for example, one member sent the invitation to over 6,000 recipients). Advertising flyers were produced in English, Spanish, and Russian and more than 3,000 flyers were distributed at the Staten Island Ferry Terminal, homes and schools. Approximately 200 community members attended the two events.

Each of the meetings began with a brief overview presentation. Attendees were then guided through eight stations. Throughout the stations, the public had the opportunity to talk with Committee members, a State Planner, NYRCR staff and Consultant Team, as well as provide written comments in several ways. The stations were organized as follows:

Station 1: Background/Process

Participants were invited to speak with a Department of State Planner for background on the overall program, as well as to view several boards with information on the planning process that supports the program.

Station 2: Community Vision

First participants were asked four vision-related questions and asked to post their responses on an easel pad. The Planning Committee had previously been asked these questions and their responses were presented as a "Vision Word Cloud."

Station 3-7: Community Assets

Participants were asked to view the Community Assets identified to date, which were displayed on maps with shading to represent risk areas. The public was asked to add additional assets, provide comments directly on the maps using markers, and respond to asset category-related questions.

Station 8: Potential Projects

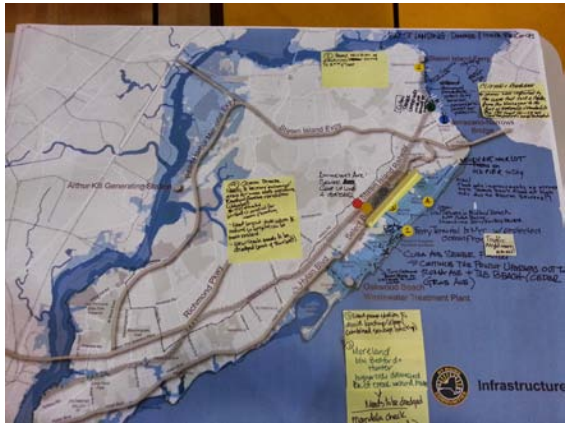
Participants were asked to view a list and a map that included existing and proposed projects identified by the Committee and Project Team. Participants were then asked to brainstorm additional project ideas and endorse preferred projects by placing a dot or note next to that item on the presentation board.

Conceptual Plan Development

The content of the Conceptual Plan has been generated and vetted by the public in the fashion described above to ensure a Plan that features implementable projects, policies and actions with broad community support.

GUEST
HOME
PERIOD
Coca-Cola

Economic Resilience


Infrastructure

EAST & SOUTH SHORES OF STATEN ISLAND

3.0 COMMUNITY PROFILE

3.0 COMMUNITY PROFILE

3.1 PLANNING AREA

Staten Island sits at the southernmost part of New York State. The island is surrounded to the west and north by New Jersey. To the south, Staten Island's shores meet Raritan Bay and to the east, the coastline of Staten Island extends into Lower New York Bay.

The geographic scope of the Staten Island NYRCR Planning Area extends from Fort Wadsworth and the Verrazano-Narrows Bridge on the north and extends south to the neighborhoods of Tottenville and Charleston. (See Figure 2) Census tract boundaries were used to draw the Planning Area boundary in order to include inundated areas within the East and South Shores and for ease of data collection and analysis. Amboy Road forms the western boundary of the Planning Area. Foster, Woodrow, and Bloomingdale Roads enclose the inland portions of the Planning Area at the southern end of the island.

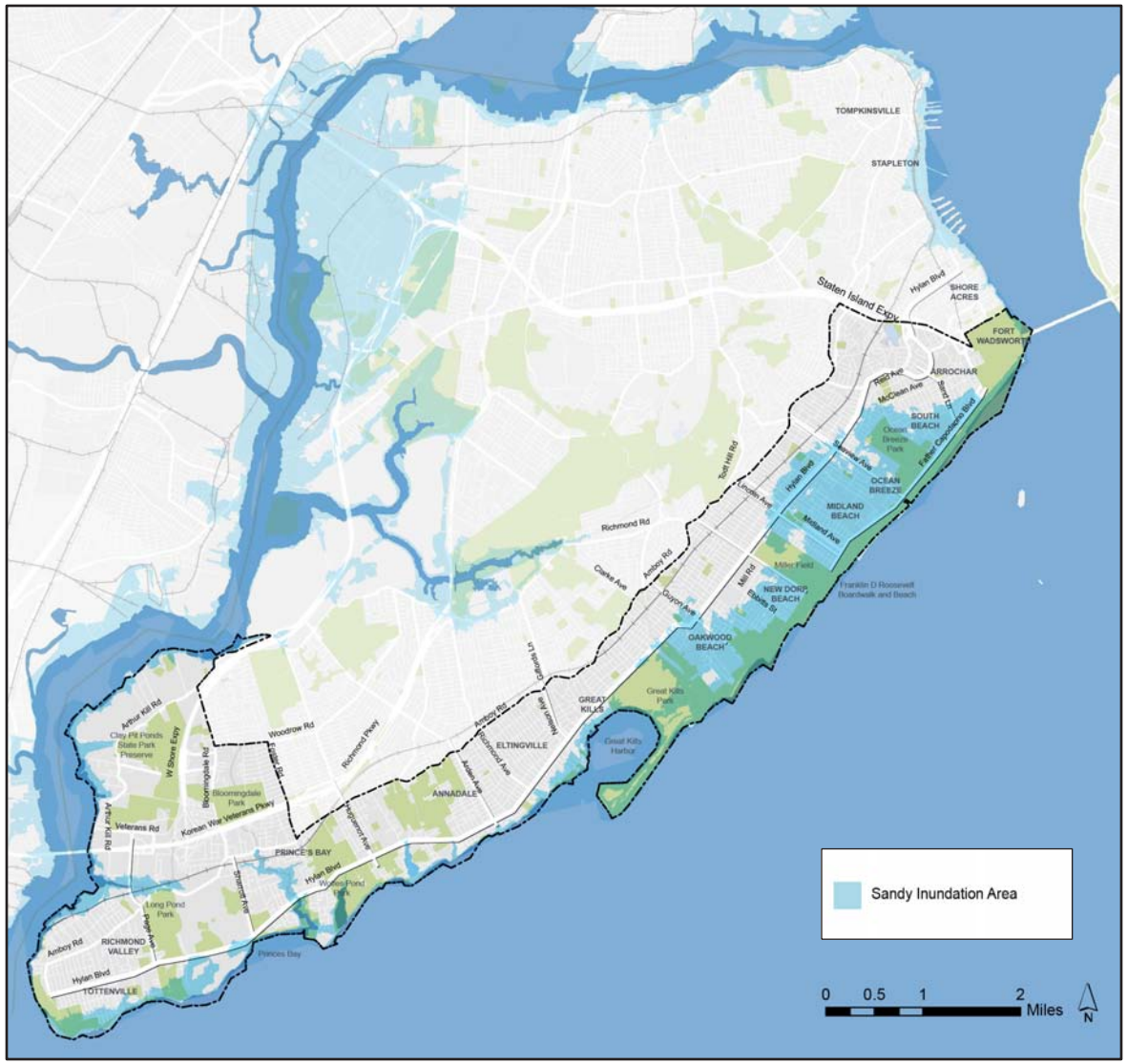
The communities along the shoreline, facing Raritan Bay and Lower New York Bay, are especially vulnerable in the event of large storms such as Superstorm Sandy, as the coastlines of Long Island and New Jersey funnel water into Lower New York Bay, which has a tendency to exacerbate storm surges. While most of the waterfront communities on Staten Island were impacted by Superstorm Sandy, some of the most extensive damage occurred in low-lying East Shore and vulnerable South Shore areas.

The East Shore of Staten Island extends approximately three miles from Fort Wadsworth in the north to Great Kills Park in the south. The East Shore consists primarily of low-lying areas boarded by open water to the southeast and hills inland that slope upwards to the northwest. The coastline within this area includes sandy beaches along Father Capodanno Boulevard in South Beach and vast expanses of marshes in Midland Beach, Ocean Breeze, New Dorp Beach and Oakwood Beach. These low-lying wetlands include residential neighborhoods developed adjacent to portions of Staten Island's Bluebelt system - a series of connecting streams, ponds, and wetlands that provide stormwater management, open spaces and wildlife habitats.

The South Shore extends from Great Kills Park to Conference House Park at the southernmost point of the island. The topography within the South Shore includes low-lying areas with small coastal cliffs, including the neighborhoods of Great Kills, Eltingville, Annadale, Huguenot, Prince's Bay and Tottenville. Development reaches the shoreline within this area, with portions of the shoreline hardened with rock or bulkhead.

The Planning Committee was presented with several additional options for the Planning Area, including an expansion of the area to the north. After significant discussion of the various options, the Planning Committee reached consensus on keeping the initial Planning Area in order to focus and leverage Community Development Block Grant Disaster Recovery (CDBG-DR) funds in the areas that were most heavily impacted by Superstorm Sandy. However, it is important to note that the Planning Committee voiced a strong concern for their neighbors on the North Shore as well as on the remainder of the island. The Planning Committee recognizes that Staten Island is a community of neighborhoods and the assets and strengths of the Island as a whole are the key to a more resilient future.

Figure 2: Planning Area Map



3.2 COMMUNITY OVERVIEW

Until the Verrazano-Narrows Bridge was built in the 1960s, the East and South Shores were characterized by small coastal towns. Along the East Shore, seasonal bungalows and tourist resorts were scattered along the beach. Development expanded southward in the 1960s, and the East Shore experienced more development in wetland areas and former summer homes were winterized to serve as permanent residences. As time progressed, development spread from upland areas closer to the coastline.

Both the East and South Shores of Staten Island have long been exposed to various forms of flooding. Low-lying wetlands on the East Shore are subject to storm surge, as occurred during Superstorm Sandy, but these areas also see increased water levels and flooding from stormwater runoff during heavy rains, tropical storms, and nor'easters. The coastline along parts of the South Shore is steeper; however, wave action and rising sea levels have eroded natural coastal defenses over time, making waterfront neighborhoods more prone to flooding.

The East and South Shores of Staten Island are home to approximately 140,000 residents and a growing population. From 2000 – 2010, Staten Island was the fastest growing borough in New York City and one of the top ten fastest growing Counties in New York State, a trend which is projected to continue in the coming years. The housing stock is primarily owner-occupied, with nearly 94% of residents owning their homes. While the Planning Area is diverse in terms of resident age and household income, 13% of residents are 65 years and older and 16% of households earn less than $25,000 a year.

84% of households in Staten Island own at least one car, which is by far the highest rate of car ownership in New York City. Public transportation in the Planning Area is not as extensive as in other areas of the city, as transit is limited to only a few main corridors. Transit options include MTA operated buses along Hylan Boulevard and routes north to the Staten Island Railway, the Staten Island Railway, and the new Select Bus Service along Hylan Boulevard all with connections to the Staten Island Ferry Terminal at St. George. In addition, there are few transportation options available to residents in the event of a mandatory evacuation once the island's connecting bridges and ferry service shut down.

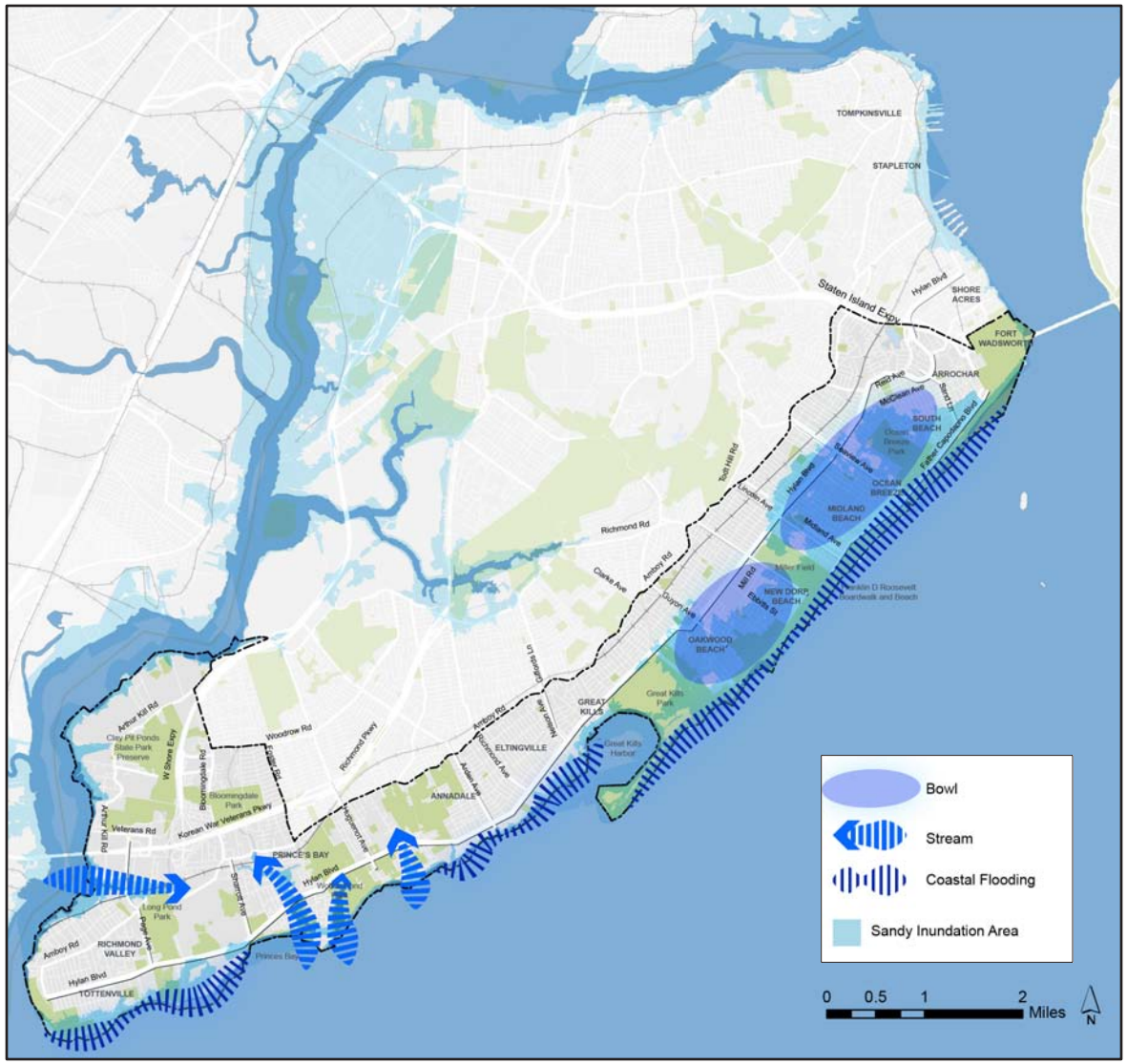
Prior to Superstorm Sandy, the East and South Shores contained approximately 2,800 businesses with 17,100 employees. These businesses were concentrated primarily in the retail and service sectors, with Staten Island University Hospital representing one of the largest employers in the Planning Area. Most of the businesses in the Planning Area are very small in scale, with over 80% having fewer than five employees. While the prevalence of small businesses contributes to the vibrancy and diversity of the local economy, this may also represent an additional economic challenge in recovering from Sandy and future weather events since small businesses often have limited resources for recovery.

3.3 SUMMARY OF STORM IMPACTS

Just before and after Superstorm Sandy made landfall on Staten Island, the three bridges connecting the borough to New Jersey as well as the Verrazano Narrows Bridge, were shut down for safety reasons, isolating the entire borough. The Staten Island Ferry, one of the most utilized mass transit options to Manhattan, ceased operations and local rail and bus service stopped functioning. As electrical power was lost across the Island, gas pumps were incapacitated and gas became scarce for a borough dependent on automobiles. The risk to health and safety became evident as the Planning Area's two hospitals, Staten Island University Hospital (SIUH) North and South campuses, were incapacitated either to storm surge or power outages. The storm's impacts on adults and families included the loss of housing units, either to flood or complete destruction and an estimated 9,500 jobs were interrupted by the storm. Twenty-three individuals from Staten Island lost their lives due to Superstorm Sandy.

Although Superstorm Sandy was no longer categorized as a hurricane when it made landfall, it was still a large and dangerous storm. The severity of Superstorm Sandy's impact was made more extreme by three uncommon factors:

Figure 3: Key Causes of Damage from Superstorm Sandy



1. The storm's landfall in the New York area coincided with a "spring" tide - a high tide that occurs during a full moon;
2. The storm was quite large, extending approximately 1,000 miles in diameter, which contributed to an elevated storm surge; and
3. Sandy followed an unusual path that led to a direct impact on the New York Metropolitan Area.

Peak storm tides during Superstorm Sandy reached 16 feet on Staten Island and data suggests that waves up to 5 or 6 feet crashed along the borough's shoreline, causing massive flooding and extensive damage along Staten Island's coastal areas. Staten Island's position in the New York Bight – a right angled funnel of land on either side of Lower New York Bay - increased the extent of the storm surge. As the storm surge came ashore, the narrowing of land compressed the rising water from the sides, making the surge even greater in force and height. As a result, peak storm tides in the waterways off Staten Island were roughly five feet higher than the Battery in Lower Manhattan.

During Superstorm Sandy, flooding on the East and South Shores of Staten Island can be attributed to four key causes:

- Development of wetlands and low lying areas: Development in wetlands and areas that would have served as natural drainage ways reduced the ability for the landscape to absorb storm and flood waters, increasing the vulnerability of homes and infrastructure;
- Inadequate stormwater management: Storm drain systems are inadequate or nonexistent in many areas. Flooding from stormwater, either through surge or backwater inundation, was exacerbated at high-tide when tide gates in existing outfalls were closed to prevent tidal water from flowing back into the system;
- Inadequate coastal flooding protection: Discontinuous natural and manmade coastal protection systems along the shoreline of the Planning Area exposed coastal areas to storm surges; and
- Sea Level Rise: Storm surge and stormwater impacts were amplified by the approximate 1.5-foot (0.5 m) rise in sea level that has occurred since 1821.

The most extensive inundation occurred in the low-lying residential neighborhoods of Oakwood Beach, New Dorp Beach, Annadale Beach and Tottenville, and in what is commonly referred to as "the bowl" in Midland Beach and Ocean Breeze – an area formed north of Father Capodanno Boulevard (Figure 3). These

neighborhoods, which had been wetlands before development expanded in Staten Island, are known for their older bungalow homes, which were historically built as vacation homes and built to lower building standards than primary residences. While inundation on the East Shore primarily occurred southeast of Hylan Boulevard, flood waters nearly reached the Staten Island Railroad tracks in Midland Beach and Dongan Hills due to its low topography, the proximity of New Creek and overburdened storm sewers.

The Midland Avenue retail corridor experienced significant flooding and many businesses are still struggling to reopen. Retail concentrations along Father Capodanno Boulevard, Hylan Boulevard, Sand Lane were also negatively impacted. Challenges facing businesses impacted by Sandy include building damage, inventory losses, insufficient insurance, and in some cases, a reduced customer base. Similarly, businesses in Great Kill Harbor along Mansion Avenue suffered significant damage during Superstorm Sandy either through damage by flooding, storm surge or property damage caused by boats in the area.

On the South Shore, powerful waves eroded the area's protective bluffs, causing significant erosion and damage, especially in the neighborhoods of Crescent Beach, Annadale and Tottenville. Storm surges traveled inland into low-lying areas along creeks and tributaries, including Mill and Lemon Creeks, flooding roads and disrupting businesses.

A total of 121,000 Staten Islanders, or about 70 percent of Con Edison's customers on the Island, were without power following Sandy due to substation damage and downed overhead lines, affecting residential customers, businesses and the two hospitals on the East and South shores. The Oakwood Beach Wastewater Treatment Plant was completely inundated, damaging many of the facility's pumps.

3.4 EXISTING PLANS AND STUDIES

There are a significant number of plans, policies, procedures and resources that address the existing conditions, regulatory frameworks, community goals and resiliency opportunities on the East and South Shores of Staten Island. These resources have been produced by public agencies at all levels (federal, state, county), regional planning groups, business and non-profit organizations and academic institutions. Reconstruction projects and resiliency programs included in the final Community Reconstruction Plan must recognize the planning work completed to date locally and in the region. A list of the relevant regulatory and advisory documents that the planning team has reviewed is included below.

Regulatory

- The New York State Coastal Management Program Document (Coastal Management Zone, National Oceanic and Atmospheric Administration, 2006)
- New York City Local Waterfront Revitalization Program (Coastal Zone Management, US National Oceanic and Atmospheric Administration, 2002)
- Rebuilding After Hurricane Sandy: A Guide to New Code and Zoning Standards - For Industry professionals (New York City Department of Buildings, June 10, 2013)
- New York City Community Development Block Grant- Disaster Recovery Action Plan (New York City, May 10, 2013)
- New York State Community Development Block Grant Action Plan (New York State Homes and Community Renewal Office of Community Renewal, April 2013)
- Staten Island Bluebelt Program (New York City Department of Environmental Protection)

Advisory

- Governor's 2100 commission report: "Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure" (NYS 2100, 2012)
- A Stronger, More Resilient New York (SIRR) (NYC Special Initiative for Rebuilding and Resiliency, June 2013)
- Coastal Climate Resilience: Urban Waterfront Adaptive Strategies (New York City, Department of City Planning for the New York and Connecticut Sustainable Communities Consortium, June 2013)
- Coastal Climate Resilience: Designing for Flood Risk (New York City, Department of City Planning, June 2013)
- Hurricane Sandy: After Action (New York City Mayor's Office, May 2013)
- Proposed Flood Resilience Text Amendments (New York City Department of City Planning, May 20, 2013)
- Staten Island Damage Assessment – US Federal Emergency Management Agency (CUNY HPC Social Policy Simulation Center)
- Hurricane Sandy Rebuilding Strategy (U.S., Hurricane Sandy Rebuilding Task Force, 2012)

- Gateway National Recreation Area: Draft General Management Plan Environmental Impact Statement (National Park Service, US Department of the Interior, July 2013)
- Climate Change Adaptation in New York City: Building a Risk Management Response (New York City Panel on Climate Change, 2010)
- Superstorm Sandy Forum: A Serious Conversation about the Future of Staten Island Opening Remarks (Dr. William J. Fritz, College of Staten Island, January 16, 2013)
- Five Points to Protect Staten Island from Future Storm Surges (William J. Fritz, February 11, 2013)
- Staten Island Damage Assessment (Katherine Brigandi, The College of Staten Island, January 18, 2013)
- Global Sea Level Rise Scenarios for the United States National Climate Assessment (National Oceanic and Atmospheric Administration, Army Corps of Engineers, United States Geographical Survey, SERDP, 2012)
- Timeline of Regional Transportation Recovery immediately post-Sandy (Afrona Kaziu, CSI)
- REVIEW PLAN: South Shore of Staten Island, NY Storm Damage Reduction Study (US Army Corps of Engineers, New York District, November 2012)
- Geomorphic Impact of Hurricane Sandy on Staten Island, NY (Alan I. Benimoff, CSI, March 20, 2013)
- Impacts of Superstorm Sandy: Coastal Adaptation for Affected Parks and Revegetation Staten Island Unit, Gateway NRA NY
- National Park Service — Department of the Interior (Rutgers University c/o National Park Service, June 27, 2013)
- Hurricane Sandy Destruction, Recovery, Mitigation, Resilience and Sustainability (Millennium Strategies, LLC, March 13, 2013)
- US Army Corps of Engineers Regional Comprehensive Study (NACCS) (US Army Corps of Engineers, August 15, 2013)
- New York City Comprehensive Waterfront Plan - Vision 2020 (New York City, Department of City Planning, March 2011)
- Waterfront Vision and Enhancement Strategy (WAVES) (New York City Mayor's Office, March 2011)
- PlaNYC (New York City, April 2011)
- PlaNYC Progress Report 2012 (PlaNYC, 2012)
- Flood-Resilient Waterfront Development in New York City: Bridging Flood Insurance, Building Codes, and Flood Zoning (Institute for Environmental Studies, Vrije Universiteit, Amsterdam, the Netherlands, June 2011)
- Cost estimates for flood resilience and protection strategies in New York City (Institute for Environmental Studies, Vrije Universiteit, Amsterdam, the Netherlands, 2013)
- Preliminary Survey of Wetland Areas (PlaNYC, 2010)
- Sustainable Stormwater Management Plan (PlaNYC, 2012)
- Climate Risk Information (NYC Panel on Climate Change, 2009)
- Storm Surge Model for NY, CT, and Northern Waters of NJ with special emphasis on New York Harbor, Paper No, 156-27 (Alan I. Benimoff, CSI, November 6, 2012)
- Protecting New York as an Ecosystem (Dr. Franco Monalto, PE, January 16, 2013)

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Sources:

U.S. Census American Community Survey 2011 5-year data.

A Stronger, More Resilient New York, 2013.

Staten Island Advance, *Con Ed, National Grid response to Hurricane Sandy on Staten Island was poor*, January 23, 2013.

EAST & SOUTH SHORES OF STATEN ISLAND

4.0 ASSESSMENT OF RISK & NEEDS

4.0 ASSESSMENT OF RISK & NEEDS

Economic

Health & Social Services

Housing

The process of completing a New York Rising Community Reconstruction plan is largely framed in terms of community assets and the risks that they face. Assets are a critical component of the Community Reconstruction Plan because these are facilities, institutions, or networks that are essential to day-to-day life, long-term resilience and rapid disaster recovery in Staten Island.

In order to create a plan to protect critical assets, the Planning Committee must also consider the relative risk that these community assets face. To do so, the Community Reconstruction Plan will utilize risk assessment maps that identify whether certain assets are located within extreme, high or moderate risk areas. The following presents a preliminary analysis of the assets and risk in the Staten Island Planning Area.

4.1 UNDERSTANDING ASSETS & RISKS

Assets

The Staten Island Planning Committee and the public are working towards identifying ways to strengthen and protect social, economic and natural assets that have been, or will be, affected by coastal hazards.

The Committee, through extensive community engagement, has identified several assets that were either impacted by Superstorm Sandy, are at risk of being impacted by future storms, or provided critical recovery functions for residents and businesses along the East and South shores. These assets are classified within six categories: economic development, housing, natural & cultural resources, health & social services, infrastructure systems and socially vulnerable populations.

Risks

It is critical to understand the risk that the Planning Area's assets could face in the event of future storms and sea level rise caused by climate change. To do this, New York State has developed a risk assessment area mapping tool that defines areas at risk from coastal hazards in relation to their topography, Federal Emergency Management Agency (FEMA)

flood zones, previous storm surge inundation, sea level rise, National Weather Service (NWS) shallow coastal flooding advisory thresholds and natural shoreline features.

The risk assessment map (Figure 4) indicates that the entire coastline of the Planning Area is in the Extreme Risk Zone, with extreme risk areas extending inland at Oakwood Beach, Lemon Creek and Mill Creek. High risk areas extend far inland throughout the East Shore neighborhoods of South Beach, Ocean Breeze, Midland Beach and New Dorp Beach. High risk areas along the South Shore include Great Kills, Eltingville and Tottenville.

4.2 IDENTIFICATION OF ASSETS & RISKS

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

- Discussions at numerous Planning Committee Meetings
- Feedback at two Public Engagement Meetings
- Meetings with committee members, business owners, residents and elected officials
- Feedback through the New York Rising Storm Recovery website
- Site tours
- Data Analysis

Infrastructure

Natural & Cultural Resources

Socially Vulnerable Populations

Extreme Risk Areas:

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

- FEMA V zone
- Shallow Coastal Flooding per NOAA NWS's advisory threshold.
- Natural protective feature areas susceptible to erosion.
- Sea level rise - Added 3 feet to the MHHW shoreline and extended this elevation inland to point of intersection with ground surface.

High Risk Areas:

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

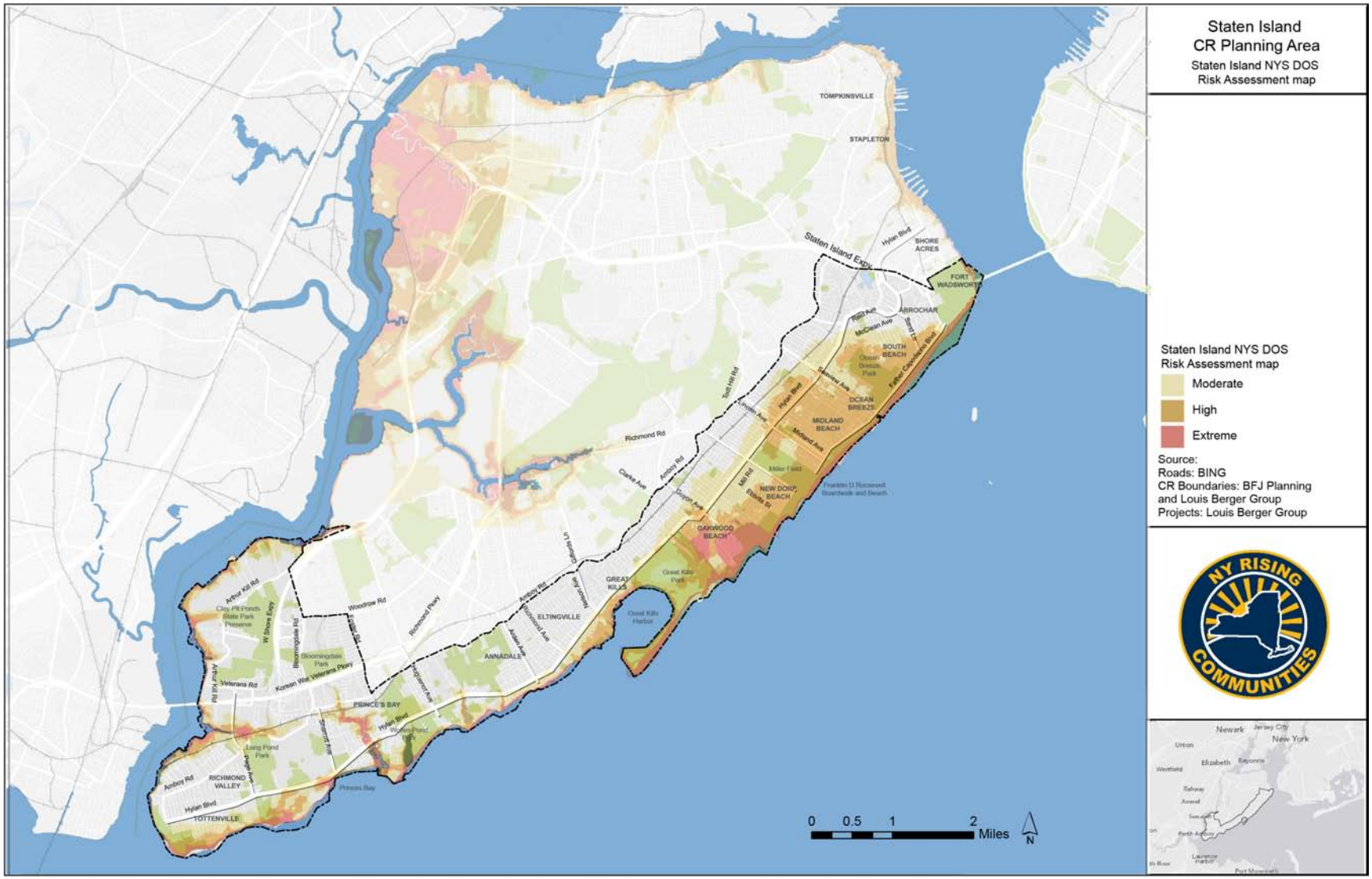
- Area bounded by the 1% annual flood risk zone (FEMA V and A zones).
- Sea level rise - Added 3 feet to NOAA NWS coastal flooding advisory threshold and extended this elevation inland to point of intersection with ground surface.

Moderate Risk Areas:

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

- Area bounded by the 0.2% annual risk (500 year) flood zone, where available.
- Sea level rise - Added 3 feet to the Base Flood Elevation for the current 1% annual risk flood event and extended this elevation inland to point of intersection with ground surface.
- Area bounded by SLOSH category 3 hurricane inundation zone.

Figure 4: DOS Risk Assessment Map



Hylan Boulevard

Staten Island University Hospital

Huguenot Commercial District

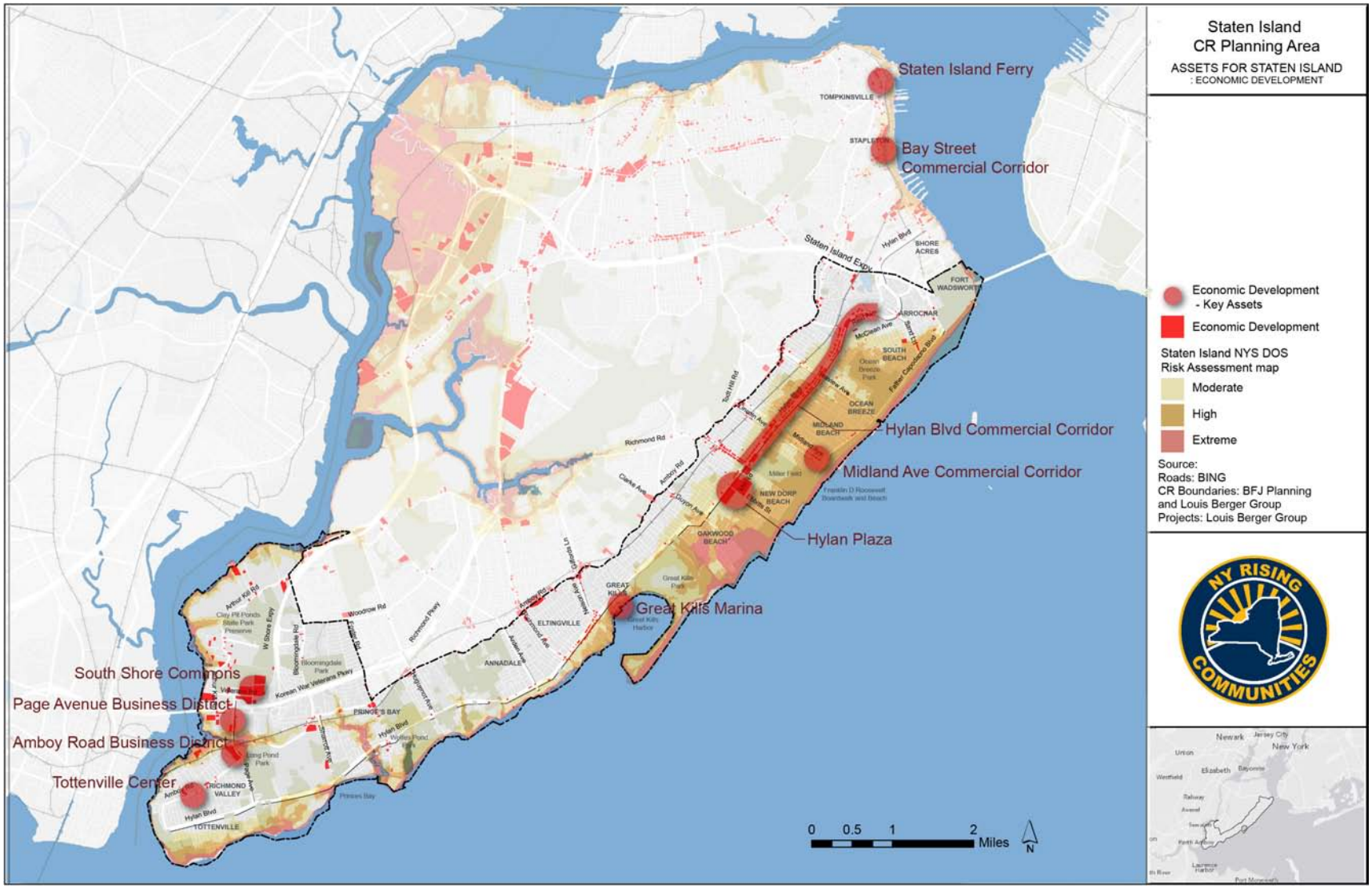
4.2.1 Economic Resilience

Economic assets that are at extreme or high risk of damage in future storms include large employers, key commercial areas, and tourism destinations (Figure 5). Staten Island University Hospital, the largest employer within the Planning Area and one of the largest on Staten Island, sits in the High Risk zone on the DOS Risk Assessment Map. Commercial districts along Midland Avenue and Hylan Boulevard on the East Shore and Amboy Road on the South Shore experienced significant inundation during Sandy and many businesses remain closed, especially in Midland Beach. These areas all lie in the High Risk zone. Great Kills Marina is an important seasonal and tourism destination that was severely damaged by Sandy's inundation. The Marina sits in the Extreme Risk zone. Critical economic assets outside of the planning area which impact the economic resilience of the East and South Shores include the Staten Island Ferry and Bay Street Commercial District.

Economic Development Examples

- Employment hubs and downtown centers
- Office buildings
- Industrial / warehousing
- Large retail stores
- Small businesses
- Banks
- Tourism destinations

Figure 5: Economic Development Assets



Staten Island University Hospital

FDNY Sandy Response

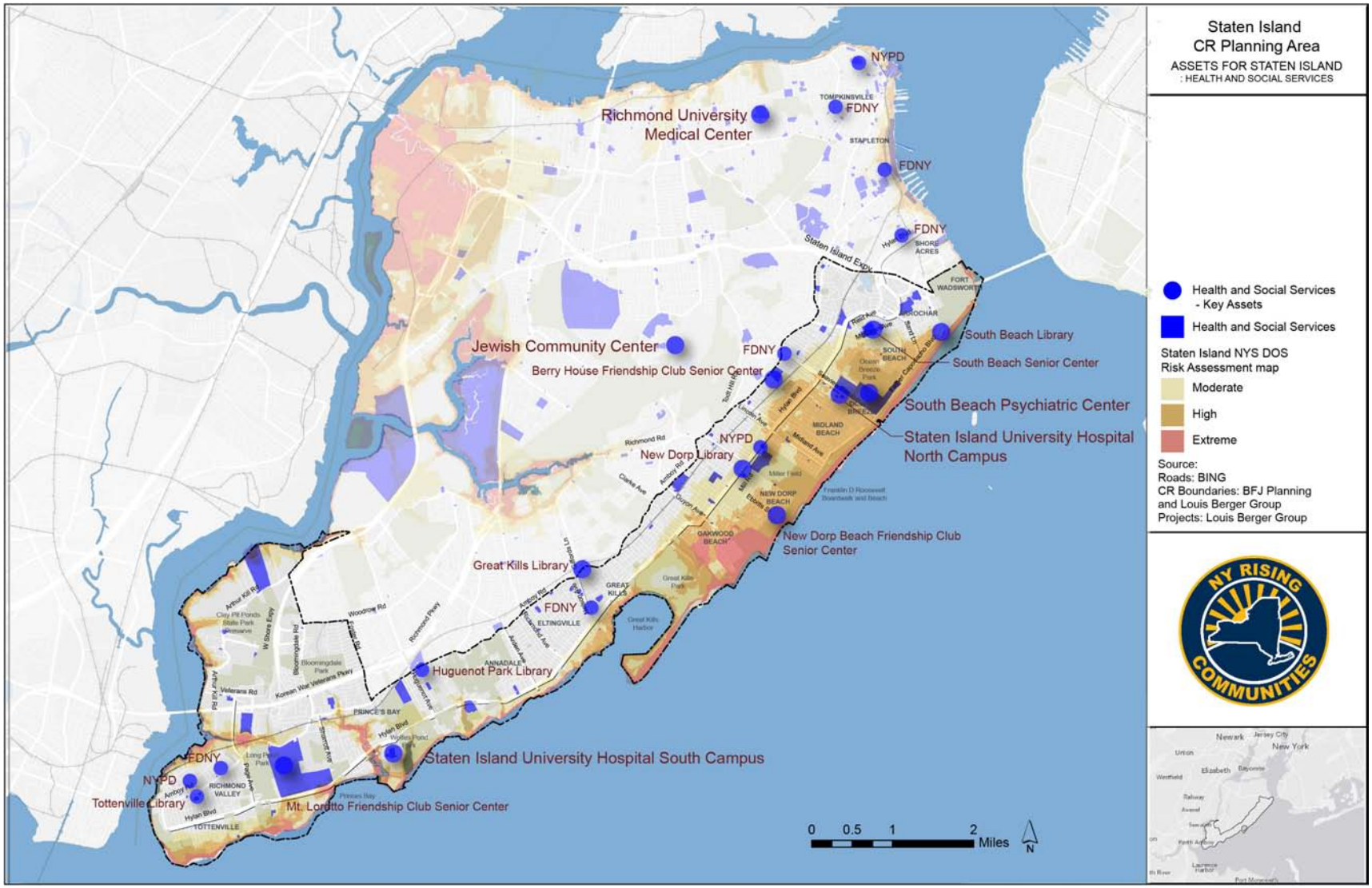
4.2.2 Health & Social Services

Staten Island University Hospital (SIU) has two locations (Figure 6); its East Shore location was severely damaged, causing medical risk to patients and job loss for employees, while its South Shore location was only moderately damaged due to its higher elevation and shoreline defenses. When SIU closes, residents do not have access to sufficient medical services because Richmond University Medical Center (RUMC) only has one emergency room and limited capacity. Therefore, RUMC is considered a critical asset despite its location outside of the planning area. Likewise, the Jewish Community Center served as an important shelter and source of services during the storm, and is therefore a critical asset beyond the planning area. Senior Centers include the South Beach Senior Center, New Dorp Beach Friendship Senior Center and the Mt. Loretto Friendship Club Senior Center. The New Dorp Beach Friendship club was a critical resource for senior citizens on the East Shore, but it was demolished during Superstorm Sandy.

Health & Social Services Examples

- Schools
- Health care facilities
- Day care and elder care
- Government buildings
- Media and communications
- First responders such as police, fire and rescue

Figure 6: Health & Social Services Assets



Tottenville

New Dorp Beach

South Beach

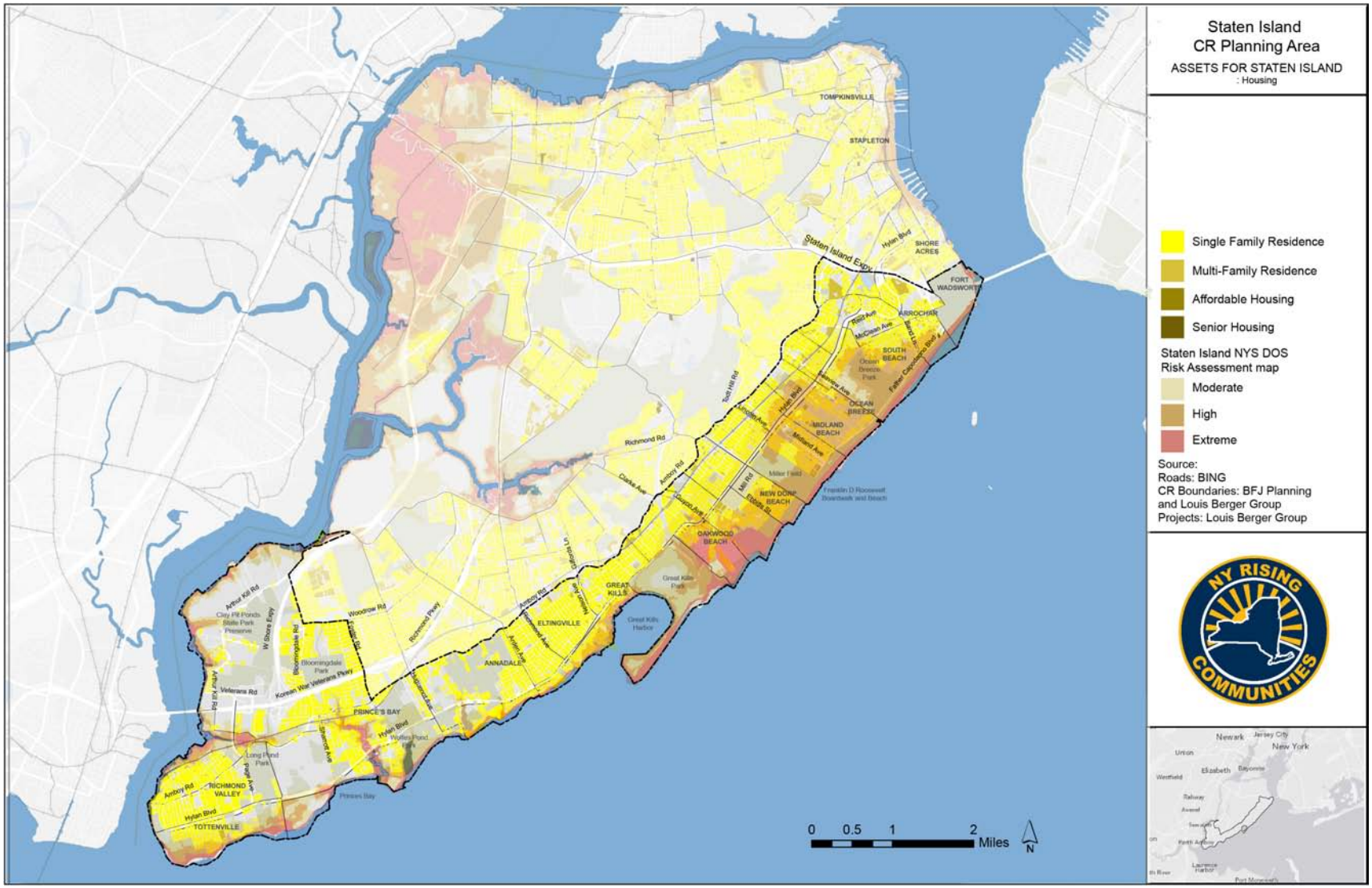
4.2.3 Housing

Areas which suffered severe inundation during Superstorm Sandy include the East Shore neighborhoods of Oakwood Beach, which is in an Extreme Risk zone, as well as South Beach, Ocean Breeze, Midland Beach, which are all in High Risk zones (Figure 7). Residential neighborhoods in High Risk zones on the South Shore include sections of Great Kills, Eltingville, Annadale, and Tottenville. In addition to these neighborhoods, the Senior Center at Staten Island University Hospital is in a High Risk Zone and the Seguine Avenue Senior Center on the South Shore is in a High Risk Zone.

Housing Examples

- Single-family residential neighborhoods
- Multi-family properties
- Senior housing
- Affordable housing

Figure 7: Housing Assets



Clifton SIR Station

Reinforced Sand Dunes, Tottenville

Varrazano-Narrows Bridge

4.2.4 Infrastructure

Transportation infrastructure for Staten Island presents risks for residents in the event of a storm, in part because of assets that are within the risk zone, but also because of difficulties in accessing transportation routes that are outside of the risk zone due to damage to roads, persistent flooding, and congestion. Assets that are particularly at risk include parts of Hylan Boulevard which were subject to Sandy inundation, and the Richmond Valley stop on the Staten Island Railway (Figure 8). The Richmond Valley Train Station sits on top of tidal wetlands with streams running behind both platforms, eastbound and westbound. As part of the Mill Creek Watershed Bluebelt work currently underway, both streams will be removed from behind the platforms and directed under the tracks to NYC DEP Bluebelt BMP's (Best Management Practices) or in layman's terms, holding ponds.

There are also several critical assets that are outside of the Planning Area that impact the ability of residents and businesses within the East and South Shores of Staten Island to recover. These include Richmond Parkway, the Staten Island Expressway, Pearl-Harbor Memorial Expressway, and bridges such as the Verrazano-Narrows Bridge, which was closed for days after Superstorm Sandy.

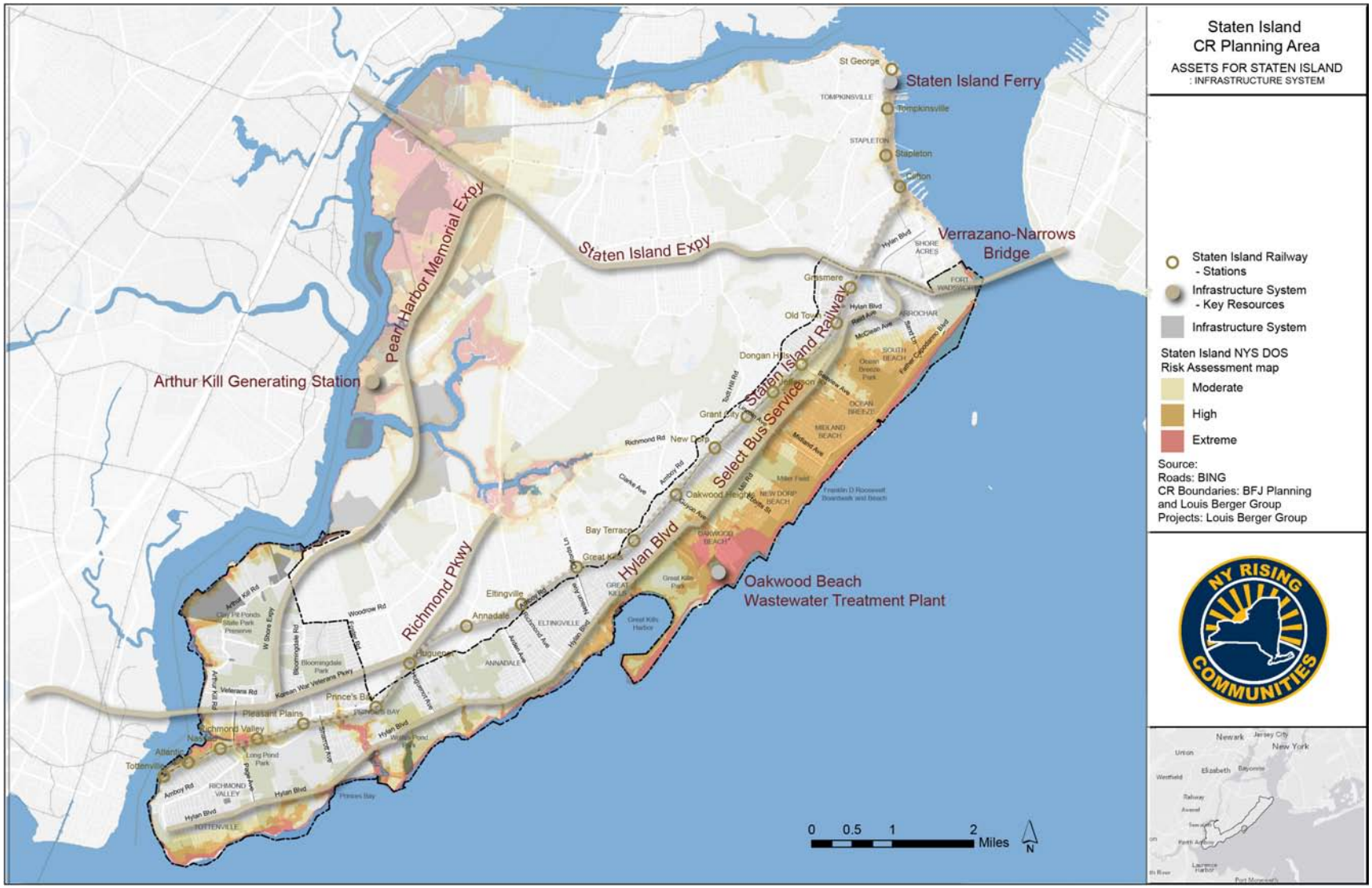
Stormwater and sewer networks are also critical infrastructure assets that present risks in the event of major storms. The Oakwood Beach Sewer Treatment Plant is in the Extreme Risk area and stormwater drainage systems in South Beach, Ocean Breeze, Midland Beach, and New Dorp Beach are in the High Risk area.

Another key asset impacted by Sandy is the Island's electrical power system. The power grid must include greater protections and redundancies to limit outages and provide back-up electricity.

Infrastructure Examples

- Transportation such as roadways and transit
- Stormwater
- Wastewater and water supply infrastructure
- Gas stations
- Solid waste or recycling

Figure 8: Infrastructure Assets



Conference House Park Wetland

New Creek Bluebelt

South Beach

4.2.5 Natural & Cultural Resources

Superstorm Sandy impacted beaches, parks, wetlands, natural stormwater systems, and cultural institutions. Miller Field, which served as a key distribution site during recovery efforts, is located in the High Risk zone (Figure 9). Franklin D. Roosevelt Beach is in the Extreme Risk zone, and suffered extensive damage to the boardwalk and beach erosion. Recovery efforts and long-term plans are underway for Great Kills Park, which includes areas in both the Extreme and High Risk zones.

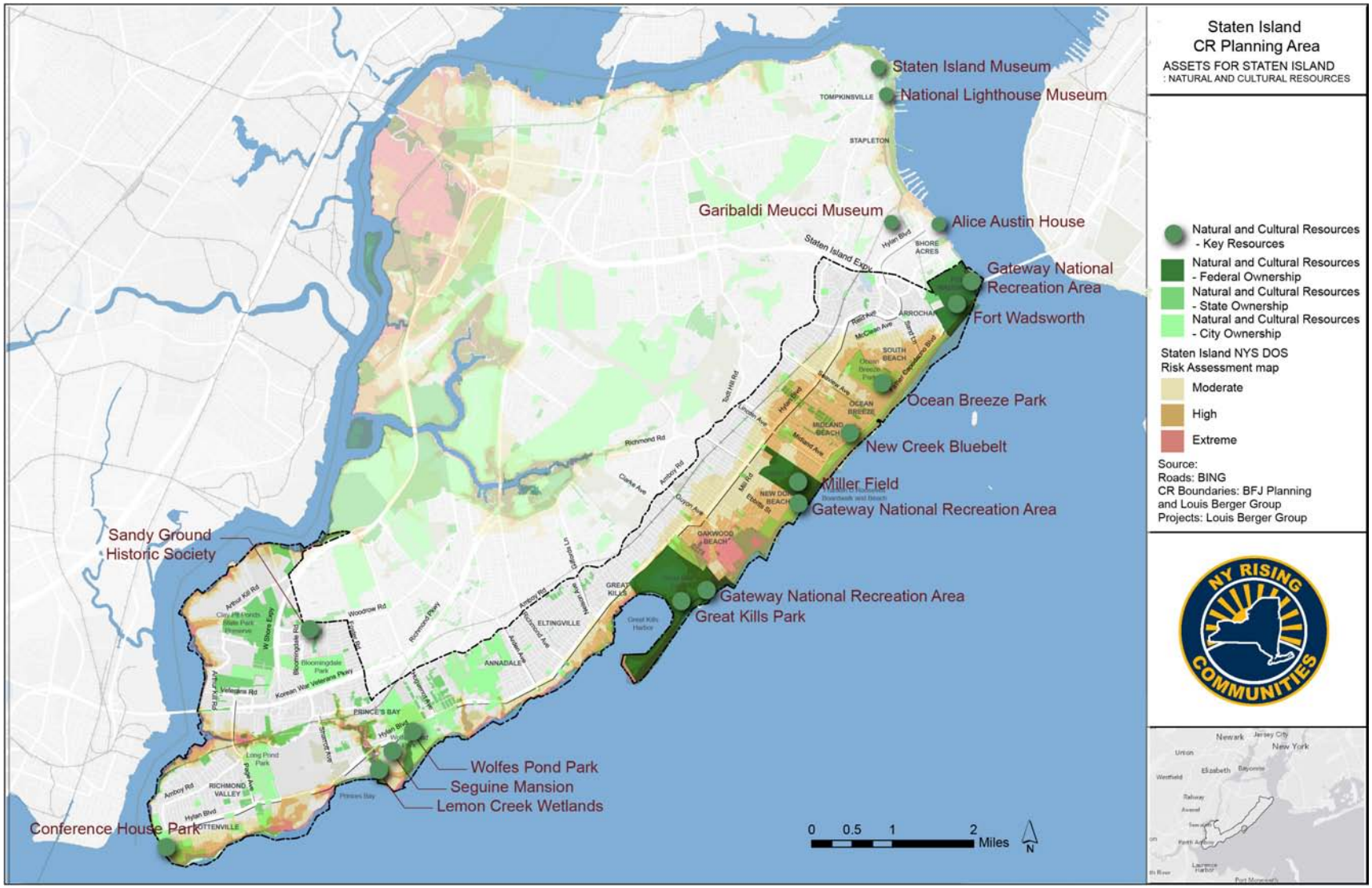
Wetlands, streams, and ponds all contribute to the natural system of managing stormwater in Staten Island. The New Creek Bluebelt in Midland Beach is in the High Risk zone. There are several streams and ponds along the South Shore, including Cunningham Pond, Mill Creek, Lemon Creek, Bunker Pond, and Wolfe's Pond. These water bodies and their surrounding areas all include both High Risk and Extreme Risk zones.

Cultural resources such as museums, religious institutions, and libraries were also impacted by Superstorm Sandy, and many are also located in areas that are at risk.

Natural & Cultural Resources Examples

- Natural and ecological habitats
- Wetlands and marshes
- Parks
- Recreation and open space
- Museums
- Libraries
- Historic landmarks
- Religious establishments

Figure 9: Natural & Cultural Resources Assets



New Dorp Beach Friendship Club

Red Cross Sandy Response

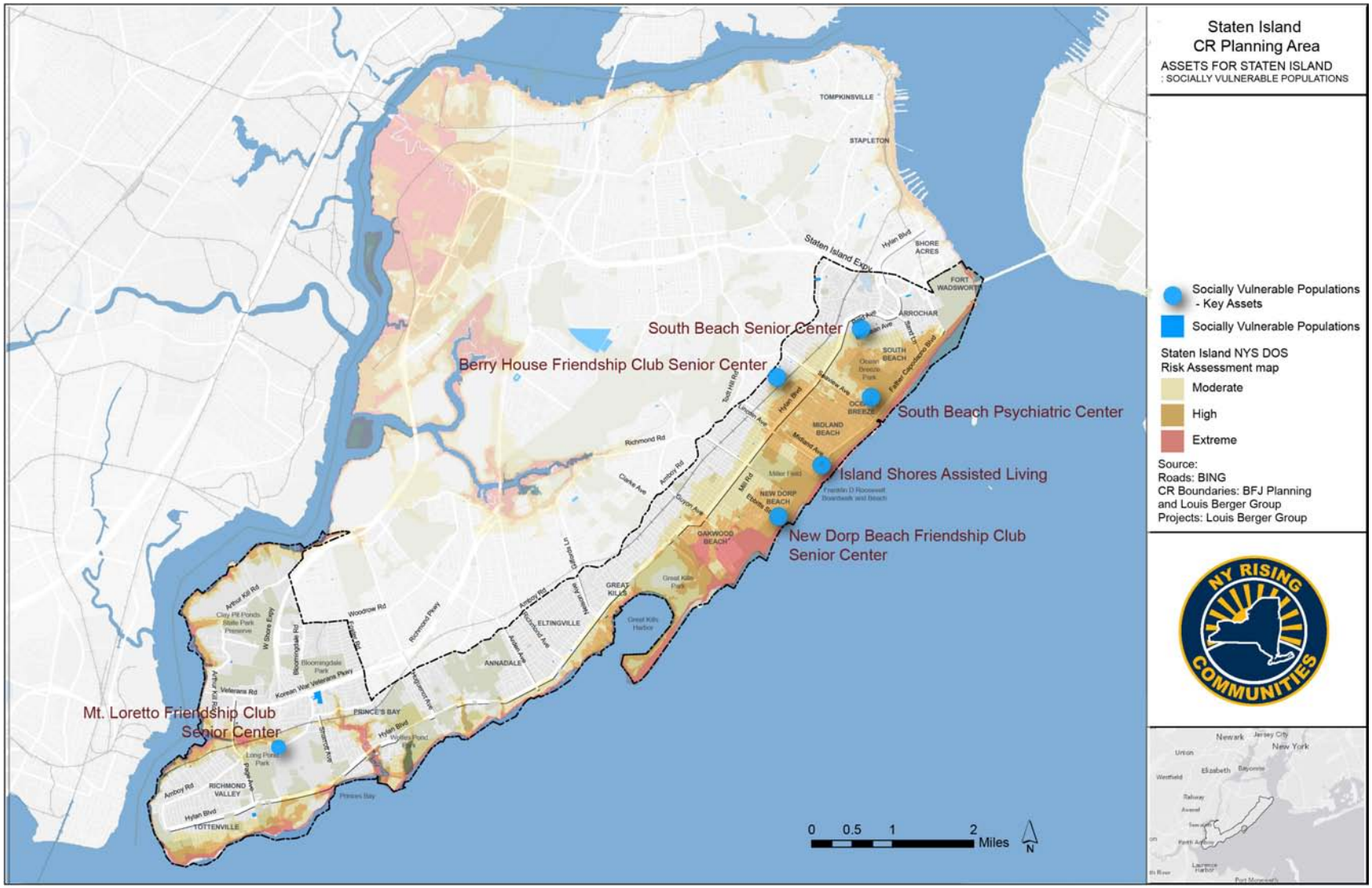
4.2.6 Socially Vulnerable Populations

Superstorm Sandy had devastating impacts on socially vulnerable populations within the East and South Shores with approximately 67% of storm-related fatalities comprised of residents over the age of 55 and more than 33% over the age of 65. Socially vulnerable populations identified within the high risk zone include the elderly population in single-family homes in Midland Beach throughout the Planning Area, residents of the South Beach Psychiatric Center and residents of the Island Shores Assisted Living facility (Figure 10).

Socially Vulnerable Populations Examples

- People with disabilities
- Low-income populations
- The elderly
- Young children
- Homeless and people at risk of becoming homeless

Figurte 10: Socially Vulnerable Populations Assets



4.3 NEEDS AND OPPORTUNITIES

Though Sandy was an unprecedented event, the sources and causes of flooding observed on the greater scale during Sandy are regularly reflected on a smaller scale during high tides, rain storms, and nor'easters. Sandy has effectively exposed the greater system-wide inadequacy of the Staten Island's flood mitigation and protection system, as well as the need for more robust comprehensive planning.

The objective of the needs and opportunities assessment is to evaluate potential for increased resilience in the short, medium, and long-term on the East and South Shores of Staten Island. The following section presents an initial evaluation of the needs and opportunities within the Planning Area. These needs and opportunities will be refined through additional detailed analysis of the assets and risks within the Planning Area, as well as through input from the Planning Committee and public.

4.3.1 Community Planning & Capacity Building

Need: Greater coordination amongst community-based organizations that provide critical resources in educating residents in preparation for disasters and helping people recover.

Opportunity: Strong network of community-based organizations, civic pride, and neighborhood identification that can be built upon to improve education and outreach.

4.3.2 Economic Resilience

Need: A stronger, more resilient local economy that helps businesses bounce back more quickly from disasters.

Opportunity: Active business community, including small businesses that are rooted in their neighborhoods; Support from a strong network of local business groups, such as the Staten Island Chamber of Commerce, Staten Island Economic Development Corporation, and Midland Beach Merchants Association.

Microgrid Strategy

4.3.3 Health and Social Services

Need: Coordination amongst health care facilities, first responders, and social services organizations to identify at-risk areas, populations, and individuals. Ensure that vulnerable populations are protected and able to recover from disasters. Measures to allow Staten Island University Hospital to remain operational during and after severe weather.

Opportunity: Strong institutions such as Staten Island University Hospital and Richmond University Medical Center, as well as specialized social services organizations that are embedded in the community, such as religious organizations, senior care providers, and non-profit networks.

4.3.4 Housing

Need: Creative economic programs to help extreme and high risk neighborhoods with high ownership rates, to either build back more safely or relocate.

Opportunity: Strong sense of community amongst waterfront neighborhoods with emotional and financial investments in assets that will benefit from modernization.

4.3.5 Infrastructure Systems

Need: strengthened coastal protections, improved stormwater mitigation, expanded sewer networks and more reliable power grid and transportation infrastructure. Connections within the Planning Area and the rest of the island, as well as between Staten Island and the rest of the region.

Opportunity: Enhance resiliency of grey and green infrastructure systems; large institutional facilities, municipal buildings, and open space to house microgrids and renewable energy.

4.3.6 Natural and Cultural Resources

Need: Integration of natural resources into existing stormwater and flood protection infrastructure.

Opportunity: Established Bluebelt program, ample parkland and open space, and potential to expand networks of green infrastructure to improve stormwater protections. Pursue public-private partnerships for investment in green infrastructure and stormwater to generate construction capital independent of traditional funding.

Temporary Berms, Tottenville

EAST & SOUTH SHORES OF STATEN ISLAND

5.0 RECONSTRUCTION STRATEGIES

5.0 PRELIMINARY RECONSTRUCTION STRATEGIES

5.1 KEY RECONSTRUCTION THEMES

Based on input from the Planning Committee, feedback from Public Engagement events, and initial research, the following key reconstruction themes represent a framework that will guide development and evaluation of specific reconstruction strategies and potential projects. Moving forward, potential projects will be assessed on their ability to mitigate future risk, vetted and prioritized by the Planning Committee and the public, and framed by their ability to respond to one or more of the following key reconstruction themes:

Theme 1

Leverage funding sources for their maximum value, including the available $25M in CDBG-DR funds and additional sources, by evaluating the impact of ongoing and planned projects in order to identify gaps where the strategic application of these funds can make the most difference.

Theme 2

Strengthen key connections to enable the East and South Shores to better withstand future weather events. Although the emphasis of the NYRCR Plan is on the East and South Shores, Staten Island is one island, and the Planning Area is inextricably linked to, and dependent upon, the rest of the island.

Theme 3

Build on the strong network of existing civic, health and social service organizations that the East and South Shore communities have been fortunate to have operating in the area to strengthen the resilience of the area's organizational infrastructure.

5.2 KEY RECONSTRUCTION STRATEGIES

Based on the above key three themes, detailed strategies and projects will evolve throughout the planning process, addressing the needs of and risk to the six asset categories. The following presents a preliminary list of key reconstruction strategies for each of the six asset categories. These strategies will continue to evolve based on input from the Planning Committee, the public and based on research and analysis conducted as part of the NYRCR planning process.

5.2.1 Community Planning & Capacity Building

Reconstruction Strategy: Strengthen the support infrastructure for socially vulnerable populations to help prepare and evacuate these groups in advance of a storm, track and protect them during the immediate aftermath, and return the community back to normal soon after.

Reconstruction Strategy: Evaluate and support facilities that provide support for low-income populations, the elderly, people with disabilities, children and the homeless should be evaluated.

Reconstruction Strategy: Provide education to the Staten Island Community, especially targeted at socially vulnerable populations. This education should include a description of how storm surges work, an explanation of why NY Harbor is especially vulnerable, why Staten Island lies at the most vulnerable point, what to watch for in storm forecasts, the importance of having a plan, and how to save life and property. This educational plan should consist of signage, associated educational brochures, and activities. Resilience is just as much about social programs and education as it is physical infrastructure.

Reconstruction Strategy: Establish emergency response network of non-profit organizations.

Reconstruction Strategy: Provide good Samaritan liability protection for State-licensed design professionals.

5.2.2 Economic Resilience

Reconstruction Strategy: Strengthen the network of local businesses to increase the economic resilience of the community prior to, during and following extreme weather events.

Reconstruction Strategy: Foster a robust and diverse business base that is resilient to risk.

5.2.3 Health & Social Services

Reconstruction Strategy: Generate greater coordination between health and social services organizations to effectively communicate services to all populations, with attention paid to populations that are often forgotten.

Reconstruction Strategy: Provide new capacity and community space to serve the senior population and other residents on Staten Island.

Reconstruction Strategy: Enhance resiliency of the physically vulnerable health and social service facilities (i.e. Staten Island University Hospital) serving the Planning Area and strengthen connections to health and social service organizations located beyond the Planning Area, yet critical to the area's population (i.e. Richmond University Hospital).

5.2.4 Housing

Reconstruction Strategy: Provide residents in low-lying and coastal areas with a range of housing options that are resilient in design and location.

Reconstruction Strategy: All residents should feel safe in their homes and during times of potential danger residents should be protected from risk by both strong physical and social infrastructure.

Reconstruction Strategy: Increase security within residential neighborhoods during times of evacuation.

5.2.5 Infrastructure Systems

Reconstruction Strategy: Increase transportation access during flood events through multi-modal transportation options and safe vehicle parking areas.

Reconstruction Strategy: Create public-private partnerships for investment in green infrastructure and stromwater to generate construction capital independent of traditional funding.

Reconstruction Strategy: Increase coastal edge elevations (with sea level rise factored in) to minimize inland tidal flooding. Increase height of existing protection measures and construct additional measures to from continuous barrier to tidal surges.

Reconstruction Strategy: Provide redundancy in electricity infrastructure and establish alternative energy sources.

Reconstruction Strategy: Pre-designate staging and storage areas for storm-recovery equipment and operations in areas containing large parking lots or warehouse facilities.

5.2.6 Natural & Cultural Resources

Reconstruction Strategy: Accelerate the improvement of the Planning Area's stormwater management system through the coordination with the ongoing Blue Belt program and private land acquisition.

Reconstruction strategy: Eco-restoration of wetlands and environmentally sensitive areas.

Reconstruction strategy: Use natural-based infrastructure systems for stormwater management.

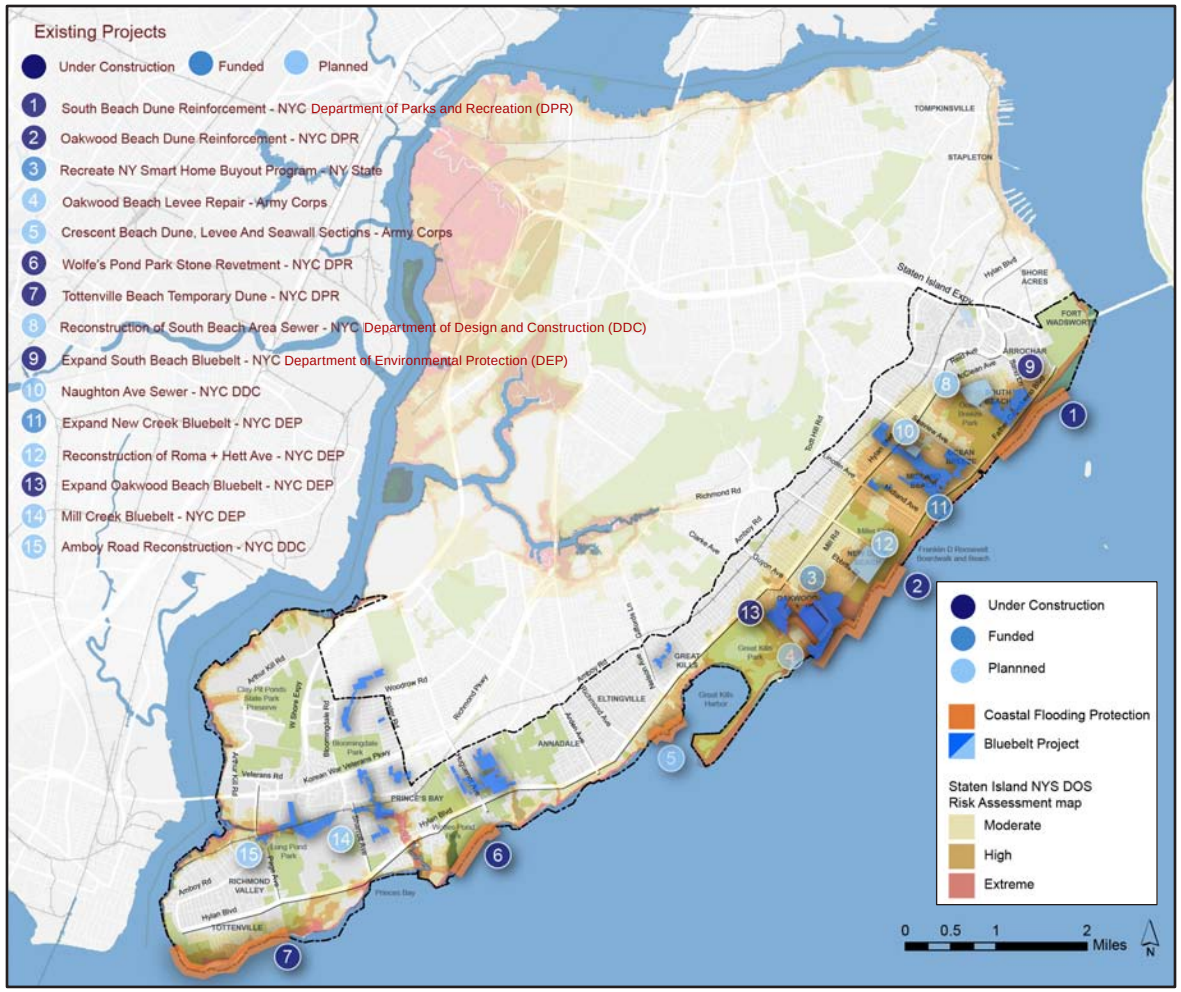
5.3 POTENTIAL KEY PROJECTS

Numerous projects are planned and several are underway to fortify portions of the shoreline and address damage caused by Sandy (Figure 11). Coordination between these projects and their managing agencies will be critical in order to maximize the level of protection provided. The goal of the NYRCR Plan is to identify which needs have been addressed and to identify where opportunities exist to fill unmet, yet critical, reconstruction and resiliency needs. These potential projects are summarized in the attached map.

In addition to those projects already planned or underway, the following list of potential project examples (the numbering of each potential project example corresponds with the numbering on the associated map) represents a preliminary compilation of ideas that have come out of the NYRCR Planning process thus far. These project examples have been categorized around the three key themes identified above as well as by the six asset categories. While these ideas represent projects suggested to date, additional projects will emerge as the planning process continues. Further, these project examples will be evaluated by the Risk Assessment Scenario tool for their cost-benefit, evaluated by the Planning Committee and at Public Engagement meetings for support

by the community, and evaluated based on their ability to protect critical assets. The final list of projects prioritized in the NYRCR Plan may include some of the following projects as well as others yet to be identified. Please see Appendix A for a description of each of the following projects.

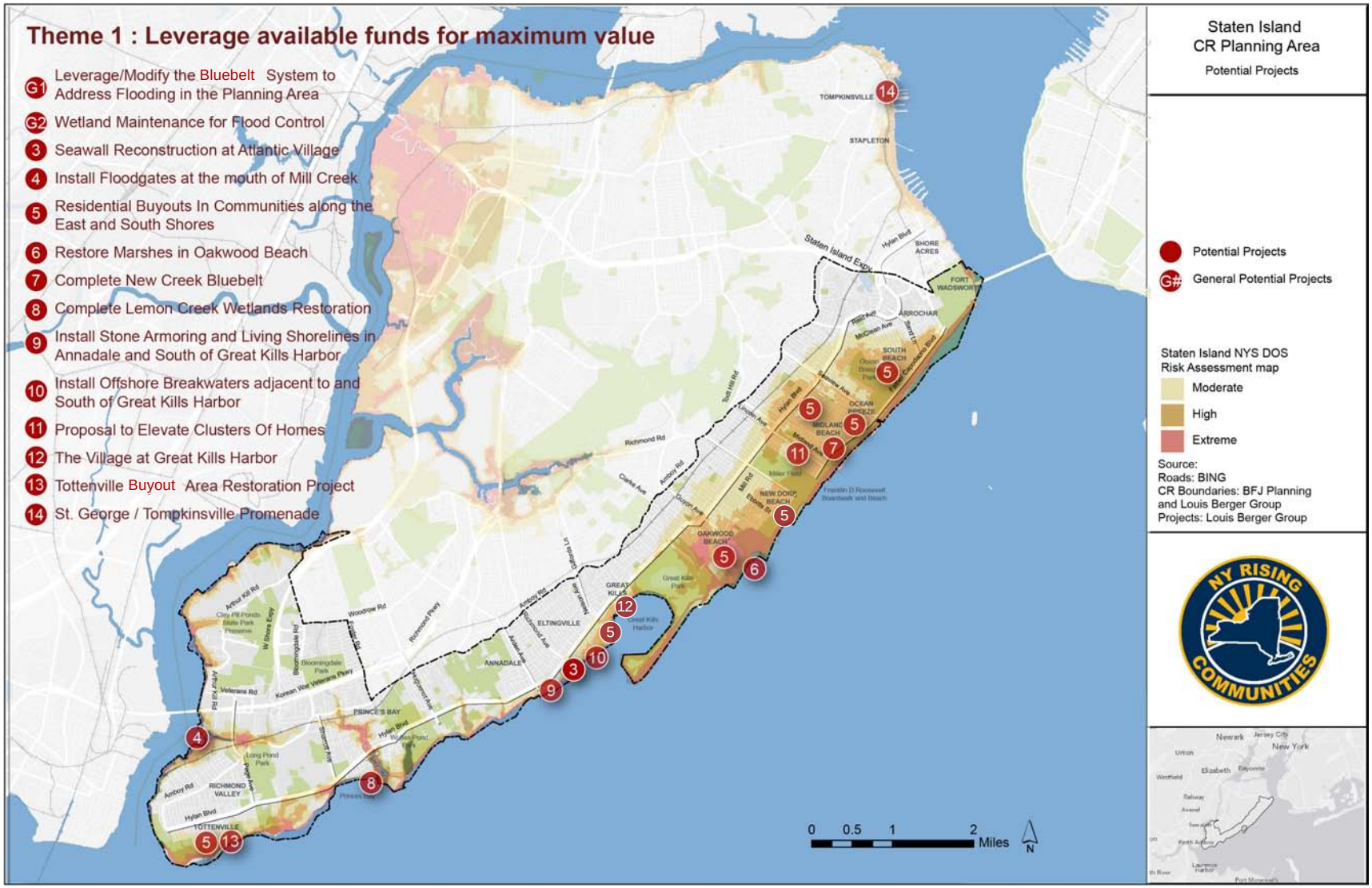
Figure 11: Existing & Ongoing Projects



Key Theme 1: Leverage available funds for maximum value

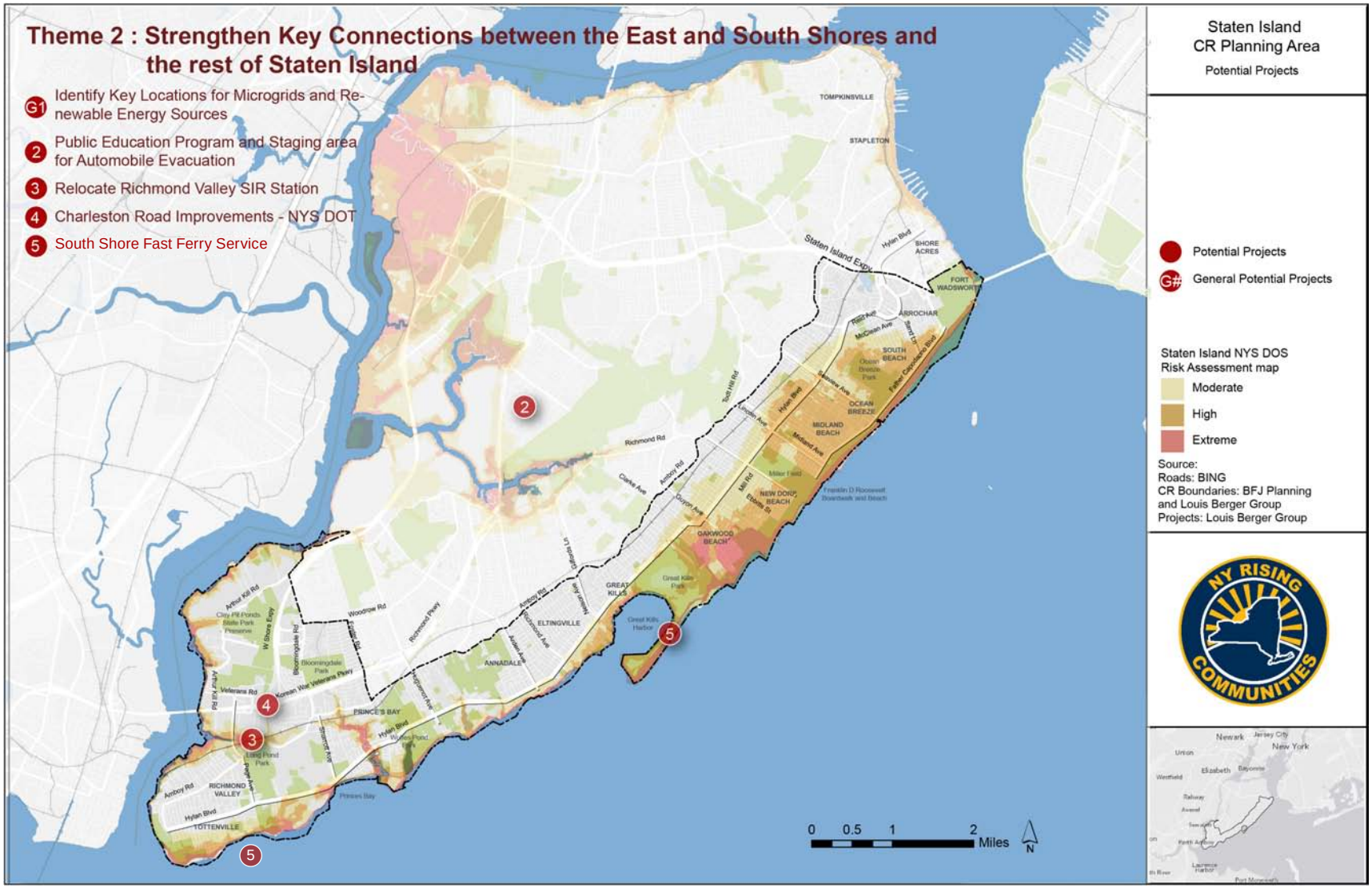
	Potential Project Examples	Time Frame	Community Planning & Capacity Building	Economic Reslience	Health & Social Services	Housing	Infrastructure Systems	Natural & Cultural Resources
G1:	Leverage/modify the Bluebelt system to address flooding in the Planning Area.	Medium					X	X
G2:	Wetland maintenance for flood control.	Short						X
3:	Seawall reconstruction at Atlantic Village.	Short					X	
4:	Install floodgates at the mouth of Mill Creek.	Long					X	
5:	Residential buyouts in communities along the east and south shores.	Short				X		
6:	Restore marshes in Oakwood Beach.	Medium						X
7:	Complete New Creek Bluebelt.	Medium					X	X
8:	Complete Lemon Creek Wetlands Restoration.	Short					X	X
9:	Install stone armoring and living shorelines in Annadale and south of Great Kills Harbor.	Long					X	X
10:	Install offshore breakwaters adjacent to and south of Great Kills Harbor.	Medium					X	
11:	Proposal to elevate clusters of homes in Midland Beach.	Medium				X		
12:	The Village at Great Kills Harbor.	Short / Long	X	X			X	X
13:	Tottenville buyout area restoration project – create open space, construct wave attenuators and upslope seawall	Long					X	X
14:	St. George/Tompkinsville Promenade.	Short		X				X
15:	Short-term coastal protections at Annadale Beach	Short					X	

Figure 12: Key Theme 1



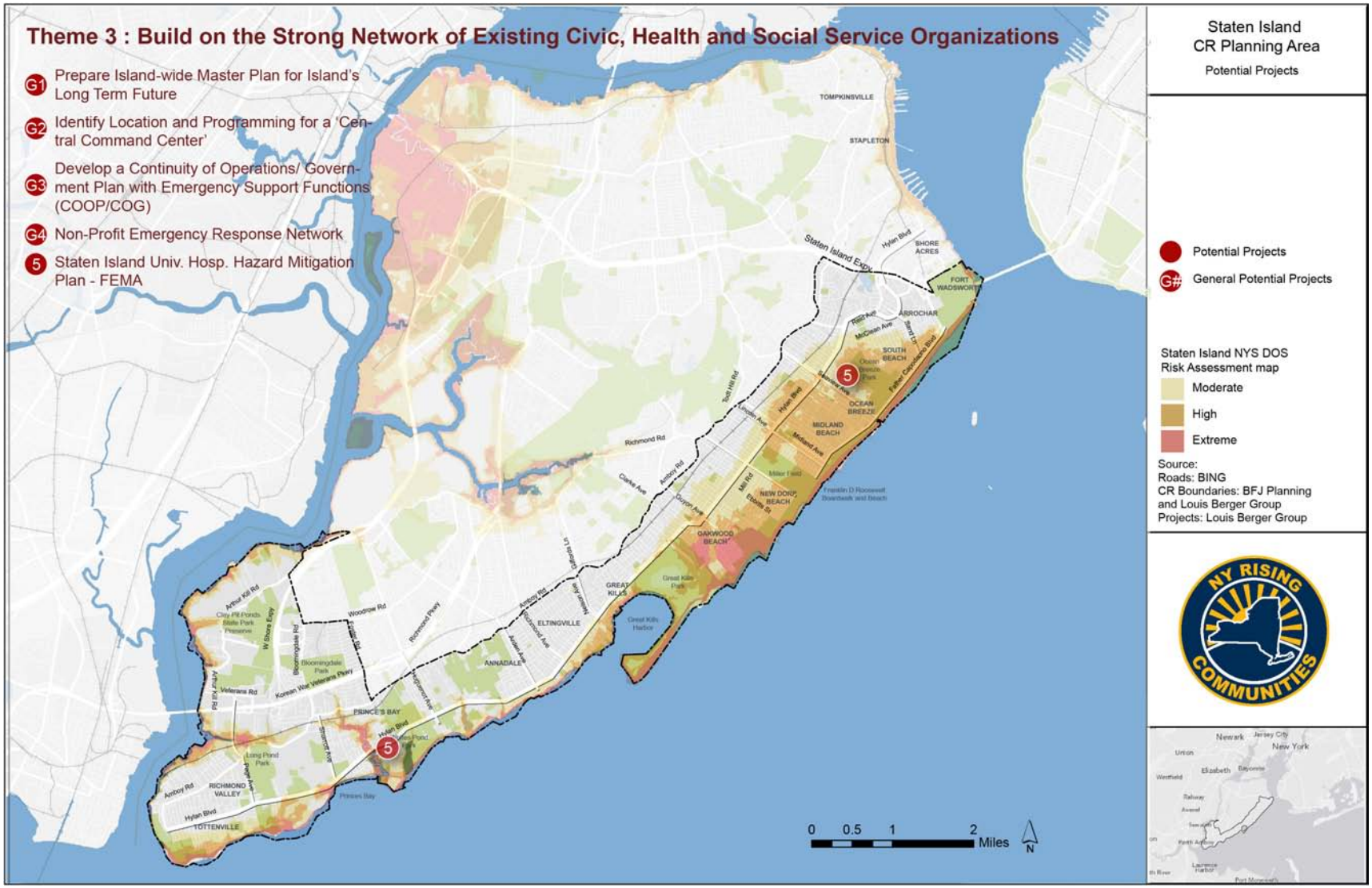
Key Theme 2: Strengthen key connections between the East and South Shores and the rest of Staten Island								
	Potential Project Examples	Time Frame	Community Planning & Capacity Building	Economic Reslience	Health & Social Services	Housing	Infrastructure Systems	Natural & Cultural Resources
G1:	Identify key locations for microgrids and renewable energy sources to ensure reliable communication during emergencies.	Short	X				X	
2:	Preparedness/Education: 'Go to High Ground' – Staging area for automobile evacuation (and other preparedness initiatives).	Short	X					
3:	Relocation of the Richmond Valley Staten Island Railroad Station.	Long					X	
4:	Charleston Road Improvements (NYS DOT).	Short					X	
5:	South Shore Fast Ferry Service	Short					X	

Figure 13: Key Theme 2



Key Theme 3: Build on existing civic, health and social service organizations to increase resilience of the area's organizational infrastructure								
	Potential Project Examples	Time Frame	Community Planning & Capacity Building	Economic Reslience	Health & Social Services	Housing	Infrastructure Systems	Natural & Cultural Resources
G1:	Prepare Island-wide Master Plan to plan for Staten Island's long-term future.	Medium	X					
G2:	Identify location and programming for a 'Central Command Center' during times of emergency.	Short	X					
G3:	Develop a Continuity of Operations/Continuity of Government Plan with Emergency Support Functions (COOP/COG).	Medium	X					
G4:	Establish a Non-Profit Emergency Response Network	Short	X		X			
5:	Staten Island University Hospital Hazard Mitigation Plan (FEMA).	Short	X		X			

Figure 14: Key Theme 3



5.4 PRELIMINARY IMPLEMENTATION MEASURES

The NYRCR Plan requires careful consideration of what assets are at risk, what resources are available, and the capacity for mitigating risk through specific management measures. Selected management measures may include a variety of projects and actions, which would reduce the risk to a given asset, several assets or the community as a whole.

New York State has identified six classes of management measures that can reduce the exposure and vulnerability of assets to storm impacts. While some management measures have more immediate benefit to risk and resilience, others are more effective in combination with other strategies. These classes include:

- Class 1: Conserve, Restore, and Enhance Natural Protective Features
- Class 2: Resilient Construction
- Class 3: Structural Defenses
- Class 4: Land Use Planning and Regulation
- Class 5: Market-Based Methods
- Class 6: Increased Awareness and Information

As potential actions are developed, the Planning Committee will weigh the applicability of management measures according to the nature of the risk and immediacy of hazard, entities involved, and available resources. Projects will then be prioritized by their capacity to reduce immediate exposure to risk, serve multiple recovery functions, and support the larger recovery strategy.

The following table illustrates potential management measure examples for the reconstruction strategies identified above.

Management Measures

Action	Class	Recovery Functions	Timeframe
Install stone armoring and living shorelines in Annadale and south of Great Kills Harbor	1, 3	Infrastructure Natural and Cultural Resources	Medium
Install offshore breakwaters adjacent to and south of Great Kills Harbor	3	Infrastructure	Medium
Install floodgates at the mouth of Mill Creek	3	Infrastructure	Long
Develop a Continuity of Operations/Continuity of Government Plan with Emergency Support Functions (COOP/COG)	6	Community Planning and Capacity Building	Short
Identify key locations for microgrids and renewable energy sources	2	Infrastructure Community Planning and Capacity Building	Short
Residential buyouts in communities along the east and south shores	1	Housing	Short
Complete New Creek Bluebelt	1	Natural and Cultural Resources	Medium

5.5 REGIONAL PERSPECTIVE

As a borough of the City of New York, which shares water bodies with the State of New Jersey and Long Island (Figure 15), regional plans and projects in neighboring jurisdictions will have a strong impact on Staten Island.

The Planning Committee's membership is representative of these many regional issues, geographic diversity, and ongoing efforts. Further, the open nature of Planning Committee meetings encourages collaboration with other local and regional initiatives.

The most significant current and proposed projects, such as the sewer upgrades by NYC Department of Design and Construction (DDC), the expansion of the New Creek Bluebelt by NYC Department of Environmental Protection (DEP), and the seawall coastal protection systems proposed by the US Army Corps of Engineers Phase I Study scheduled to begin construction in 2016, will impact the proposed reconstruction strategies developed through the NYRCR planning process.

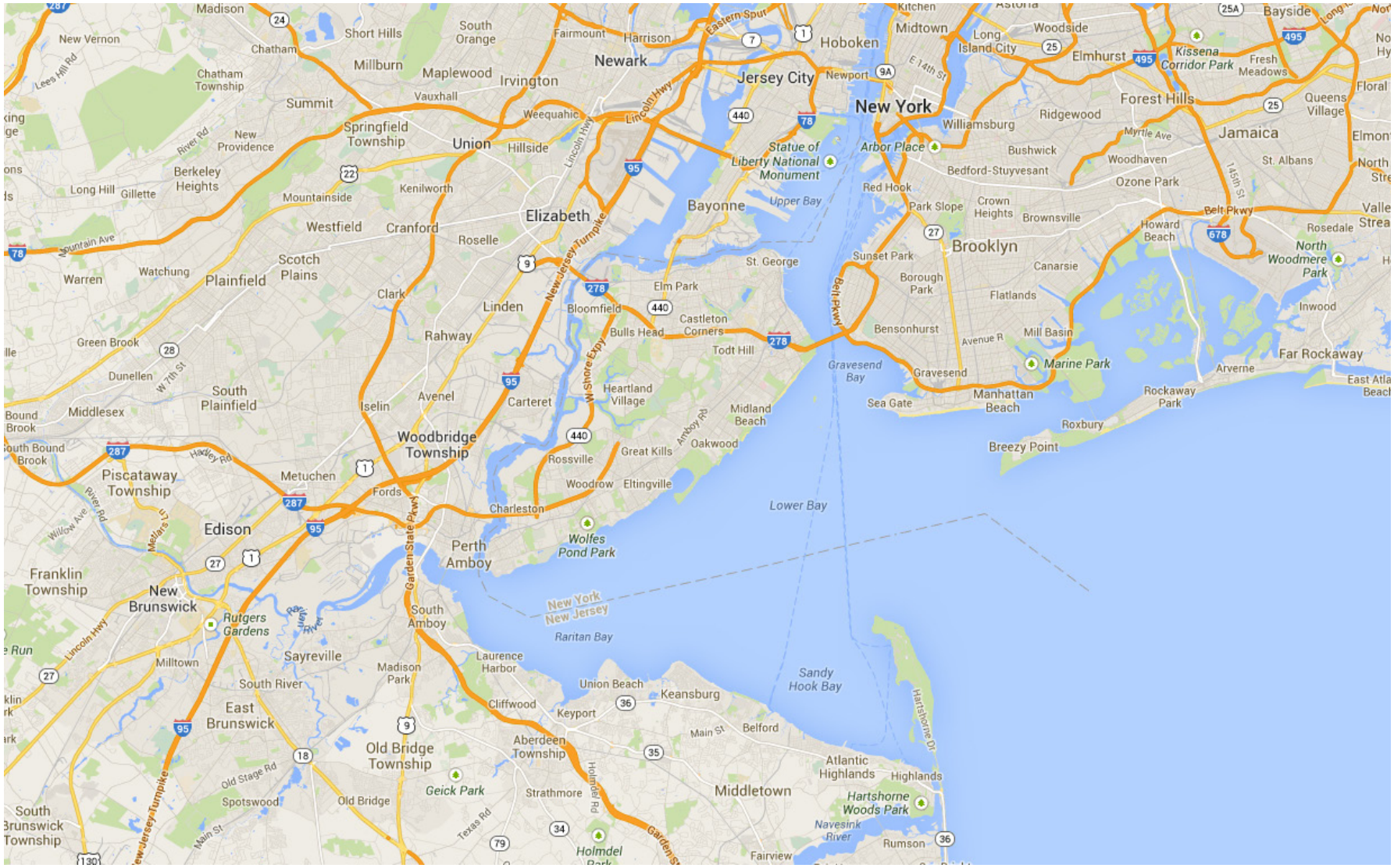
Noted regional initiatives and organizations reviewed or engaged through this process include:

- New York City and state and federal agencies, including local Staten Island offices
- New York City Special Initiative for Rebuilding and Resiliency (SIRR)
- US Army Corps of Engineers, Hurricane and Storm Damage Reduction Project on the South Shore of Staten Island, NY; North Atlantic Coast Comprehensive Study
- Sandy Rebuilding Task Force, Hurricane Sandy Rebuilding Strategy
- National Parks Service, plans for Gateway National Recreation Area
- New York City Local Waterfront Revitalization Program
- SImagines: Planning for Recovery Program
- Vision for Staten Island
- Staten Island American Institute of Architects Regional/Urban Design Assistance Team

Some challenges identified are beyond the jurisdictional control of Staten Island, such as city zoning ordinances, which are governed by the City of New York, and shoreline stabilization, which is the responsibility of the US Army Corps of Engineers. Therefore, it is critical that the NYRCR planning process is inclusive of community, city, state and federal agencies, who share jurisdictional control and responsibility on Staten Island and along its shorelines and waterways. The New York Department of State will continue to facilitate coordination with New York City and federal partners, working closely with the Staten Island Planning Committee, to ensure that the outcomes of Staten Island's Community Reconstruction Plan are recognized, do not conflict with and complement recovery and resiliency strategies identified for implementation by the City, State, and Army Corp of Engineers, while bringing local perspectives to a regional dialogue.

Reconstruction strategies will be evaluated by the Committee on a regional basis, rather than in a vacuum, considering current or proposed projects as well as parallel planning efforts such as Long Term Community Recovery (LTCR) plans. As all NYRCR Committees work through the planning process, collaboration with committees in other Boroughs will lead to coordinated reconstruction strategies that can serve multiple recovery functions. The State will continue to facilitate communication among organizations, by sponsoring meetings and workshops to address regional challenges and craft comprehensive strategies for building both a more resilient Staten Island, and a stronger New York State.

Figure 15: Regional Map



EAST & SOUTH SHORES OF STATEN ISLAND

6.0 PRELIMINARY IMPLEMENTATION STRUCTURE

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The community will identify key projects and reconstruction strategies in the categories of community planning and capacity building, economic, health and social services, housing, infrastructure, and natural and cultural resources. These projects will then be evaluated further based on several factors including time range (immediate/intermediate, long-range), geographic scope (regional or local), financial cost, and benefits (public versus private interests).

Assessing the benefits and costs of the project is imperative to determine if the project is feasible and implementable. Once the costs and benefits have been determined and the project is deemed feasible, timeline, funding source and responsible agency will be identified.

Determining Benefits

The benefits of a reconstruction project will focus on hazard risk reduction and increasing public safety. The risk reduction estimate (or hazard loss avoidance) may be determined through use of the New York State Risk Assessment Tool or the HEC-RAS model, dependent on available data and nature of the project. Additional benefits (co-benefits) to a project may include sustainability, economic benefits, environmental benefits and health and social benefits. Examples include the number of potential lives saved and expected economic gains, such as community revitalization.

Determining Costs

Project costs will be based off the scope of work and include management, construction cost (including administration and management), life cycle costs (annual maintenance), useful life (number of years before the project will need to be replaced). Costs should also consider the socio-economic impacts such as displacement of population.

Timeframe

Immediate/Intermediate/Long-Range Implementation – an action that could reasonably be implemented in two (2) years or less would be an Immediate action; within two to five (2-5) years would be Intermediate; and an action that would take longer than five (5) years to enact would be Long-Range.

Funding Sources

The final projects presented in the Community Reconstruction Plan are not limited to the CDBG-DR funds ($25 million). Additional funding sources may be utilized and include:

- FEMA Funding (pre-disaster, post-disaster)

- HMA Program: post-disaster (HMGP) and pre-disaster(PDM, FMA)
- Other Federal Agencies (USACE, EPA)
- Public-private partnerships
- Local Funding including taxation and Bonds

Responsible Agency

Lastly, a responsible agency will be identified for each project. The responsible agency will be determined based on the nature of the project.

EAST & SOUTH SHORES OF STATEN ISLAND

7.0 APPENDIX A

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7.1 POTENTIAL PROJECT DESCRIPTIONS

The following presents a brief description of potential projects broken down by the three key themes described in the NYRCR Conceptual Plan. This list is not intended to be a final list of projects, but rather a point of departure for discussing potential projects in the Planning Area. Please see the attached maps for the location of each of these potential projects.

Theme 1: Leverage available funds for maximum value.

G1: Leverage/modify the Bluebelt system to address flooding in the Planning Area

The New York City Department of Environmental Protection (NYC DEP) is currently expanding the mid-island bluebelt, which will detain stormwater and help mitigate stormwater flooding in the Planning Area. NYC DEP has already acquired 325 acres of wetlands and adjacent areas for the Staten Island Bluebelt, with plans to acquire an additional 195 acres over the next 30 years, including acquisitions in Oakwood Beach, New Creek, and South Beach. This initiative would explore opportunities in coordination with NYCDEP, local communities and others to increase the number of properties, their location, their connectivity, flood storage and discharge capacity and relationship with the coastal area and opportunities to strategically accelerate implementation taking into account flood protection objectives.

G2: Wetland maintenance for flood control

With an extensive bluebelt network, Staten Island requires debris removal and active maintenance of wetlands to ensure their proper function and maximum capacity for stormwater retention. This project would increase maintenance capacity of the NYC DEP through community partnerships and volunteering, promoting environmental education and stewardship among Staten Island residents over a key nature-based infrastructure asset.

3. Seawall reconstruction at Atlantic Village

The seawall at Atlantic Village is commonly owned by the homeowners association. It was damaged by Superstorm Sandy, leading to the inundation of 60 homes within the village. This proposal is for repairs to the seawall and promenade along the beach, which would also provide expanded access to the public. Although the beachfront is privately owned by the homeowner's association, they have historically allowed public access. An initial estimate to repair the wall is for approximately $1M.

4. Install floodgates at the mouth of Mill Creek

New York City, as part of the report produced by the Special Initiative for Recovery and Resilience (SIRR), proposes that the Army Corps of Engineers study the potential for floodgates at the mouth of Mill Creek to prevent inundation from future storms. One primary objective of this proposal is to protect the Staten Island Railway from flood damage. In addition, the Mill Creek floodgates would be used to demonstrate the viability of this strategy at other locations along the South Shore.

5. Residential buyouts in communities along the east and south shores

Residential structures have been identified for acquisition in order to alleviate repetitive flooding. These particular homes are listed by FEMA as either Repetitive Loss or Severe Repetitive Loss properties. The homes are primarily located in Oakwood Beach, New Dorp Beach, and Midland Beach. This program would build upon the Recreate NY Smart Home Buyout Program which has begun in Oakwood Beach. The goal of acquiring these homes is to prevent future claims, protect Staten Island residents, and implement wetland reforestation and green infrastructure. In addition, residents from Ocean Breeze, Great Kills, and Tottenville have also expressed interest in participating in a buyout program. An expansion of a buyout program in these neighborhoods should be explored.

6. Restore marshes/wetlands in Oakwood Beach, New Dorp Beach and Midland Beach

As a final mitigation step following residential buyouts, the report *Hurricane Sandy: Destruction, Recovery, Mitigation, Resilience and Sustainability*, suggests wetlands restoration or constructing "stormwater wetlands" in Oakwood Beach, New Dorp Beach and Midland Beach. Wetlands restoration would renew the natural and historical wetlands that were lost or degraded, to renew their ecosystem function. The New York City Department of Environmental Protection has proposed a similar concept of constructing stormwater wetlands or marshes, a common practice utilized on the Staten Island Bluebelt, for retaining and filtering stormwater runoff.

7. Complete New Creek Bluebelt

New York City's proposed New Creek West Branch project will address wetland rehabilitation and flood management in an area that is prone to chronic street and property flooding in Midland Beach. Approximately 80 percent of streets in and around the project area regularly flood as they currently do not have storm sewers. At the present time rain water runs off streets, roof tops and other impervious surfaces and collects in low lying areas because there is no outlet for the water since the West Branch of New Creek is filled with sediment, meaning it cannot convey stormwater runoff.

The proposed project will open up the West Branch wetland system thereby reducing chronic flooding and allowing the low-lying area surrounding it to drain more rapidly after a storm. The proposal will direct rain water to the Bluebelt's constructed wetlands which are designed with natural hydrology in mind and with measures that prevent large amounts of sediment from again clogging the waterways. The project will restore an original stream that has become almost entirely silted in and provide a healthy and diverse riparian habitat. The applications are submitted with a scope of work and the USDA estimates the cost and funds based on the application. New York City is applying for funding through the Emergency Watershed Protection Program (EWP) under the USDA's Natural Resources Conservation Service (NRCS).

8. Complete Lemon Creek wetlands restoration

(See G1 above)

9. Install stone armoring and living shorelines in Annadale and south of Great Kills Harbor

New York City, as part of the report produced by the Special Initiative for Recovery and Resilience (SIRR), recommends installing armor stone shoreline protection, known as revetments, in vulnerable locations along Staten Island's coastline. The first Phase of revetments is slated for installation in Annadale, beginning in 2013 with anticipated completion in 2016. This project aims to serve as a pilot project to demonstrate the effectiveness of such structural shoreline erosion control. The Mayor's Office of Long Term Sustainability was tasked with this project, in partnership with the New York City Economic Development Corporation (NYC EDC).

10. Install offshore breakwaters adjacent to and south of Great Kills Harbor

SIRR also recommends that the City of New York call on and work with the US Army Corps of Engineers (USACE) to study and potentially install offshore breakwaters adjacent to and south of Great Kills Harbor. The goal of this project is wave attenuation, meaning the mitigation of waves before they surpass the shoreline and impact the Planning Area. The breakwaters aim to protect those businesses, marinas and residential communities subject to strong wave action and erosion during extreme weather events. This project should be achieved within four years of a completed USACE Study.

11. Proposal to elevate clusters of homes in Midland Beach

This proposal is to elevate clusters of homes in the low-lying communities of Midland Beach, New Dorp Beach, and Ocean Breeze to protect housing assets, as well as lives, from extreme weather events.

12. The Village at Great Kills Harbor

The mission of the Village of Great Kills Harbor is to create a renewed, sustainable and resilient seaside destination anchored by existing businesses, families, new investment, and by its historic beginnings as a fishing village. Members of the Great Kills Harbor Community have initiated 'ground-up' resilient planning in their own neighborhood. The project, titled, "The Village of Great Kills Harbor" is spear-headed by business owners and residents, in consultation with an experienced Staten Island Planning Team. The initiative is designed to engage neighborhood stakeholders and will include Community Planning, Economic Resilience, Infrastructure Systems, and Natural and Cultural Resources.

13. Tottenville buyout area restoration project

Residents of Tottenville would like to explore the possibility of a buyout program that includes the area between Swinnerton Street to the west, Sprague Avenue to the east and some distance north of Billop Avenue. The residents propose that once the homes have been bought-out and demolished, the land should be restored as designated open space (not redeveloped) that includes coastal protection measures such as wave attenuators. The attenuators could be artistic to provide an aesthetic benefit and integrated into a park that can be flooded. In addition, in order to provide additional protection a flood wall could be installed at upslope end of buyout area to protect remaining properties.

14. St. George/Tompkinsville Promenade

In the short term, the proposed project is to repair the promenade, construct temporary fencing, and restore pedestrian access from the promenade to the ferry terminal. The long-term vision is to create a landscape greenway which would incorporate coastal protection elements and public recreational access on the waterfront.

15: Short-term coastal protections at Annadale Beach

As described above under potential project 9, New York City recommends installing armor stone shoreline protection, known as revetments, in vulnerable locations along Staten Island's coastline. The first Phase of revetments is slated for installation in Annadale, beginning in 2013 with anticipated completion in 2016. However, residents of the neighborhood would like to see temporary or short-term coastal protection measures, including sand replenishment, berms, jetties at the shoreline of Annadale Beach to control coastal erosion in the short term as the study continues for the proposed seawall. Annadale Beach is defined as the shoreline from Poillon Avenue to Arbutus Ave north of Wolfe's Pond Park.

Theme 2: Strengthen key connections between the East and South Shores and the rest of Staten Island.

G1: Identify key locations for microgrids and renewable energy sources to ensure reliable communication during emergencies

Widespread power outages following Superstorm Sandy dismantled the communications network, among other impacts, and elucidated the need for a reliable, independent power supply network as well as a dependable method for communications during disaster response. Planning Committee members suggested the Fresh Kills landfill as a resource for wind and other renewable power sources, incrementally implementing micro-grids at strategic locations to supply critical facilities (e.g., hospitals, shelters, colleges or other facilities that already have emergency backup power sources). A micro-grid ties together multiple energy sources that generate electricity, and can function independent from the regular power grid. These can be conventional energy sources such as diesel or natural gas as well as renewable energy such as solar, wind and other sources. During normal conditions, the micro-grid can provide electricity back to the traditional power grid, helping to reduce peak electricity demands. If the regular grid fails during an emergency, the micro-grid would continue to supply power to those facilities connected to it. Micro-grids can also be combined with "Smart Grid" technology which allows for distribution of electricity better tailored to localized demand and can also be connected with each other to create a network of micro-grids, thereby reducing the risk of outages.

2. Preparedness: 'Go to High Ground' – education campaign, staging area for automobile evacuation, as well as other preparedness initiatives

The College of Staten Island has proposed a system of wayfinding signage paired with designated areas for automobile evacuation that encourage residents to 'go to high ground' during a storm surge event. The year-round signage would serve as a continuous information campaign that serves to visually educate the residents of Staten Island about how storm surges work. The College has developed a template for the signs, and is presently developing an accompanying brochure that illustrates why the Island is vulnerable and the importance of emergency preparedness. The goal of the education campaign is to mitigate against loss of life and property (cars).

3. Relocation of the Richmond Valley Staten Island Railroad Station

New York City, as part of the report produced by the Special Initiative for Recovery and Resilience (SIRR), proposes that MTA study the potential for the Richmond Valley SIR station to be relocated to Page Avenue. This would create a rail and bus hub in the Page Avenue commercial area and respond to transit demand created by the closing of the Atlantic and Nassau stations in Tottenville. Further, the new station could be elevated to prevent the frequent flooding that occurs at the existing Richmond Valley station.

4. Charleston Road improvements (NYS DOT)

New York State Department of Transportation has proposed to conduct road improvements off of the Korean War Veterans Parkway and Westshore Expressway. Road improvements would include closing the New Jersey-bound entrance ramp on Veterans Road West near Sharrotts Road, adding an entrance ramp at Westfield Avenue, and adding a Veterans Road West exit ramp just before Englewood Avenue.

5. South Shore Fast Ferry Service

After Superstorm Sandy, the City of New York operated an eight-week temporary ferry service running from Great Kills Park to Pier 11 at Wall Street, continuing on to 35th Street. Residents of Staten Island have expressed interest in implementing a permanent fast ferry service from somewhere on the South Shore to Manhattan, which would provide an additional commute alternative as well as greater overall connectivity."

Theme 3: Build on existing civics to increase resilience of the area's organizational infrastructure.

G1: Prepare island-wide Master Plan to plan for Staten Island's long-term future

A recurring theme at Planning Committee meetings was the need for interagency coordination and community input to develop a long-term Master Plan for the entire Island. As Staten Island is unique from the other Boroughs in New York City, the Island would benefit from a more local planning effort that builds upon the visioning and planning processes of the Vision for Staten Island, SImagines and NYRCR to incorporate resiliency into a comprehensive Master Plan. Such a plan would emphasize communication between the community and the New York City government, as well as state and federal partners.

G2: Identify location and programming for a 'Central Command Center' during times of emergency

A repeated suggestion during public outreach meetings involved the need for a year-round resource center for Staten Island residents, where they could go before extreme weather events for information on emergency preparedness, social services, and state or federal programs. During a disaster, the resource center would function as a 'central command center' where residents knew they could access a reliable power supply, phone charging stations, food and supplies. Serving as more of a distribution location than a shelter, this command center would then become a hub for FEMA, New York State and New York City to administer disaster recovery programs. This project corresponds with the recommendation for reliable power supplies, as it would be a key location for a micro-grid or other independent source of power.

G3: Develop a Continuity of Operations/ Continuity of Government Plan with Emergency Support Functions (COOP/ COG)

The identified need for interagency coordination that evoked the preparation of a long-term Master Plan also encourages the preparation of a short-term Continuity of Operations Plan for disaster recovery. FEMA is the Department of Homeland Security's lead agency for managing the nation's Continuity Program, through which FEMA provides direction and guidance to assist in developing capabilities for continuing the federal, state, and local government jurisdictions and private sector organizations' essential functions across a broad spectrum of emergencies. According to FEMA, a COOP/COG plan has four phases: Phase I – Readiness and Preparedness; Phase II – Activation, when plans, procedures, and schedules to transfer activities, personnel, records, and equipment to alternate facilities are activated; Phase III – Continuity Operations when full execution of essential operations at

alternate operating facilities is commenced; and Phase IV – Reconstitution, when operations at alternate facility are terminated and normal operations resume. The COOP/COG plan could be activated in response to a wide range of events or situations ranging from wildfires to extreme storm events or the threat of a terrorist attack. The plan would ensure that all coordination among agencies, businesses and community organizations is in place prior to a disruptive event, and that both social services and communication of those services continue during disaster recovery.

G4: Establish a Non-Profit Emergency Response Network

After Superstorm Sandy, a number of local, Staten Island organizations joined together to increase their impact in helping victims of the storm recover. A non-profit emergency response network would help these groups, including the Siller Foundation, the Staten Island Community and Interfaith Long-Term Disaster Recovery Organization, JCC of Staten Island, and many others be better prepared to mobilize in the event of a future disaster. In part, the role of this network would include leveraging the resources and funds of national organizations, identifying locations and strategies for temporary housing, and coordinating volunteer assistance.

5. Staten Island University Hospital Hazard Mitigation Plan (FEMA)

New York City, as a part of the report produced by the Special Initiative for Recovery and Resilience (SIRR), proposes to provide technical and other support to Staten Island University Hospital as it seeks to secure FEMA Hazard Mitigation Grant Program funding. The funding would allow SIUH to implement flood resiliency measures that were included as part of a needs assessment produced by the Staten Island Borough President's Office.