



# YONKERS NYRCR



## NY RISING COMMUNITY RECONSTRUCTION PLAN

.....

**December 2014**

NY Rising Community  
Reconstruction Program



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# Foreword

## Introduction

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

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

## Program Overview

The NYRCR Program, announced by Governor Cuomo in April of 2013, is a more than \$700 million planning and implementation program established to provide rebuilding and resiliency assistance to communities severely damaged by Hurricane Irene, Tropical Storm Lee, and Superstorm Sandy. Drawing on lessons learned from past recovery efforts, the NYRCR Program is a unique combination of bottom-up community participation and State-provided technical expertise. This powerful combination recognizes not

only that community members are best positioned to assess the needs and opportunities of the places where they live and work, but also that decisions are best made when they are grounded in rigorous analysis and informed by the latest innovative solutions.

Launched in the summer of 2013 and completed in March 2014, Round I of the NYRCR planning process included 50 NYRCR Planning Areas, comprising 102 storm-impacted localities. In January 2014, Governor Cuomo announced a second round of the planning process, serving an additional 22 storm-impacted localities. Four of these localities were absorbed into existing Round I NYRCR Planning Areas, bringing the number of localities participating in Round I up to 106; the other 18 localities formed 16 new Round II NYRCR Planning Areas. Between Rounds I and II, there are 66 NYRCR Planning Areas, comprising 124 localities. The program serves over 2.7 million New Yorkers and covers nearly 6,500 square miles, which is equivalent to 14% of the overall State population and 12% of the State's overall geography.

In Rounds I and II, the State allotted between \$3 million and \$25 million to each participating locality for the implementation of eligible projects identified in the NYRCR Plan. The funding for these projects is provided through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.<sup>1</sup>

Each NYRCR Planning Area is represented by a NYRCR Planning Committee composed of local residents, business owners, and civic leaders. Members of the Planning Committees were identified in consultation with

<sup>1</sup> Five of the Round I Planning Areas—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.

established local leaders, community organizations and, in some cases, municipalities. The NYRCR Program sets a new standard for community participation in recovery and resiliency planning, with community members leading the planning process. Across the State, more than 650 New Yorkers have represented their communities by serving on Planning Committees. Nearly 650 Planning Committee Meetings have been held, during which Planning Committee members worked with the State's team to develop community reconstruction plans, which identify opportunities to make their communities more resilient. All meetings were open to the public. An additional 250+ Public Engagement Events attracted thousands of community members, who provided feedback on the planning process and resulting proposals. The NYRCR Program's outreach has included communities that are traditionally underrepresented, such as immigrant populations and students. All planning materials are posted on the program's website ([www.stormrecovery.ny.gov/nyrcr](http://www.stormrecovery.ny.gov/nyrcr)), providing several ways for community members and the public to submit feedback on the program and materials in progress.

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

The NYRCR Program does not end with this NYRCR Plan. Governor Cuomo has allotted over \$700 million for planning as well as implementing eligible projects identified in NYRCR Plans. NYRCR Planning Areas are also eligible for additional funds through the NY Rising to the Top Competition, which evaluates applications from Round II NYRCR Planning Committees across three categories—Regional Approach, Inclusion of Vulnerable Populations, and Use of Green Infrastructure. The winner of each category will be

allotted a share of the competition's \$3.5 million to fund additional eligible projects.

In April 2014, Governor Cuomo announced that projects identified in NYRCR Plans would receive priority consideration through the State's Consolidated Funding Application (CFA) process and charged the Regional Economic Development Councils (REDCs), which play an advisory role in the CFA process, to support NYRCR projects. In December 2014, Governor Cuomo announced that 24 NYRCR projects received nearly \$12 million in CFA funding. This announcement is an example of the Governor honoring his commitment to leverage the work of the NYRCR Planning Committees to incorporate resilience into other State programs and to find additional sources of funding for NYRCR projects. The NYRCR Program is also working with both private and public institutions to identify existing funding sources and to create funding opportunities where none existed before.

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

On the pages that follow, you will see the results of months of thoughtful, diligent work by the Yonkers NYRCR Planning Committee, which is passionately committed to realizing a brighter, more resilient future for its community.

## The NYRCR Plan

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

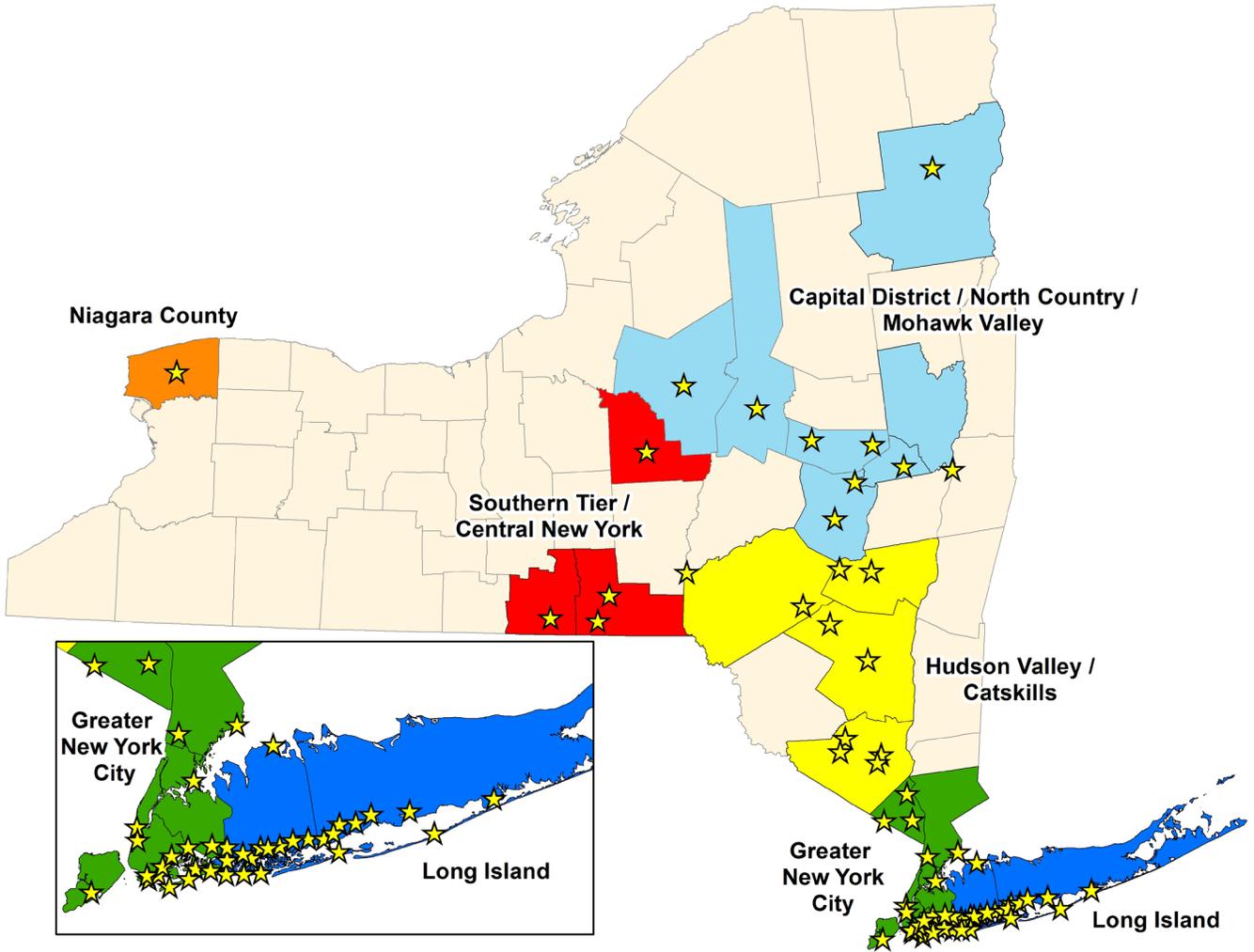
The projects and actions set forth in this NYRCR Plan are divided into three categories. The order in which the projects and actions are listed in this NYRCR Plan does not necessarily indicate the Planning Committee's prioritization of these projects and actions. Proposed Projects are projects proposed for funding through an NYRCR Planning Area's allotment of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. The Proposed Projects and Featured Projects found in this NYRCR Plan were voted for inclusion by voting members of the Planning Committee. Those voting members with conflicts of interest recused themselves from voting on any affected projects, as required by the NYRCR Ethics Handbook and Code of Conduct.

As part of Round II of the NYRCR Program, the Yonkers NYRCR Planning Area has been allotted up to \$3.0 million in CDBG-DR funds for the implementation of eligible projects identified in this plan.

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

The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Planning Area's CDBG-DR allotment to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act. Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. Projects will be implemented on a staggered timeline, and the NYRCR Program will choose an appropriate State or local partner to implement each project. GOSR will actively seek to match projects with additional funding sources, when possible.

In the months and years to follow, many of the projects and actions outlined in this NYRCR Plan will become a reality, helping New York not only to rebuild, but also to build back better.



NY Rising Communities

Note: Map displays the 66 NYRCR Planning Areas from Rounds I and II. (Five of the Round I Planning Areas—Niagara, Herkimer, Oneida, Madison, and Montgomery Counties—are not funded through the CDBG-DR program.)

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# Executive Summary

## I. Overview

The NY Rising Community Reconstruction (NYRCR) Program was established by Governor Andrew M. Cuomo to provide rebuilding and revitalization assistance to communities damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. Recovery and reconstruction initiatives began immediately following these storm events, the overall success of which will be measured by the communities' ability and commitment to become more resilient. The NYRCR Program provides an opportunity for residents, business owners, and community leaders to actively participate in planning for a stronger future—to reflect, to learn, and to build back better and stronger. The Program empowers communities to prepare locally-driven recovery plans to identify innovative reconstruction and resiliency projects and other actions to allow each community not only to survive, but also to thrive in an era when natural risks will become increasingly common.

The Yonkers NYRCR Plan (Plan) was developed over seven months of community stakeholder engagement. The Plan reflects Yonkers' vision and goals, honoring its unique qualities and assets for building a safer, more resilient, and sustainable future.

### a. Community location and allotment amount(s)

The City of Yonkers, located in Westchester County just north of the Bronx, measures 20.3 square miles. The diverse city has just fewer than 200,000 residents and is the fourth largest city in New York. Yonkers is the fastest growing major city in the State outside of New York City with a growth rate of 2.8%. The City is home to over 100 nationalities and has a very diverse landscape, ranging from 4.5 miles of beautiful Hudson

River waterfront along its western edge, to its bustling downtown and historic business district, to miles of hills and valleys that are home to beautiful parks and quiet suburban neighborhoods.

Yonkers is defined by a series of hills and valleys that form an integral part of the City's landscape. Two rivers help delineate the borders of the City: to the west is the Hudson River, and to the east is the Bronx River. In between these two rivers are various streams and waterways prone to flooding, including Grassy Sprain Brook, Saw Mill River, Tibbetts Brook, and Troublesome Brook. Where development is located within the low-lying areas adjacent to these watercourses, significant flooding has occurred. In addition to the riverine flooding along the interior waterways, Yonkers is also vulnerable to coastal flooding from storm surges along the Hudson River.

This Yonkers NYRCR Plan presents proposed programs, policies, and construction initiatives developed throughout the planning process.

The State has allotted up to \$3 million in Federal Community Development Block Grant-Disaster Recovery (CDBG-DR) funding to implement eligible projects developed through the Yonkers NYRCR planning process.

### b. Scope of planning area

The planning area encompasses the entire City of Yonkers. The NYRCR Planning Committee (Committee) determined that impacts from flooding, wind, stormwater, downed trees, and utility outages were widespread enough to merit including all of the City's neighborhoods within the Scope. The areas in the City that did not suffer direct damage from these significant storms remain candidate locations for recovery services, shelters, and other important community

resources. Locating these types of facilities in less damage-prone areas could help the City to recover more effectively from future storm events. In addition to the Citywide Geographic Scope, the Committee determined that certain areas of the City known to have been most heavily impacted by storm damages were in need of a more detailed focus. These sections of Yonkers, centered on major watershed corridors, were developed as focus areas. A total of five focus areas were selected, including the watersheds of the Bronx River, Grassy Sprain Brook and Reservoir, Saw Mill River, Tibbetts Brook, and the City’s Hudson River waterfront.

### c. Summary of storm impacts

Hurricane Irene (August 28, 2011) hit Yonkers with full force, causing widespread and long-lasting damage. These storms damaged public and private property and caused serious physical, economic, and safety hardships to Yonkers residents. Many of the City’s waterways reached record heights during Hurricane Irene, including the Bronx River, Saw Mill River, Grassy Sprain Brook, and Tibbetts Brook. The flood waters of both storms caused extensive damage to businesses, homes, and City infrastructure.

Superstorm Sandy (October 29, 2012) brought with it winds of up to 90 miles per hour that downed hundreds of trees and closed roads throughout the City. Downed trees blocked travel along City roads, and took with them electrical lines, resulting in power losses to thousands of City residents as well as closure of schools and businesses for a full week. During Superstorm Sandy the Hudson River had a high tide of approximately 14 feet above Mean Low Water, flooding much of the waterfront. Hurricane Sandy’s storm surges destroyed a lot of the equipment at the Yonkers Wastewater Treatment Plant (WWTP) and caused untreated and partially treated sewage to flow into the Hudson River. Some of the businesses in Yonkers remain unable to reopen since Superstorm Sandy.

The physical damage caused by Superstorm Sandy and Hurricane Irene to roads, homes, and City infrastructure, coupled with the economic impacts of prolonged closure of businesses, continue to affect Yonkers today. The City is still recovering as its residents prepare for future storm events.

### d. Summary of critical issues

During and after Hurricane Irene and Superstorm Sandy, many water bodies in Yonkers overtopped their banks and released floodwaters throughout the City. In addition to flooding, strong winds during Superstorm Sandy brought down trees and power lines causing disruption to power. These storms exposed vulnerabilities within the City. The issues identified affect the City’s ability to withstand the impact and recover from future storms. The key critical issues facing the City of Yonkers include:

- ▶ Riverine, Coastal, and Stormwater Flooding
- ▶ Tree and Wind Damage
- ▶ Susceptibility of Major Infrastructure to Storm Damage
- ▶ Communication and Education Challenges
- ▶ Managing the Impacts of Development, Including Resiliency Projects

## II. Community-Driven Process

All of the material presented in the Yonkers NYRCR Plan has been developed collaboratively. The NYRCR Program provided the Community with a unique opportunity to participate in a bottom-up, community-driven planning effort to reshape Yonkers for a more resilient future. The steps in the process included organizing for action, creating an inventory of community assets, determining needs and opportunities, conducting a risk assessment, engaging with the region-wide planning context, developing strategies for investment and action, and producing this final Yonkers NYRCR Plan.

## a. Community vision/goals

The Yonkers NYRCR Vision Statement:

The City of Yonkers is a vibrant and diverse community focused on protecting our residents, property, infrastructure, and natural resources from extreme flooding and natural disasters. Our goals are to work together to safeguard the public health and safety of the City's residents through flood mitigation and effective flood recovery, protect the natural environment, and enhance the City's economy for current and future residents.

### Goals:

As we develop a Community Reconstruction Plan, we will strive to develop ecologically sound policies and programs that will:

- ▶ Address flooding as a Citywide problem—with multiple watersheds, rivers, and tributaries—that requires a coordinated mitigation effort with solutions unique to each watershed;
- ▶ Advance educational outreach to ensure our residents understand natural hazards and how they can protect themselves, their homes, and their neighborhoods against future storms in an environmentally sustainable way;
- ▶ Collaborate with City, County, State, and Federal agencies and adjacent municipalities regarding drainage improvements and maintenance;
- ▶ Contribute to a coordinated Citywide preparedness and response against future storms;
- ▶ Coordinate with nearby upstream municipalities that contribute to our flooding problem;
- ▶ Cultivate partnerships among private organizations, public agencies, and municipalities to ensure responsible development;
- ▶ Develop policy, design, and construction standards to make our neighborhoods more resilient in the future;
- ▶ Maintain and upgrade the City's infrastructure;
- ▶ Preserve the character of our neighborhoods; and

- ▶ Protect our neighborhoods from coastal and riverine flooding.

## b. Summary of public outreach

The NYRCR Program is fundamentally a grassroots initiative. Initial project recommendations were generated by the Yonkers NYRCR Planning Committee, which was comprised of community leaders, storm-impacted residents, and municipal staff. The Committee met approximately every other week from the end of June 2014 through mid-November 2014. Materials were circulated to the Committee before and after each meeting and also posted to the City's page on the NYRCR website. Committee members also shared information with their community by posting relevant materials to the City website and Facebook page, leaving materials in the libraries and other high traffic areas, posting information throughout the City, reaching out to friends and neighbors through email and conversation, and attending municipal meetings and community functions to report on their NYRCR Plan progress. To encourage participation and reach as many neighborhoods within the City as possible, meeting locations moved throughout Yonkers during the planning process to accommodate residents and be as inclusive as possible.

Three Public Engagement Meetings were held throughout the seven month planning process, with a fourth to be conducted after the final plan is complete. These meetings provided the opportunity for Yonkers residents to learn about the NYRCR planning process; review and provide feedback on assets, needs, opportunities, strategies, and projects; and help develop community-driven plans for a more resilient future. The format of the Public Engagement Meetings varied throughout the process, but generally included PowerPoint presentations, display boards and mapping, discussion groups with handouts and markers, survey sheets, and a photo booth, where participants had photos taken to memorialize their ideas. The first meeting gathered input on the community vision, goals, assets, and planning context; the second event focused on needs and opportunities; and the third event introduced the community to the Committee's list of projects.

### III. Final plan as blueprint for implementation

#### a. Needs and risks underpin projects

The risks to and vulnerability of assets in the City of Yonkers were made clear when these assets were exposed to Superstorm Sandy and Hurricane Irene. Through the NYRCR planning process, the community shifted its focus from simply making repairs to improving resiliency and prioritized building back better. This change of purpose revealed significant opportunities to help the City build back better.

The Committee understands where the City is vulnerable, where critical assets are located, and what the risks are to those assets. To address their specific vulnerabilities, a comprehensive needs and opportunities analysis was prepared through a combination of research, analysis, discussions among the Committee, and feedback from the community. A sample of the needs and the opportunities identified are:

#### Needs

- ▶ System to contact volunteers in each vulnerable neighborhood to participate in pre- and post-flood emergency communication, including homeowner associations and co-op/condo boards
- ▶ Generators for stores that have perishable inventory, especially grocery stores; for high-rise buildings with elevators; and for other services that are critically needed after storms
- ▶ Better coordination of services/information among emergency services agencies
- ▶ Better protection of homes and neighborhoods from flooding
- ▶ Preservation of electrical service during storms (electrical systems are vulnerable above and below ground)
- ▶ Restoration of streams and tributaries through the removal of debris/obstructions according to recognized best practices

- ▶ Regional and inter-municipal cooperation on flooding and resiliency issues

#### Opportunities

- ▶ Establish and maintain liaison with district volunteer leaders (e.g. various homeowner associations and co-op/condo boards)
- ▶ Find a way to incentivize stores to install generators—especially grocery stores (NYS already mandates gas stations)
- ▶ Inform and educate emergency services personnel (ambulance drivers, firefighters, police) of emergency routes and driving procedures to be used during major storms
- ▶ Utilize land management tools to create flood-safe homes and neighborhoods
- ▶ Explore alternative power opportunities such as renewables and micro-grids for improved access to power and increased flexibility during/after storms
- ▶ Revise protocols for tree pruning, removal, and replanting
- ▶ Support and build on current efforts in the State legislature to establish a Statewide flood mitigation and preparedness authority

#### b. Strategies describe the committee’s approach to meeting those needs

The strategies proposed in the NYRCR Plan consider emergency, disaster recovery, and long-term resiliency needs that remain unmet. The strategies were developed to concentrate the resiliency efforts toward resolving critical issues identified throughout the planning process. They represent statements of action that address how best to fortify community assets, capitalize on opportunities, resolve critical issues, and meet short-, medium-, and long-term goals identified during the planning process. The projects developed throughout the planning process are a path to executing the strategies and realizing the vision the community has for the City of Yonkers.

### c. Projects are the path to executing the strategies

Presented in the table below are strategies developed by the Committee and the Proposed or Featured Projects that implement them. Strategies specifically address the stated needs and transform opportunities into action items. The strategies were developed to concentrate resiliency planning efforts toward resolving critical issues identified throughout the planning process. The Proposed and Featured Projects are presented in conjunction with the strategy that they fulfill; they are not presented in any particular order of priority.

Proposed Projects are projects proposed for funding through a NYRCR Community’s allotment of CDBG-DR funding.

Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

Additional Resiliency Recommendations are projects and actions that the Committee would like to highlight and that are not categorized as Proposed or Featured Projects.

**Table ES-1 Proposed and Featured Projects**

| Strategy  | Project Name  | Project Category |
|---|---|------------------|
| Work with neighborhoods and businesses to improve flood resistance in Yonkers’ vulnerable areas                     | Bronx River and Grassy Sprain Brook Hydrologic Study                                  | Proposed Project |
|   | Saw Mill River Hydrologic Study   | Proposed Project |
| Improve on existing emergency preparedness and communications   | Emergency Power to Street Lights along Evacuation Routes                              | Proposed Project |
|   | Yonkers Emergency Response and Recovery Campaign                                      | Proposed Project |
| Provide information and assistance to home and business owners with pre-storm floodproofing and post-storm recovery | Technical Assistance Program for Residential Resiliency                               | Proposed Project |
| Promote resiliency and flood management best practices through land-use planning and regulation                     | Planning Study to Establish Best Management Practices for Upland Waterways            | Proposed Project |
|   | Resilient Revitalization of the Alexander Street Waterfront— Study and Pilot Projects | Proposed Project |
|   | Scout Field Engineering Study   | Proposed Project |
| Repair, rehabilitate, upgrade, and fortify critical infrastructure assets   | Creation of Access to Grassy Sprain Brook through Sprain Brook Parkway Sound Barrier  | Proposed Project |
|   | Reconstruction of Seawall at Yonkers Paddling and Rowing Club                         | Proposed Project |
| Enhance regional coordination in flood mitigation planning  | Feasibility Study for Creation of a Regional Flood Control Authority                  | Proposed Project |
| Harness resiliency potential of natural resources   | Planning Study for Sprain Diversion Channel   | Featured Project |



# 2014 NY RISING COMMUNITY RECONSTRUCTION PLAN YONKERS NYRCR

## Section I Community Overview





# I Community Overview

## A. Introduction to Yonkers

The City of Yonkers is located in Westchester County along the Hudson River in the lower Hudson Valley of New York State. It is situated just north of the Bronx, New York City, and less than 30 minutes from Midtown Manhattan. To the east, Yonkers is bordered by the City of Mount Vernon, the Town of Eastchester, and the Villages of Tuckahoe and Bronxville. The Town of Greenburgh and the Village of Hastings-on-Hudson border the City to the north, while the Hudson River forms the entire western boundary of the City. Yonkers is New York's fourth largest city and the largest city in Westchester County. The City has a diverse population, consisting of over 100 nationalities<sup>1</sup>. Yonkers' equally diverse landscape ranges from a beautiful 4.5-mile-long waterfront along the Hudson River at the City's western edge, to a bustling downtown and historic business district, and miles of hills and valleys that are home to beautiful parks and quiet suburban neighborhoods.

Yonkers serves as the gateway between New York City and the Hudson Valley. It is well-served by transportation routes due to its location adjacent to New York City. The NYS Thruway (Interstate 87), connecting Albany and New York City, originates at the border between Yonkers and the Bronx and traverses the City from north to south. Other major roadways include the Saw Mill River, Sprain Brook, and Bronx River Parkways, all major north-south connectors within Westchester County. The Metro-North Railroad commuter rail system also provides service to Yonkers. Metro-North's Hudson River Line serves four stations along Yonkers' western edge, while the Metro-North Harlem Line serves an additional seven stations that

the City shares with its eastern neighbors. Yonkers' excellent location and accessibility have made it a highly desirable community for hundreds of years.



*The Hudson River at Getty Square, Yonkers' Downtown Waterfront*

During Colonial times, the area that is now Yonkers was part of a large land holding owned by Adriaen van der Donck, New York City's first lawyer. Van der Donck built a saw mill in what is today the Getty Square neighborhood, beginning a long tradition of industry in Yonkers. As the city grew, so did its industrial prowess as manufacturers could be located close to the population center of New York City and along major transportation routes—the Hudson River, the railroads, and later, parkways and interstate highways. The Otis Elevator Company opened its first factory in Yonkers in the 1850s, and a number of other industries were located in the area including carpet makers, plastics factories, automobile makers, and the nation's largest hat manufacturer.



*Greystone Railroad Station in Yonkers*

After the Second World War, manufacturing began to move out of Yonkers, although some manufacturing remains. This includes the Kawasaki rail car factory, which is the U.S. headquarters for that company's operations. In recent years, Yonkers has seen a revitalization of its waterfront and downtown, with new mixed-use construction along the Hudson River symbolizing a new era for the City.

Today, Yonkers is the fourth-largest municipality in New York State, with a population of 195,976 as of 2010. While many cities in New York State are shrinking, Yonkers is the fastest growing major city in the State outside of New York City with a growth rate of 2.8%. Fifty-six percent (56%) of the population is white, 19% is black, 6% is Asian, and 13% of the population is of Hispanic origin. Fifty-four percent (54%) of Yonkers' housing units are renter-occupied and 46% are owner-occupied. Thirty-six percent (36%) of Yonkers' housing units are in structures of 20 or more units. Twenty-six percent (26%) of the housing stock is in single-family detached houses. Yonkers' housing stock is also relatively old, with only 18% built after 1970. Fifty-five percent (55%) of households living in rented housing units pay more than 30% of their monthly household income in rent. The City's unemployment rate is a relatively low 5.7%.<sup>1</sup>

Yonkers is defined by a series of hills and valleys that form an integral part of the City's landscape. Two rivers help delineate the borders of the City: to the

west is the Hudson River, and to the east is the Bronx River. In between these two rivers are various streams and waterways prone to flooding, including Grassy Sprain Brook, Saw Mill River, Tibbetts Brook, and Troublesome Brook. Developed areas located within the low-lying areas adjacent to these watercourses have experienced significant flooding. In addition to the riverine flooding along the interior waterways, Yonkers is also vulnerable to coastal flooding from storm surges along the Hudson River.

Hurricane Irene and Superstorm Sandy resulted in very different patterns of damage in Yonkers. Hurricane Irene primarily affected upland areas, where rivers and streams flooded their banks, whereas Superstorm Sandy caused its most significant damage along the Hudson River waterfront, where storm surge and wave action were the main factors.



*Grassy Sprain Reservoir*

## B. Geographic Scope

Defining the physical extent of the area that the NY Rising Community Reconstruction (NYRCR) planning process will address was an early step taken by the Yonkers NYRCR Planning Committee (Committee). This planning area, or Geographic Scope, is intended to encompass areas within the City that contain assets and resources critical for the community's response to storm events and the City's economic drivers. The Geographic Scope also includes locations with a history of flooding and storm damage. In developing the Geographic

Scope, the Committee considered locations that are most vulnerable and where assets are most at risk, as well as areas where additional economic investment will help the community's financial resilience.

The Geographic Scope of this NYRCR Plan includes the entirety of Yonkers' municipal limits. The Committee determined that impacts from flooding, wind, stormwater, downed trees, and utility outages were widespread enough to merit including all of the City's neighborhoods within the Scope. Even areas in the City that did not suffer direct damage from these significant storms remain candidate locations for recovery services, shelters, and other important community resources. Locating these types of facilities in less damage-prone areas could help the City to recover more effectively from future storm events.

This geographic study area forms the basis for all subsequent steps of the NYRCR planning process, including the analyses that led to the asset inventory, needs and opportunities, risk assessment, strategies, and projects. The final Geographic Scope, a map of the City of Yonkers, is depicted in Figure I-1.

In addition to the Citywide Geographic Scope, the Committee determined that certain areas of the City known to have been most heavily impacted by storm damages were in need of a more detailed focus. These sections of Yonkers, centered on major watershed corridors, were developed as focus areas. In total, five focus areas were selected, including the watersheds of the Bronx River, Grassy Sprain Brook and Reservoir, Saw Mill River, Tibbetts Brook, and the City's Hudson River waterfront. The final Focus Areas are depicted in Figures I-2 through I-8.

Discussion of how to determine the Geographic Scope began at the first Planning Committee Meeting. Initial conversations revolved around the importance of focusing on the three primary watersheds (i.e., Saw Mill River, Grassy Sprain Brook, and Bronx River) where flooding had routinely and severely damaged neighborhoods, and despite numerous studies and recommended flood protection measures, these neighborhoods remain unprotected. The Committee

also focused on land uses along the Hudson River that are vulnerable to tidal surges, including the Yonkers Wastewater Treatment Plant (WWTP), the North Yonkers Pump Station, the City's Riverfront Library, and new and proposed redevelopment projects along the City's waterfront. Finally, the Committee felt that Citywide policy recommendations were also warranted to make the City more resilient to future storms and to address the potential for City-



*Members of the Public review the Geographic Scope and Focus Areas, Public Engagement Event #1*

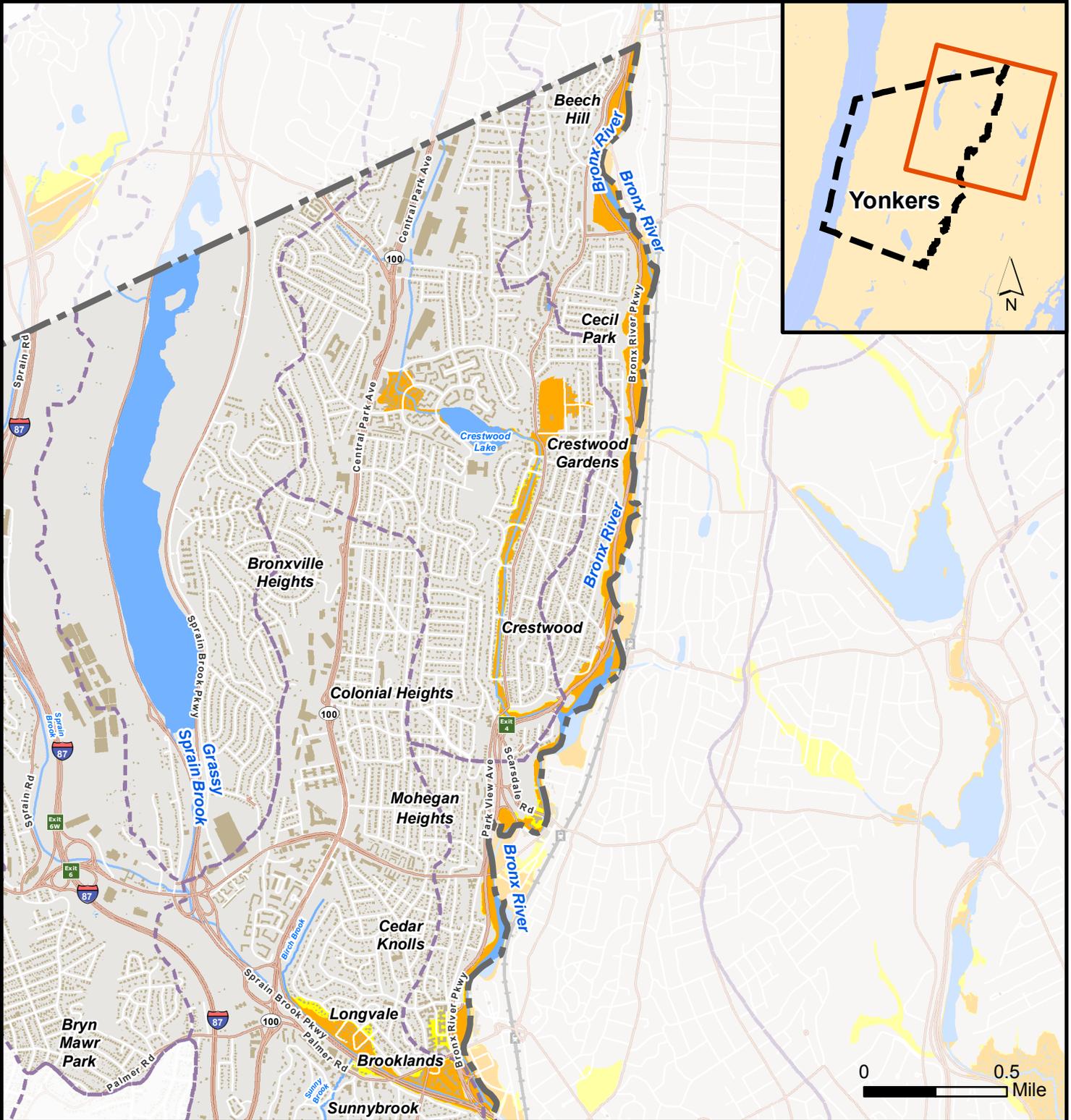
wide damage from high winds, downed trees, off-line vital infrastructure, and power outages. A Geographic Scope that excluded certain areas of the City was rejected because this would not have allowed for a comprehensive discussion of those Citywide problems. A single large Geographic Scope without focus on the important watershed areas was also deemed inadequate. In the end, the Committee determined that while the entire population of the City had been affected by Hurricane Irene and Superstorm Sandy, there were areas warranting focused attention because of their continuous history of flooding and other severe storm impacts. A Citywide Geographic Scope with several localized focus areas was determined to be the best approach.

The Geographic Scope and Focus Areas developed by the Committee were endorsed by the broader Yonkers community during the first of four Public Engagement Events held throughout the NYRCR process. More information about public outreach can be found in Section V.C, "Public Engagement Process."



# Figure I-2

## Bronx River Area (North) - City of Yonkers



### Legend

- |                              |                        |                  |
|------------------------------|------------------------|------------------|
| City of Yonkers (Study Area) | Watersheds             | Wetlands         |
| Building                     | Water Bodies           | Rivers & Streams |
| <b>NYSDOS Hazard Zones</b>   | <b>FEMA Floodzones</b> | Rail Station     |
| Extreme Risk                 | Extreme Risk           | Railroads        |
| High Risk                    | High Risk              | Major Highways   |
| Moderate Risk                | Moderate Risk          |                  |

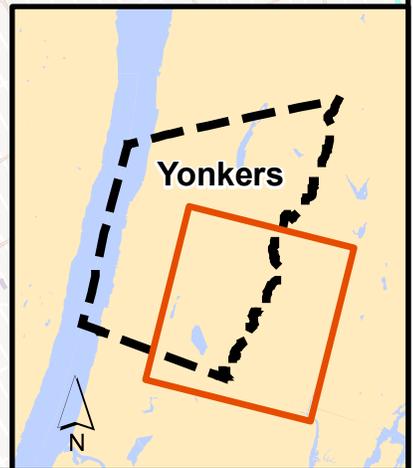
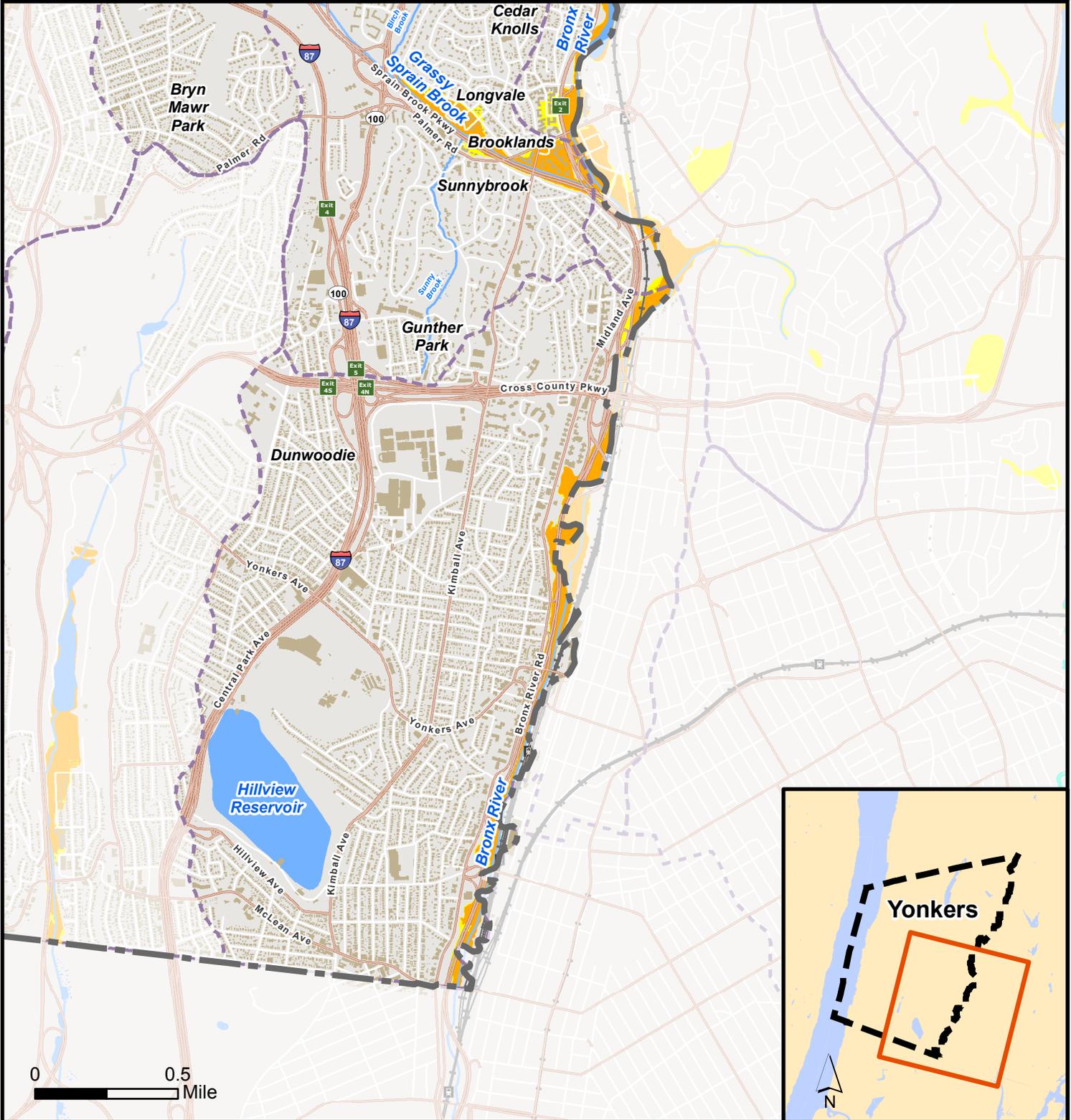
### Data Sources

City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County



# Figure I-3

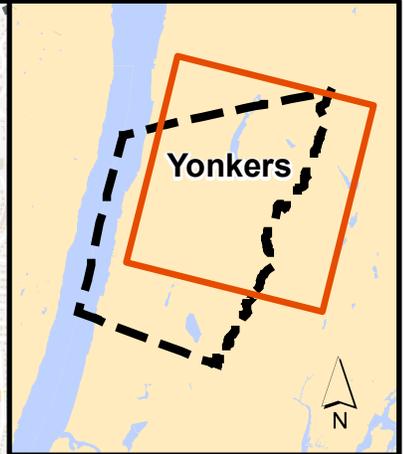
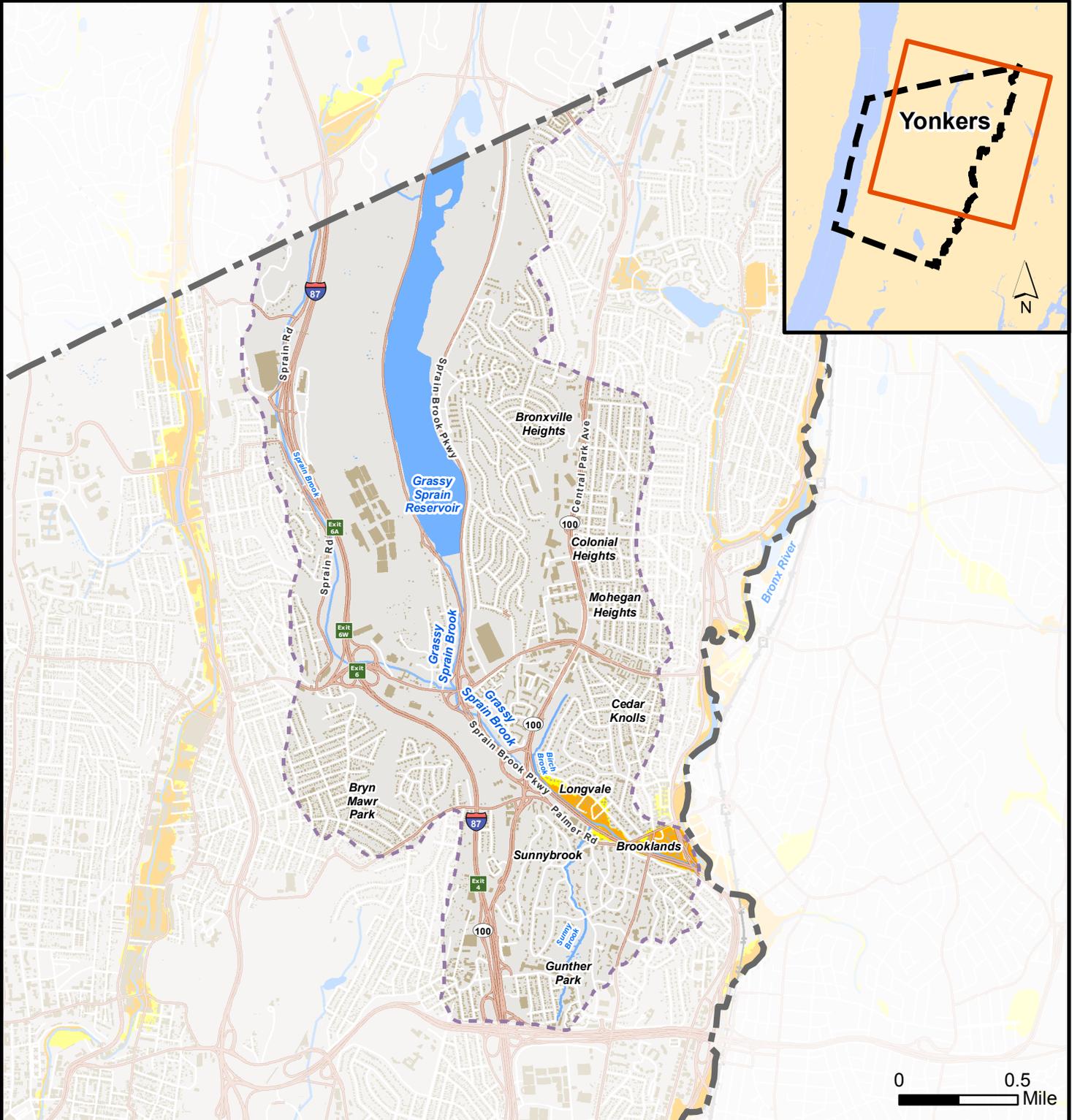
## Bronx River Area (South) - City of Yonkers



|  |   |  |   |   |  |
|--|---|--|---|---|--|
|  | <b>Legend</b><br>City of Yonkers (Study Area)<br><b>NYSDOS Hazard Zones</b><br>Extreme Risk<br>High Risk<br>Moderate Risk | Watersheds<br>Building<br><b>FEMA Floodzones</b><br>Extreme Risk<br>High Risk<br>Moderate Risk | Wetlands<br>Water Bodies<br>Rivers & Streams<br>Rail Station<br>Railroads<br>Major Highways | <b>Data Sources</b><br>City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County |  |
|  |   |  |   |   |  |

**Figure I-4**

**Grassy Sprain Brook Area - City of Yonkers**



**Legend**

- City of Yonkers (Study Area)
- NYSDOS Hazard Zones**
- Extreme Risk
- High Risk
- Moderate Risk
- Watersheds
- Building
- FEMA Floodzones**
- Extreme Risk
- High Risk
- Moderate Risk
- Wetlands
- Water Bodies
- Rivers & Streams
- Rail Station
- Railroads
- Major Highways

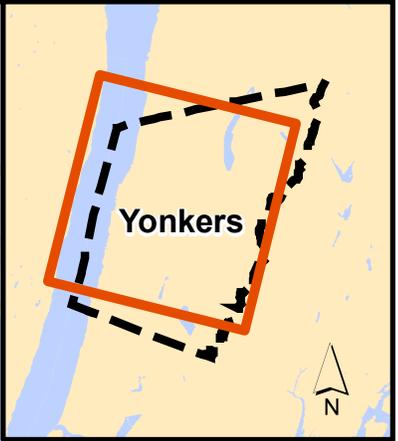
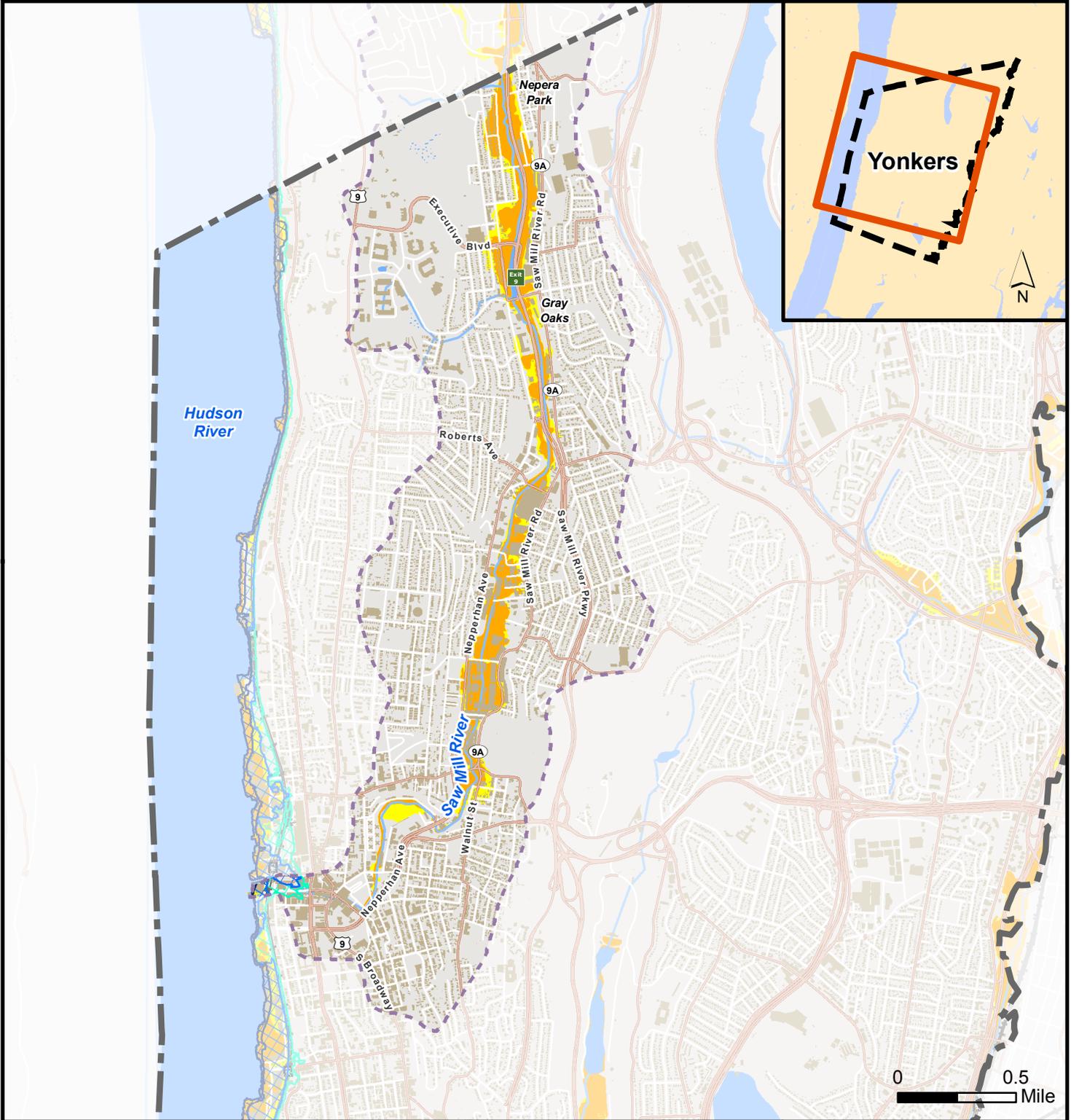
**Data Sources**

City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County



**Figure I-5**

**Saw Mill River Area - City of Yonkers**



**Legend**

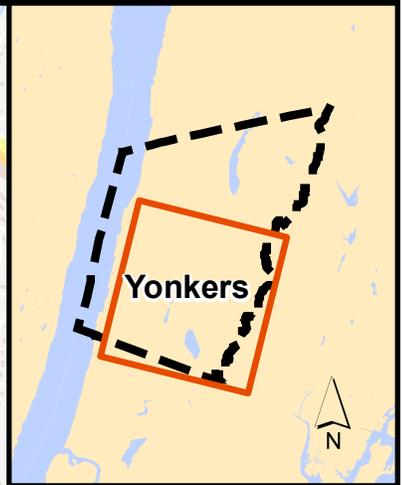
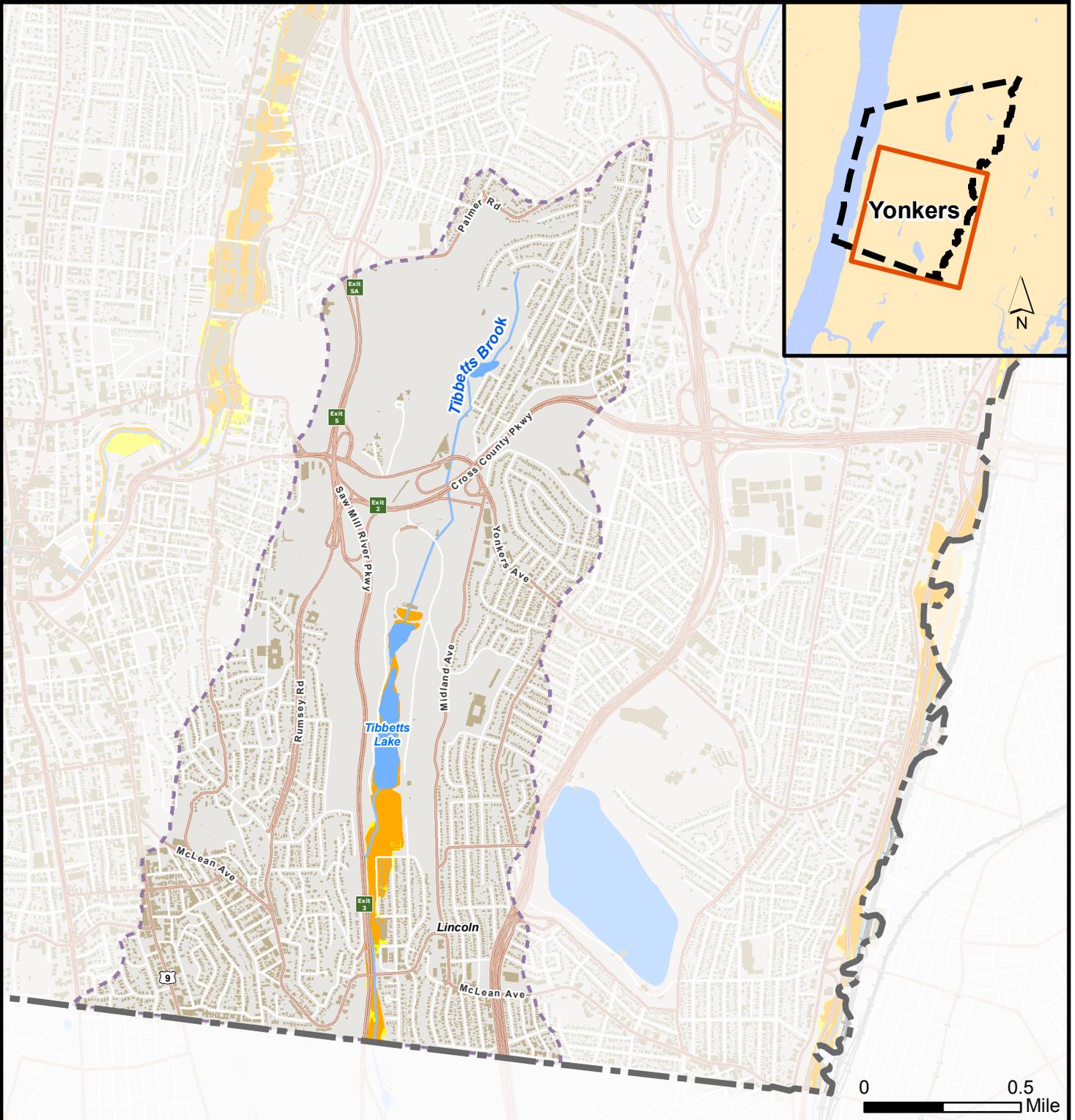
- City of Yonkers (Study Area)
- NYSDOS Hazard Zones**
- Extreme Risk
- High Risk
- Moderate Risk
- Watersheds
- Building
- FEMA Floodzones**
- Extreme Risk
- High Risk
- Moderate Risk
- Wetlands
- Water Bodies
- Rivers & Streams
- Rail Station
- Railroads
- Major Highways

**Data Sources**

City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County



# Figure I-6 Tibbetts Brook Area - City of Yonkers

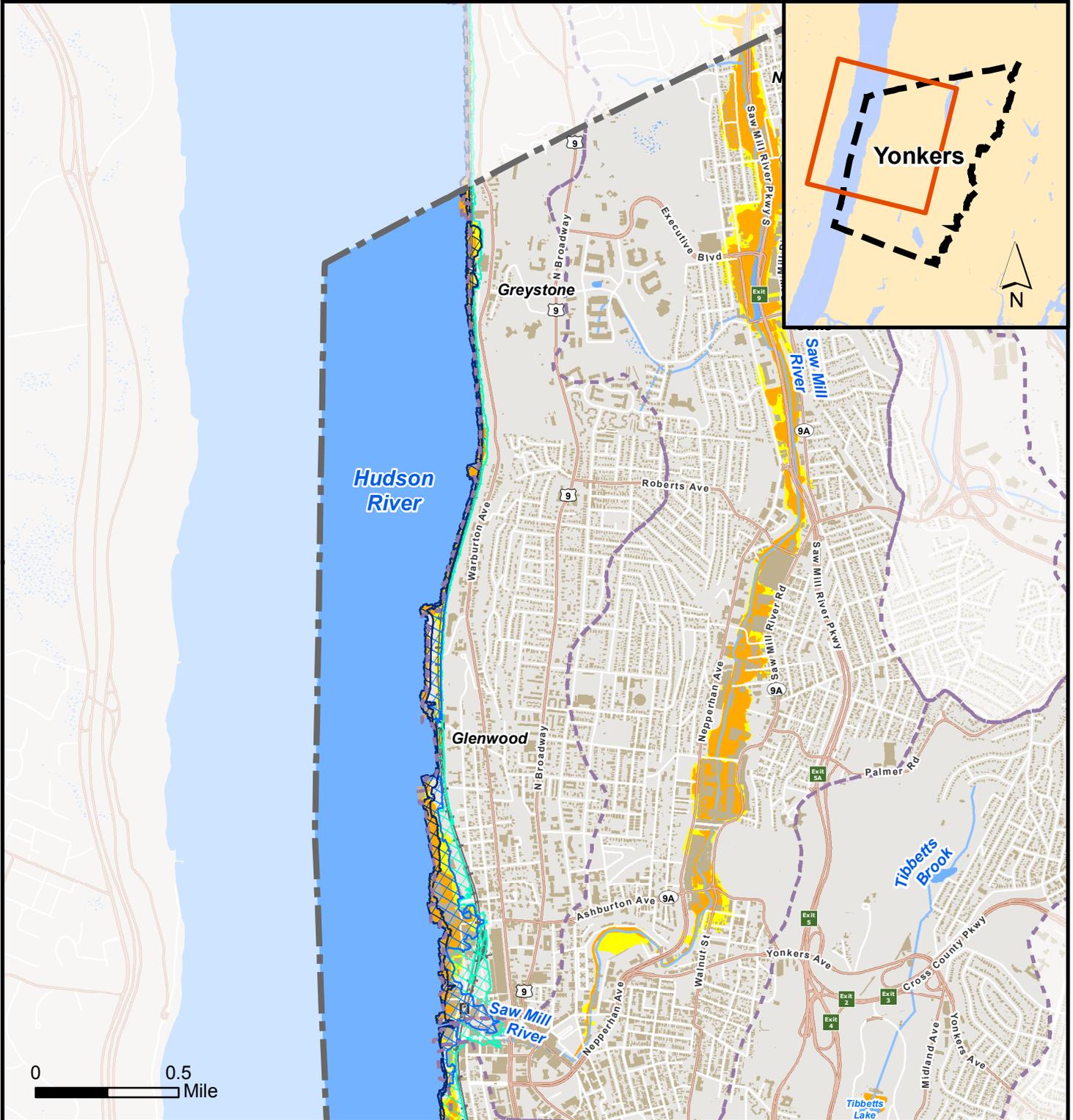


| Legend                     |                              | Data Sources   |  |
|----------------------------|------------------------------|--|--|
|                            | City of Yonkers (Study Area) | City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County |  |
| <b>NYSDOS Hazard Zones</b> |                              |  |  |
|                            | Extreme Risk                 |  |  |
|                            | High Risk                    |  |  |
|                            | Moderate Risk                |  |  |
|                            |                              |  |  |
|                            |                              |  |  |



**Figure I-7**

**Hudson River Area (North) - City of Yonkers**



0 0.5 Mile

**Legend**

City of Yonkers (Study Area)

**NYSDOS Hazard Zones**

- Extreme Risk
- High Risk
- Moderate Risk

- Watersheds
- Building

**FEMA Floodzones**

- Extreme Risk
- High Risk
- Moderate Risk

- Wetlands
- Water Bodies
- Rivers & Streams
- Rail Station
- Railroads
- Major Highways

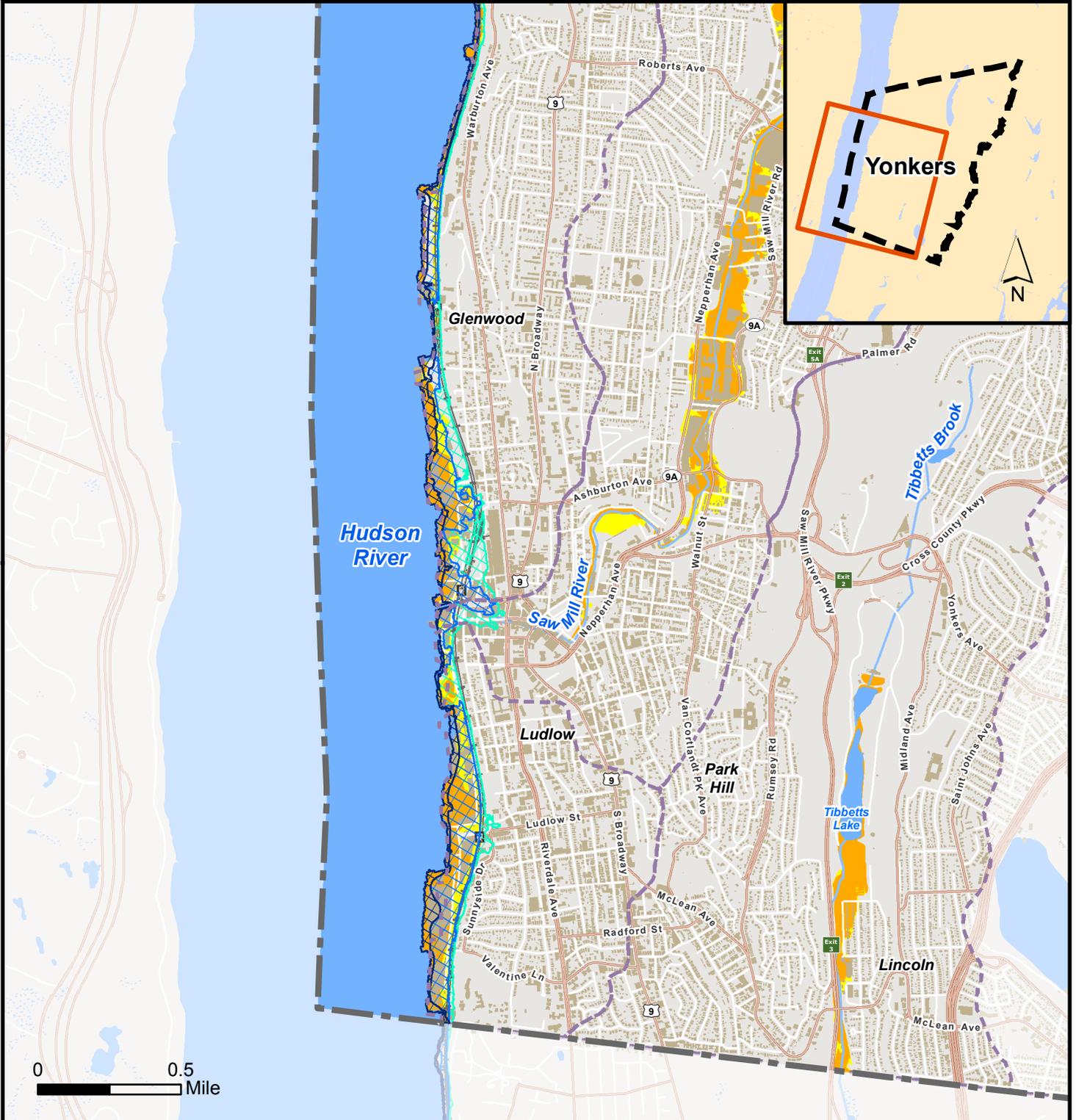
**Data Sources**

City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County



**Figure I-8**

**Hudson River Area (South) - City of Yonkers**



**Legend**

City of Yonkers (Study Area)

**NYSDOS Hazard Zones**

- Extreme Risk
- High Risk
- Moderate Risk

Watersheds

Building

**FEMA Floodzones**

- Extreme Risk
- High Risk
- Moderate Risk

Wetlands

Water Bodies

Rivers & Streams

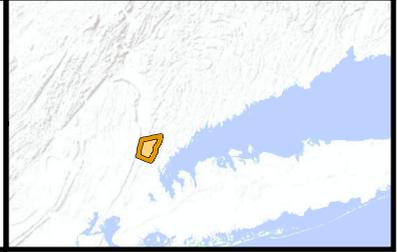
Rail Station

Railroads

Major Highways

**Data Sources**

City of Yonkers, ESRI, FEMA, NWI, NYSDOS, NYSITS, Westchester County



## C. Description of Storm Damage

Due to its location along the Hudson River and numerous other rivers and streams, Yonkers is affected by both riverine and coastal flooding, as well as wind damage and other types of storm damage. Recent storms, including two powerful nor'easters in the spring of 2007, Hurricane Irene (August 28, 2011), and Superstorm Sandy (October 29, 2012) hit Yonkers with full force, causing widespread and long-lasting damage.

In March and then in April of 2007, just four years prior to Hurricane Irene, Yonkers was in the path of low pressure systems that moved into southern Westchester. The April 2007 nor'easter was especially strong, and brought with it 9.84 inches of rainfall in 24 hours, as measured from the Yonkers Raceway gauge. Significant property damage resulted as floodwalls were crested, drainage systems backed up, and streams overflowed, resulting in millions of dollars in damage.

### Hurricane Irene

On August 28, 2011, the torrential downpour that came ashore with Hurricane Irene caused water levels in the Bronx River, Saw Mill River, Grassy Sprain Brook, and Tibbetts Brook to reach record heights. Rainfall from Hurricane Irene was recorded to reach 9.14 inches in the City in 24 hours.<sup>2</sup> The rising waters of the City's rivers, brooks, and streams caused flash flooding. Homes, businesses, and infrastructure were destroyed throughout the City's neighborhoods, and residential properties suffered millions of dollars in property damage. In response to Hurricane Irene, the City activated its Emergency Operations Center (EOC) and coordinated the pumping of numerous basements and other below-ground structures. Figure I-9 presents a map of storm surge flooding from Hurricane Irene (shown in magenta). Mapping of storm surge in Yonkers is limited to coastal areas along the Hudson River, so the FEMA 100-year flood zone is shown on the map; this is the best available representation of the extent of upland flooding during Hurricane Irene.



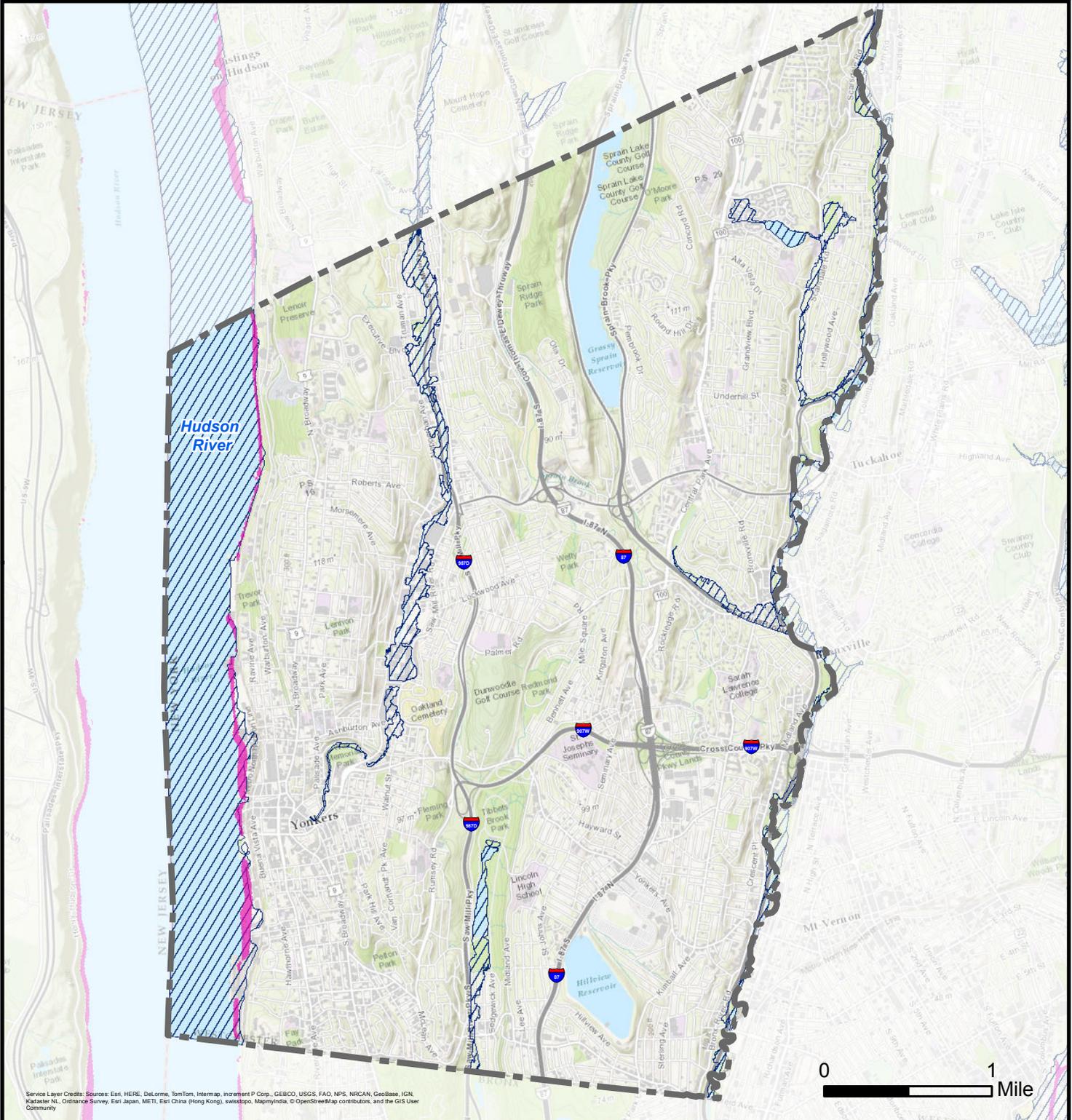
*Flooding in Longvale after Hurricane Irene  
(T. Ryan)*

Numerous roads were closed due to floodwaters overtopping culverts and bridges. Exacerbating these impacts were high winds that downed trees and electrical lines. Several roads were undermined and local landslides rendered roads impassable. In addition to the parkways, which run adjacent to the City's inland rivers, many local roads in low-lying areas or upstream of river constriction points were affected, including Palmer Avenue, Nepperhan Avenue, the intersection of Yonkers and Kimball Avenues, Abner Place, Harrison Avenue, Longvale Road, and Clunie Avenue, among others.

In addition to the widespread damage to the City's infrastructure, Hurricane Irene left a wake of destruction in many of Yonkers' neighborhoods. Along the Grassy Sprain Brook, Brooklands and Longvale were among the hardest hit areas of the City. The waters of the Grassy Sprain Brook and Bronx River flooded the Brooklands Cooperative causing \$3.3 million of damage, damaging elevators, boilers, electrical transformers, and other facilities, and rendering 24 housing units uninhabitable for more than one year. This was only four years after the April 2007 nor'easter destroyed 25 units and nearly 100 automobiles. In the nearby Longvale neighborhood, more than 30 houses suffered extreme damage. Dozens of homes had their basements fully flooded as a result of Irene.<sup>3</sup> Residents were forced to evacuate and several needed to be rescued by watercraft. Exacerbating the flood damage and creating serious health hazards, the floodwater

**Figure I-9**

**Hurricane Irene Storm Surge - City of Yonkers**



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Katastern NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox, © OpenStreetMap contributors, and the GIS User Community

**Legend**

-  City of Yonkers (Study Area)
-  2011 Hurricane Irene Storm Surge Flooded Area
-  FEMA 100-Year Flood Zone

**Data Sources**

City of Yonkers,  
NYSITS,  
Westchester County



carried with it raw sewage, home heating oil, and other toxic materials swept up by the raging currents.



*Flooding at Brooklands (K. Smith)*

Also particularly affected by the flooding was the Clunie Avenue/Nepara Park neighborhood which had to be evacuated due to the high floodwaters from the nearby Saw Mill River. Raw sewage from the City sewer line, which runs between the homes on Clunie and Nepperhan Avenues, and the City trunk line, which runs along the Saw Mill River, mixed with the flood waters. Once the flood waters had reached Clunie Avenue, ConEd turned off the power to both streets, making sump pumps useless and exacerbating the flooding. Evacuations also occurred for homes near Palmer Road and Kimball Avenue. Other affected areas included the “Carpet Mills” area along Nepperhan Avenue (Saw Mill River), the Harrison Avenue area (Tibbetts Brook), and St. Vladimir’s seminary (Troublesome Brook).

### Superstorm Sandy

Superstorm Sandy’s potent mix of wind and water pushing up the Hudson River caused a record high tide in the City of Yonkers. Supplemented by spring tide (the maximum possible high tide), the storm surge was approximately 14 feet above the average water level at low tide. This surge caused extensive flooding along the City’s waterfront, damaging businesses, residences, public facilities, and City infrastructure. Several multifamily residential buildings, including the

Scrimshaw House and Hudson Park, suffered major damage, affecting hundreds of residents. The Yonkers Pier was damaged as was the restaurant X2O, on the second floor of the Pier. The Excelsior Packaging Company on Alexander Street was forced to close as a result of the damage inflicted by Sandy, and it has yet to reopen. The American Sugar refinery also suffered damage. Employees of these facilities were unable to go to work for an extended period of time. Other shoreline facilities, such as the Yonkers Paddling and Rowing Club, the JFK Marina, and the Science Barge, were damaged as a result of the high tides and devastating winds. The record storm surge from Superstorm Sandy is shown in Figure I-10.

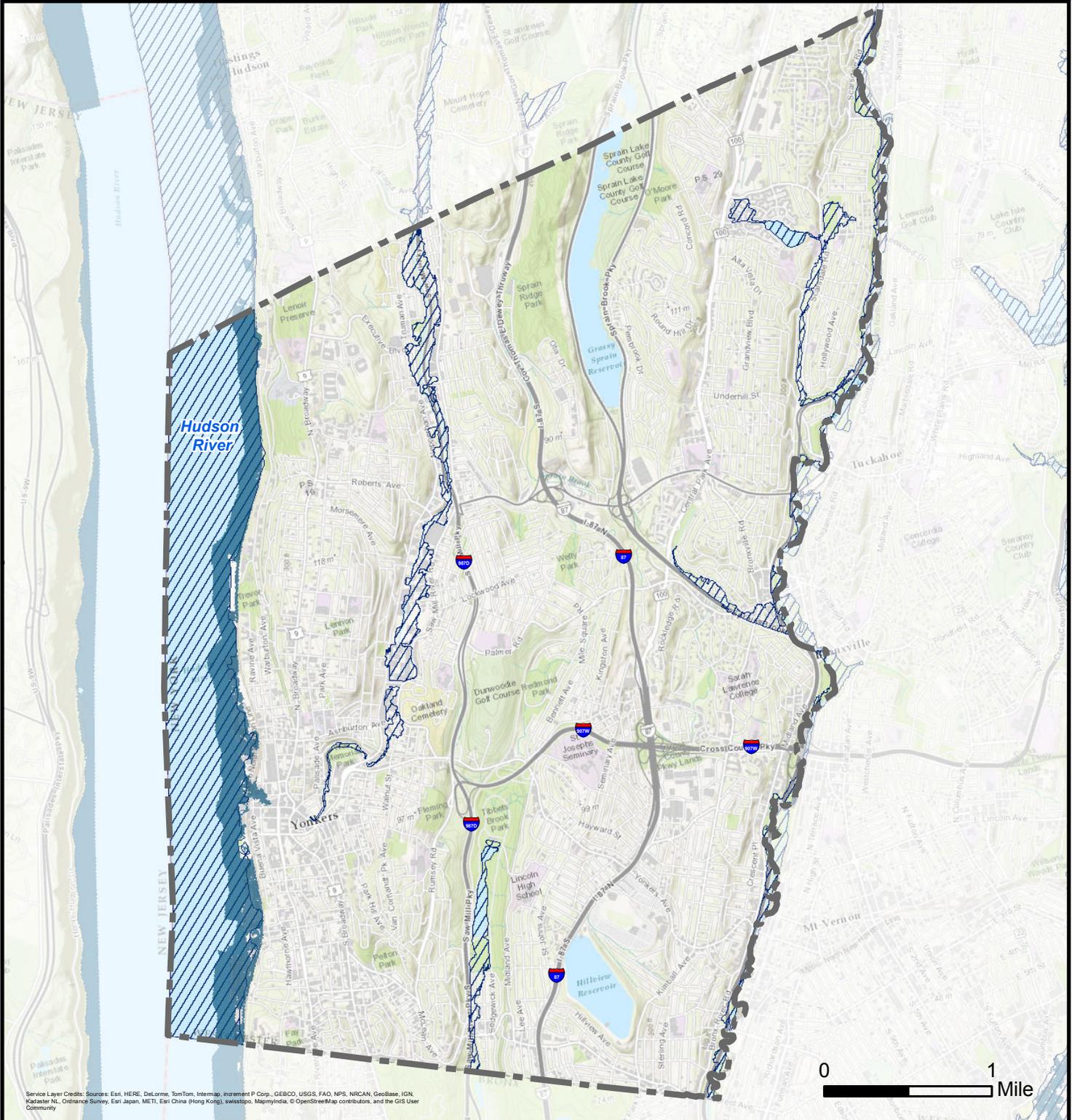
City infrastructure also suffered as a result of Superstorm Sandy. The City’s Larkin Plaza complex, which houses the Riverfront Library and Board of Education offices, is still undergoing repairs nearly two years after the storm. The damage to the building was estimated at close to \$3 million and included massive repairs to the elevator systems, which took 20 months to get back into service.



*Damage at the Yonkers Wastewater Treatment Plant (J. Mistry)*

# Figure I-10

## Superstorm Sandy Storm Surge - City of Yonkers



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Katastern NL, Ordnance Survey, Esri, Japen, METI, Esri China (Hong Kong), Swisstopo, Mapbox, © OpenStreetMap contributors, and the GIS User Community

### Legend

- City of Yonkers (Study Area)
- 2012 Hurricane Sandy Storm Surge Flooded Area
- FEMA 100-Year Flood Zone

### Data Sources

City of Yonkers,  
NYSITS,  
Westchester County



The Yonkers Wastewater Treatment Plant (WWTP) and the North Yonkers Pump Station on the Hudson River sustained major damage. A 14-foot storm surge traveled up the Hudson River and inundated the Yonkers WWTP facility. The first floors in buildings at the Yonkers facility received two to three feet of water. Inundated electrical components had to be replaced, and damage occurred to boilers, communication systems, fire protection systems, settling tanks, and biological systems for sewage treatment. Forty-nine million gallons of untreated sewage flowed into the Hudson River from the Yonkers WWTP over a 14-hour period at the peak of the storm. Another 1.2 billion gallons of partially treated sewage flowed from the plant in the ensuing four weeks.

In addition to flooding along the Hudson River, Superstorm Sandy brought with it ferocious winds that left more than 20,000 City residents without electricity. It took more than two weeks to fully restore power to the City. During that time, the City's Emergency Operations Center was again activated and coordinated rescue operations, road closures, the power restoration process, temporary housing, and the gasoline supply.

The wind also downed hundreds of trees, closing roads throughout the City. Public schools were closed for an entire week, and the County bus service, on which many City residents and employees rely, was canceled for days. Metro-North Railroad was down for 48 hours before being able to resume service. While inland neighborhoods did not experience substantial flooding, many residents took costly precautions in anticipation of a potential flood. In the Brooklands Cooperative, many residents evacuated the entire contents of their apartments into moving vans to wait out the storm, under great financial and emotional strain.

## D. Critical Issues

The Committee and members of the community expressed in sobering detail the impacts brought to bear on their City by Hurricane Irene and Superstorm

Sandy. The picture painted was one of struggle and loss during the storm events followed by an outpouring of support, outreach, and kindness provided by many in the immediate aftermath and beyond. The Committee expressed weariness of the flood damage that they have endured from storm after storm, and frustration that decades of studies and recommendations that could protect their homes and neighborhoods have yet to be implemented.

Critical issues were also identified by residents during Public Engagement Events where attendees openly discussed concerns that arose from their own experiences with these storms. This input was used to build on the critical issues developed by the Yonkers NYRCR Planning Committee. These include:

### 1. Riverine, Coastal, and Stormwater Flooding

Larger storms, most recently Hurricane Irene in 2011 and Superstorm Sandy in 2012, caused substantial riverine and coastal flooding in low lying areas. These storms damaged public and private property and caused serious physical, economic, and safety hardships to Yonkers residents. Areas in the City especially at risk from recurrent flooding include the Brooklands, Longvale, and Nepara Park neighborhoods, residences along Troublesome Brook, and much of the City's Hudson River waterfront including Scrimshaw House, Hudson Park, Larkin Plaza, and the proposed redevelopment along Alexander Street. Protecting neighborhoods and minimizing damage from flooding are the paramount critical issues for Yonkers. The NYRCR Planning Committee and residents want flood mitigation measures to be implemented that will contain floodwaters to protect neighborhoods at risk, improve the resiliency of the City's infrastructure, reduce flooding heights and frequency, and improve coordination between first responders and residents.

Past studies and reconnaissance efforts by the Federal Emergency Management Agency (FEMA), the U.S. Army Corps of Engineers (USACE), Westchester County, the City, and others should be revisited to

identify previously recommended flood mitigation projects that remain viable and that would be beneficial in flood damage avoidance. Supplemental engineered solutions—both hard and soft—should also be explored to target the City’s most critically flood-prone areas. These could include modifications to existing bridges, culverts, dams, outfalls, and other hard structures to realize a measurable reduction in flood elevations. Soft engineering solutions could include the use of green infrastructure practices, such as stream restoration, bio-swales, rain gardens, and green roofs.



*Undersized Culvert of the Metro-North Bronxville Bridge (K. Graves)*

## 2. Tree and Wind Damage

Superstorm Sandy brought with it winds of up to 90 miles per hour that downed hundreds of trees and closed roads throughout the City. Downed trees blocked travel along City roads and took with them electrical lines, resulting in power losses to thousands of City residents. Public schools were closed for an entire week. To avoid similar disruptions from future storms, the City must develop strategies to minimize the negative consequences of storm-related wind damage, including such measures as regular and frequent tree maintenance programs, improved response times for removal of downed trees and other debris, and fortifying critical

infrastructure—including electric service—to withstand high winds with reduced damage.

## 3. Susceptibility of Major Infrastructure to Storm Damage

Protecting residents, homes, businesses, parks, natural resources, infrastructure, and energy resources from flooding, storm surge, and wave action is critical to creating a resilient Yonkers. In particular, vital City infrastructure was significantly compromised during past storms:

- ▶ Wastewater conveyance and treatment systems were inundated and had to be shut down;
- ▶ The supply of electricity was interrupted due to damage to power lines caused by wind and downed trees, as well as ConEd’s decision to shut down the system to prevent flood damage;
- ▶ Gas stations were overwhelmed by the need for fuel due to electrical outages, and many exhausted their supply; and
- ▶ Access to certain areas of the City was cut off as a result of roads being flooded.

In addition, infrastructure that had been designed to protect Hudson River waterfront properties, including jetties, bulkheads, and seawalls, was not able to withstand storm damage. In particular, safeguarding the Yonkers WWTP, located on the Hudson River, is a storm resilience issue that must be addressed. In addition, keeping local roads and regional transportation corridors that traverse the City open and operational during and after storm events is of paramount importance to insure safety. Among such roads are the Bronx River, Saw Mill River, and Sprain Brook Parkways, Saw Mill River Road, and Nepperhan Avenue. Further consideration can also be given to the best use of the City’s Hudson Riverfront to ensure that it serves as an asset available to all City residents which can be safely evacuated in advance of storm events.

## 4. Communication and Education Challenges

The recent storm events highlighted the need for better community awareness, education, and dissemination of information about how to prepare, what to do, and where to go during storm events. Ways the City can improve its communication and education efforts to these ends include:

- ▶ Provide critical, real-time data on road closures, power outages, flooding, and evacuation routes;
- ▶ Develop improved signage and public educational materials with instructions on safe evacuation routes, emergency shelter sites, and the locations of food and medical services in the aftermath of storm events to promote a more orderly and efficient response to storm events, and distribute these materials to residents;
- ▶ Improve access to information in the aftermath of storm events, providing information on temporary shelters, replacement of lost property, and funding for the repair, rebuilding, or buy-out of damaged or lost property; and
- ▶ Improve the means and methods of communication across the different levels of government (Federal, State, County, City) and link residents to critical information disseminated by the government and emergency service providers.

## 5. Managing the Impacts of Development, Including Resiliency Projects

Yonkers is located at the lower reaches of several large, heavily developed watersheds. As a result, it experiences the cumulative flow emanating from upstream areas. It is critical for new development and redevelopment in Yonkers as well as in upstream communities to incorporate the highest levels of stormwater management possible. This may include restricting development and inappropriate land uses within floodplain areas. In addition, developed areas that exacerbate flooding should be identified—these would be areas found to have inadequate stormwater

infrastructure, or areas that effectively lack any stormwater management. Retrofitting such areas with supplemental stormwater detention, infiltration, or other forms of green infrastructure could be beneficial to downstream neighborhoods in high flood risk areas. In this way, the City could manage the impacts of existing and future development. The City’s stormwater management regulations must be re-examined.



*Damaged Basement in Longvale after Hurricane Irene  
(T. Ryan)*

## E. Community Vision

The Vision Statement for the Yonkers NYRCR Planning Committee was developed with input from residents. The Vision Statement relies heavily on Committee members’ familiarity with Yonkers, the needs of the community, and previous planning efforts. A draft of the Vision Statement was shared with the public at the first Public Engagement Event; feedback from that meeting was extremely important in finalizing the Vision Statement. More information about public outreach can be found in Section V.C, “Public Engagement Process.”

Through the visioning process, the Committee and the public worked to identify, assess, and conceptualize local and regional opportunities for Yonkers. There was general agreement that the Vision Statement needed not only to describe the Yonkers of the future, but also to identify specific ways to attain that vision.

Hence, the Committee and the public outlined a series of goals to help Yonkers build back better. These goals were developed to address and enhance flood resilience, high quality of life, collaborative partnerships, education, and the establishment of high standards for future policy and development.

The Committee wished that the Vision focus on protecting Yonkers residents and their neighborhoods. Enhancing public health and safety and protecting the natural environment were also important goals that the Committee wished to express through the Vision to acknowledge that the NYRCR program is not solely about storm damage; rather, it exists to enhance the already vibrant Yonkers community.

Residents who provided feedback on the draft Vision Statement at the Public Engagement Event emphasized the importance of having the statement focus on the people of Yonkers, rather than just the City's resilience and the problems of storm damage. Residents also noted the importance of improved mobility and the condition of the Hudson River waterfront as a community asset still waiting to be fully realized.

The final Vision Statement and goals are as follows:

## Vision

The City of Yonkers is a vibrant and diverse community focused on protecting our residents, property, infrastructure, and natural resources from extreme flooding and natural disasters. Our goals are to work together to safeguard the public health and safety of the City's residents through flood mitigation and effective flood recovery, protect the natural environment, and enhance the City's economy for current and future residents.

## Goals:

As we develop a Community Reconstruction Plan, we will strive to develop ecologically sound policies and programs that will:

- ▶ Address flooding as a Citywide problem—with multiple watersheds, rivers, and tributaries—that requires a coordinated mitigation effort with solutions unique to each watershed;
- ▶ Advance educational outreach to ensure our residents understand natural hazards and how they can protect themselves, their homes, and their neighborhoods against future storms in an environmentally sustainable way;
- ▶ Collaborate with City, County, State, and Federal agencies and adjacent municipalities regarding drainage improvements and maintenance;
- ▶ Contribute to a coordinated Citywide preparedness and response against future storms;
- ▶ Coordinate with nearby upstream municipalities that contribute to our flooding problem;
- ▶ Cultivate partnerships among private organizations, public agencies, and municipalities to ensure responsible development;
- ▶ Develop policy, design, and construction standards to make our neighborhoods more resilient in the future;
- ▶ Maintain and upgrade the City's infrastructure;
- ▶ Preserve the character of our neighborhoods; and
- ▶ Protect our neighborhoods from coastal and riverine flooding.

## F. Relationship to Regional Plans

The storms and resulting damage from Hurricane Irene and Superstorm Sandy highlighted the need for coordinated planning initiatives and policies that can significantly contribute to long-term regional resilience. Many regional planning efforts have been undertaken both before and after the storms in the Mid-Hudson Region and in Westchester County. In 2013, the

*Mid-Hudson Regional Sustainability Plan* was released, laying out short-, mid-, and long-term goals and strategic priorities for the region's development. The Mid-Hudson Regional Economic Development Council also released a *5-Year Strategic Plan* in 2011, which presented specific goals for the regional economy. In addition, Westchester County updated its 1996 comprehensive plan, *Patterns for Westchester*, in 2008, and again in 2010 with *Westchester 2025*.

In the wake of Hurricane Irene, Westchester County enacted a law in 2011 requiring the County to develop 'reconnaissance' plans for each of its watersheds. These pre-existing regional planning efforts served as the genesis for many projects that were identified through the NYRCR process. The Planning Committee was tasked with representing the interests of Yonkers, but members understood the importance of taking a regional approach to recovery and resiliency. Committee members worked together to create strategies that were consistent with and supportive of regional goals, including planning for the effects of severe storms and flooding. Many of the regional planning documents, including *Westchester 2025* and the *Mid-Hudson Regional Sustainability Plan*, identified the need for focused coordination and cooperation among communities to achieve their goals. This sentiment is echoed by the Committee and its willingness to work toward the common goal of mitigating future flood damage and creating a more stable and climate-resilient local and regional economy.

The key challenge for the Committee was twofold: (1) to identify initiatives that would not duplicate previously completed plans, and (2) to extract from existing studies those initiatives, policies, projects, and programs that had not yet been implemented and that addressed critical needs and promoted long-term resilience. This comprehensive document review helped the Committee to recognize gaps in the existing plans and assess the potential synergies between local and regional needs and opportunities, while considering how the NYRCR Plan might support and incorporate regional goals and perspectives.

Table I-1 presents a list of available local and regional

planning documents and resources considered. These documents were reviewed for information and data pertaining to the NYRCR planning process and to assist in the identification of potential projects and strategies that could be implemented to help Yonkers build back better. Regional goals from the plans that have been incorporated into the NYRCR Plan are listed along with a brief description of how the NYRCR Plan could relate to or build upon the regional plans. The findings are summarized in Table I-1.

Key shared local and regional themes identified by the review of existing plans included:

- ▶ Planning for the effects of climate change, including severe storms and flooding, to avoid recurring costly damage to life, health, and infrastructure, is a critical step toward long-term resilience;
- ▶ County, State, and Federal agencies responsible for infrastructure maintenance, repair, and reconstruction have well-considered long-term plans, but are restricted by the lack of available funding;
- ▶ Additional coordination and cooperation between municipalities and various local, State, and Federal agencies is required to decrease vulnerability and increase resilience;
- ▶ Conversion of underutilized waterfront land to open space and appropriate water-dependent uses designed for resilience and to accommodate sea level rise reduces risk, vulnerability, and cost of repetitive reconstruction in the event of natural disasters;
- ▶ Upgrade and repair of infrastructure to address areas of chronic flooding reduces roadway and culvert repair costs and limits road closures; and
- ▶ Providing Hudson River waterfront access and additional funding for linking downtown areas with the Hudson River waterfront provides economic benefits in increased tourism spending.

Throughout the planning process, the Committee reviewed many ideas for regional projects, all of which supported goals set forth in the various previously completed regional plans.

**Table I-1 Local and Regional Plans**

| Plan   | Relevance   | Key Components for NYRCR Process   |
|--|---|--|
| <b>City of Yonkers Plans</b>   |   |  |
| Draft City of Yonkers Multi-Hazard Mitigation Plan (2013)                                | Extensive analysis of hazards that threaten the City and ways to reduce future damages associated with these hazards.   | Contains a detailed identification of hazards, including storm damage, that affect the City and strategies to reduce future damage. Also contains important background information on the City (community profile and demographics). |
| Incident Maps–Storm Damage from Superstorm Sandy (2012)                                  | Geographic Information Systems (GIS)-based maps created by the Yonkers Department of Public Works in the wake of Superstorm Sandy.  | Maps identify specific locations of damage to sidewalks, utilities, and street trees. Data can be used to pinpoint vulnerable areas in the City.   |
| A Plan for Redevelopment of the Yonkers Waterfront (2010)                                | Substantial development plans along the Hudson River.   | Proposed development projects that are currently under consideration by the City, specifically private development projects at JFK Marina, Glenwood Power Plant, and Trevor Park.  |
| Alexander Street Master Plan (2009)  | An area plan encompassing land along the Hudson River waterfront from Beczak Environmental Center to the JFK Marina.  | Specific land use plan proposing a mix of residential, open space, commercial, and retail space along the Hudson River.  |
| Saw Mill River Daylighting Analysis – River Park Center (2008)                           | Original Plan for the daylighting of the Saw Mill River.  | HEC-RAS analysis prepared for the Saw Mill River within Yonkers.   |
| Draft Local Waterfront Revitalization Plan (LWRP) (1989 and 2006)                        | Land use guidelines for activities along the entire Hudson River waterfront.  | Recommendations regarding appropriate water dependent uses and improved public access to the waterfront.   |
| Connections – The Yonkers Comprehensive Plan (2000)                                      | Establishes community vision/goals for long-term growth and development, focusing on economic development, natural resources, health, safety and welfare, historic and cultural resources, housing, recreation, parks and open space, transportation. | Identifies goals for Yonkers including increasing the amount of green space, undertaking waterfront revitalization efforts, and improving City services and facilities.  |
| <b>Westchester County Plans</b>  |   |  |
| Westchester County Multi-Hazard Mitigation Plan (2014)                                   | Compiles existing available data, studies, and reports concerning a variety of disaster events possible throughout Westchester County.  | Provides resources and mitigation goals for Countywide hazards.  |
| Stormwater Reconnaissance Plan for the Bronx River Basin Watershed (2013)                | Compiles existing available data, studies, and reports concerning flooding within the Bronx River Watershed.  | Recommends basin-wide watershed advisory board to facilitate inter-municipal agreements towards reducing flooding in the Bronx River watershed.  |
| Stormwater Reconnaissance Plan for the Saw Mill River – Pocantico River Watershed (2012) | Compiles existing available data, studies, and reports concerning flooding within the Saw Mill River-Pocantico River Watershed.   | Recommends basin-wide watershed advisory board to facilitate inter-municipal agreements towards reducing flooding in the Saw Mill River-Pocantico River watershed.   |
| Addressing local and regional impacts – Flooding In Westchester (2012)                   | Guidance document with information on flood concepts and ways land use regulation can be used to mitigate flood damage.   | Provides status of studies and recommended projects within critical watersheds in the City.  |

**Table I-1 Local and Regional Plans (cont'd)**

| Plan   | Relevance  | Key Components for NYRCR Process  |
|--|--|---|
| <b>Westchester County Plans (cont'd)</b>   |  |   |
| Westchester 2025 Context and Policies (Amended 2010)   | Provides a general framework for planning in Westchester County through 2025, including analysis of major issues/ general policy areas, and policies for guiding sustainable growth and development. | Provides countywide context, goals, and initiatives. The plan contains very limited discussion of flooding/natural hazards, with no specific discussion of Yonkers. |
| Section 905(B) Reconnaissance Study, Westchester County Streams, U.S. Army Corps of Engineers (2008) | USACE feasibility study to provide flood damage reduction improvements to the Saw Mill River.  | Identifies problems, needs, and opportunities related to potential improvements that would lead to reductions in flood damages in Yonkers' watersheds.              |
| Bronx River Watershed Management Plan (Volume 1) (2007)  | Specifies priority actions and identifies candidate stormwater retrofit and watershed restoration projects in the lower reach of the Bronx River watershed.  | Includes sub-watershed management strategies for the Bronx River Lower Direct Drainage, Grassy Sprain Brook, and Troublesome Brook.                                 |
| Summary of Findings: Bronx River Watershed Stream Corridor and Upland Assessments (2005)             | Summary of field work for Westchester County portions of the Bronx River Watershed.  | Includes discussion of field work along the lower Westchester reaches of the Bronx River.   |
| <b>Hudson River</b>  |  |   |
| Scenic Hudson Sea Level Rise Mapper (2013)   | Interactive mapper that provides floodplain and inundation data in combination with local assets, hazardous materials sites, wetlands, and locations of submerged aquatic vegetation (SAV).          | Data can be used in Hudson shoreline assessments.   |
| Draft Hudson River Estuary Habitat Restoration Plan (2013)   | General strategies for restoring habitat in the lower Hudson River with description of habitat types along the River.  | Description of habitat types along River; does not describe specific projects or locations; no specific discussion of Yonkers.                                      |

# 2014 NY RISING COMMUNITY RECONSTRUCTION PLAN YONKERS NYRCR

## Section II Assessment of Risk and Needs





## A. Description of Community Assets and Assessment of Risk

An important step in the NYRCR planning process is to assess the risk posed to assets and systems in Yonkers that were affected by past flood events or may be impacted by future storms. This evaluation provides valuable information as projects and strategies are developed to mitigate the risk from flooding and make the community more resilient.

### i. Description of Community Assets

The first step in the risk assessment process is to inventory and map assets and system components that provide essential community functions and are proximate to known flood risk areas. Community assets and systems may consist of places, services, groups, or infrastructure networks, and can be categorized into five Asset Classes related to their role in the community, which are as follows:

- ▶ Housing;
- ▶ Health and Social Services;
- ▶ Economic;
- ▶ Infrastructure Systems; and
- ▶ Natural and Cultural Resources.

The Yonkers NYRCR Community asset inventory was developed by compiling existing digital datasets from City, State, and Federal agencies including the Westchester County GIS Data Warehouse, the City of Yonkers Assessor's Office, the Critical Infrastructure

Response Information System (CIRIS) State datasets, and NYS Orthoimagery. These asset datasets were cross-referenced and supplemented with aerial imagery and address locators, and collated into an asset inventory listing. To streamline the inventory, assets were grouped together if they served the same community function, were located close to one another, or had similar site characteristics. For example, several neighborhood businesses in close proximity to one another could be grouped into a commercial center, or single-family homes into a neighborhood. Asset systems were inventoried by enumerating the principal points and components of those systems, such as treatment plants in the wastewater conveyance system and substations in the electric transmission system.

Once a preliminary list of assets was determined, detailed information for each asset was added to the inventory, including:

- ▶ Asset location, including address and geographic coordinates;
- ▶ Risk area, based on Federal Emergency Management Agency (FEMA) and New York State Department of State (NYS DOS) flood zone mapping;
- ▶ Asset class and asset subcategory;
- ▶ Community value (described in further detail below);
- ▶ Critical facility designation, a FEMA designation given to assets that are essential to recovery following a flood or storm event;
- ▶ Whether the asset serves socially vulnerable populations, including children, the elderly, homeless

persons and those at risk of becoming homeless, people with limited English proficiency, people with special needs, and low-income community members, as these assets are particularly important both before and following a storm; and

- ▶ Landscape attributes, or features of the landscape that could either mitigate or exacerbate the impacts of flooding and erosion to an asset.

The next step of the methodology used local knowledge to refine the list of assets. The preliminary asset inventory and mapping were reviewed by the Committee for refinement, and shared with community residents at Public Engagement Meetings to gain their input and capitalize on their intrinsic understanding of the City of Yonkers. The dataset analysis supplemented the work of the Committee by identifying assets that may have been hidden in plain sight—i.e., assets vital to the Community’s health and resilience that go unnoticed on a day-to-day basis because they only become obvious when they fail, such as small roadway bridges and smaller government services. Alternatively, assets that may not have been captured in the existing digital datasets or for which digital data did not exist could be enumerated by the community. The full asset inventory data table is provided in Appendix V.D “Asset Inventory,” and a map of the assets is shown in Figure II-1, “Asset Inventory – City of Yonkers.”



Asset Mapping Workstation at the First Public Engagement Event



Yonkers Community Asset Board at First Public Engagement Event

## Community Value Scoring

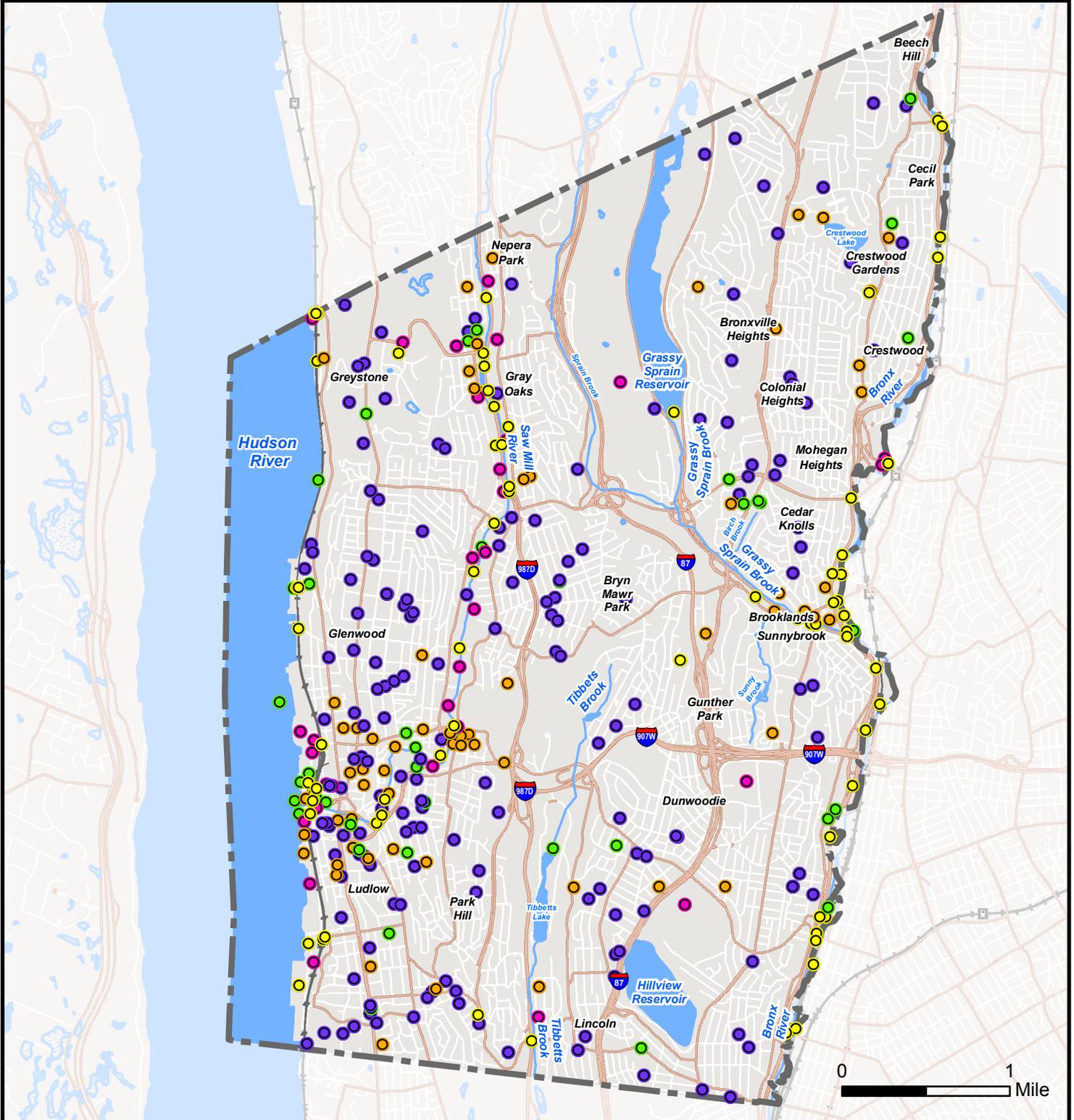
As part of the Asset Inventory process, a Community Value is assigned to the assets. NYRCR Committee members participated in an exercise assigning Community Values of High, Medium, or Low to asset subcategories. Members were asked to give special attention to assets whose loss or impairment would compromise critical facilities or any essential cultural, social, economic, or environmental functions serving the City.

General criteria for High, Medium, and Low Community Values were defined for the Committee as follows:

- ▶ **High:** Asset(s) that are so significant in the support of that community’s day-to-day function that the loss of that asset or extended lack of functioning would create severe impacts to the community’s long-term health and well-being or result in the loss of life or injury to residents, employees, or visitors.
- ▶ **Medium:** Asset(s) that are important to the functioning of that community’s day-to-day life and whose loss or extended lack of functioning would cause hardship to the community’s well-being, but whose function could be replaced or duplicated in a mid-term time frame without significant burden to a community’s long-term health.

# Figure II-1

## Asset Inventory - City of Yonkers



|  |   |  |  |
|--|---|--|--|
|  | <b>Legend</b>   |  | <b>Data Sources</b><br>City of Yonkers,<br>NYSITS,<br>Westchester County |
|  | City of Yonkers (Study Area)<br>Major Highways<br>Railroads<br>Rail Station | <b>Assets</b><br>Economic<br>Health and Social Services<br>Housing<br>Infrastructure Systems<br>Natural and Cultural Resources |  |

► **Low:** Asset(s) that play a role in the functioning of a community’s day-to-day life, but whose loss could be managed and overcome within a community without substantial impact to that community’s functioning. They can be replaced or temporarily duplicated in a short-term time frame with only a limited burden to a community’s long-term health.

The Committee members’ responses were then compiled; the value receiving the most member votes was then assigned to all assets within that subcategory. A summary of the results from the exercise is found in Table II-1.

**Table II-1 Asset Subcategory and Community Value**

| Asset Subcategory  | Community Value |
|--|-----------------|
| Communications Infrastructure (Internet, Cellular, Telephone, Cable) | High            |
| Department of Public Works   | High            |
| Electric and Gas Infrastructure                                      | High            |
| Fire, Police, Emergency Facilities                                   | High            |
| Government Buildings   | High            |
| Homes and Facilities for Vulnerable Populations*                     | High            |
| Hospitals  | High            |
| Housing  | High            |
| Major Roads  | High            |
| Railroad   | High            |
| Sanitary Sewer Infrastructure  | High            |
| Secondary Roads  | High            |
| Storm Sewer Infrastructure   | High            |
| Downtown Business District   | Medium          |
| Elementary and Secondary Schools                                     | Medium          |
| Industrial Areas   | Medium          |
| Lakes and Reservoirs   | Medium          |
| Post-Secondary Schools   | Medium          |
| Rivers and Tributaries   | Medium          |
| Wetlands   | Medium          |
| Cultural/Community Centers   | Low             |
| Historic Buildings   | Low             |
| Major Employers  | Low             |
| Marinas  | Low             |
| Other Business Areas   | Low             |
| Parks and Recreation Facilities                                      | Low             |

Notes: \* Vulnerable Populations are defined as people with disabilities, low and very-low income populations, elderly, young children, homeless persons and those at risk of becoming homeless, and people with limited English proficiency.

## Risk Area Ranking

While the asset inventory was developed, maps were also produced to illustrate the geographic distribution of risk areas across the City of Yonkers. These maps focused the asset inventory on those areas at risk. Risk areas in inland riverine neighborhoods in Yonkers are synonymous with the floodplains delineated by FEMA, while the risk areas along Yonkers' Hudson River shoreline are synonymous with those delineated by NYS DOS Coastal Management Program. The Risk Areas are defined as follows:

- ▶ **Extreme Risk Area:** The most frequently flooded areas are typically found in the 10-year floodplains, which encompass the Extreme Risk Area. In Yonkers, the 10-year floodplain had not been digitally modeled by FEMA. Input from members of the Committee and the community as to which places have been frequently and repetitively inundated and damaged by flooding was used to approximately identify the Extreme Risk Areas within the City. These areas include portions of those floodplains repeatedly impacted by past storms in the hardest-hit areas of the City. They are outlined by a red dashed line in Figure II-2.
- ▶ **High Risk Area:** The 100-year floodplains encompass the High Risk Area, and are subject to a 1.0% chance of flooding in any given year. These floodplains had been digitally mapped by FEMA in Yonkers, and can be found throughout the City along major rivers, streams, and water bodies. High Risk Areas are the most prevalent of the risk zones in the Yonkers planning area.
- ▶ **Moderate Risk Area:** The 500-year floodplains encompass the Moderate Risk Area, and are subject to a 0.2% chance of flooding in any given year. These floodplains had also been digitally mapped by FEMA in Yonkers, and are typically found on the fringes of High Risk Areas.

The community assets were analyzed to identify the risks they may be exposed to, and are summarized by Asset Class as follows. Figure II-2 illustrates the City of Yonkers Risk Areas.

## Economic

Assets in the Economic category include the downtown, business clusters, major employers, industrial and manufacturing centers, and tourism destinations. Protecting and enhancing the downtown and commercial areas from flood impacts is important to the economic health of the City. There are no Economic assets considered FEMA Critical Facilities. American Sugar (a manufacturing facility) and the Yonkers Yacht Club are located in extreme risk areas, as are business areas along Odell, Nepperhan, and Grey Oaks Avenues, and industrial properties off Saw Mill River Road and Delaware Road.

Asset data was gathered from Westchester County and City of Yonkers parcel and land use data. Assets in close proximity with similar characteristics and risk factors have been identified as a group (e.g., "Getty Square – Downtown District") while small businesses located outside of large clusters, such as "The Olde Stone Mill," are listed separately.

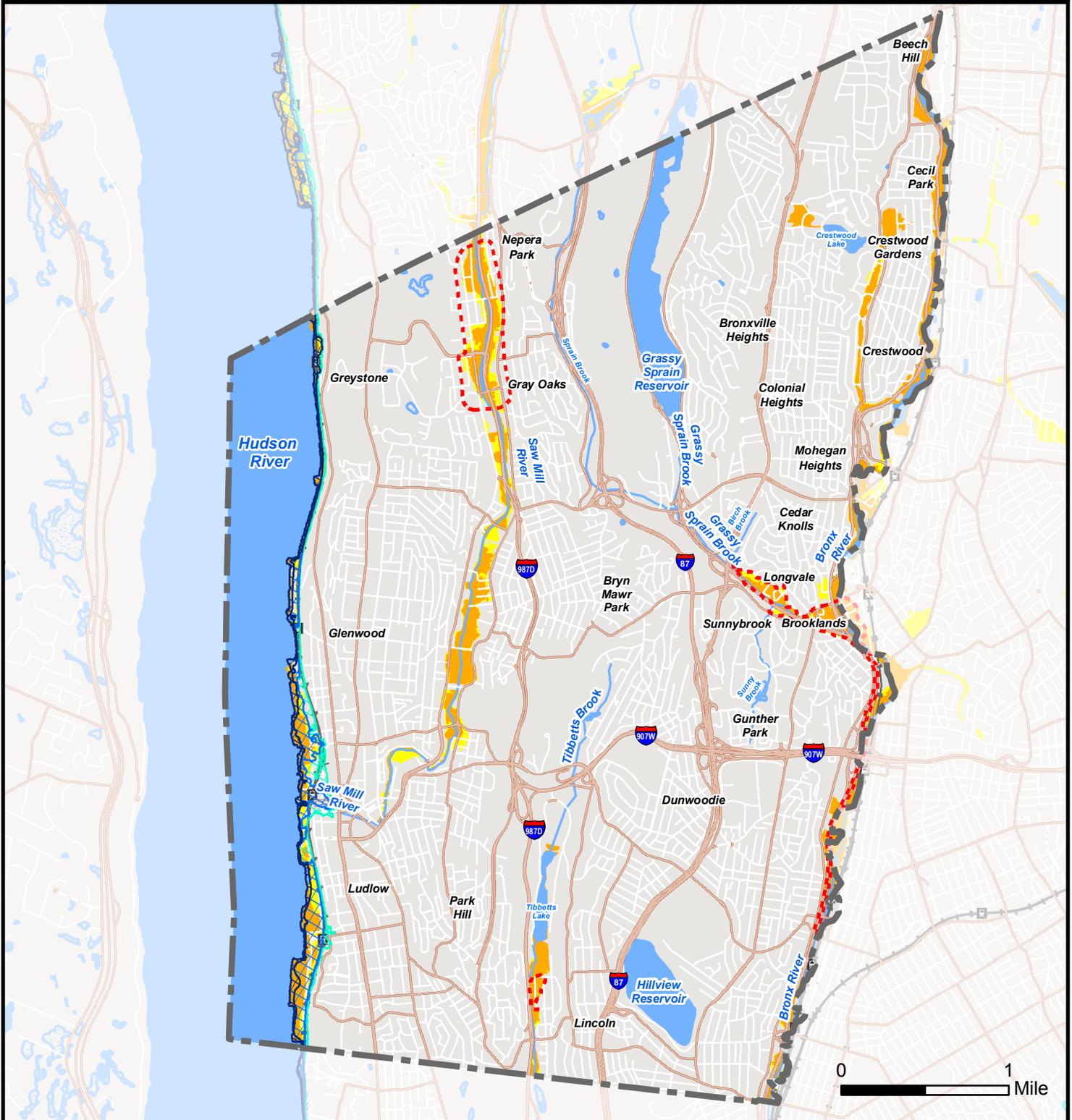
Table II-2 lists the Economic assets organized by Asset Subcategory.



*Economic Asset: Offices along Executive Boulevard*

# Figure II-2

## Risk Areas - City of Yonkers



### Legend

- City of Yonkers (Study Area)
- Major Highways
- Railroads
- Rail Station
- Extreme Risk Areas\* (repetitively flooded)

- #### NYS DOS Hazard Zones
- Extreme Risk
  - High Risk
  - Moderate Risk

- #### FEMA Floodzones
- Extreme Risk
  - High Risk
  - Moderate Risk

### Data Sources

City of Yonkers, FEMA, NYS DOS, NYSITS, Westchester County

\*Extreme Risk Areas identified by Planning Committee



**Table II-2 Economic Assets**

| <b>Asset Name</b>  | <b>Risk Area</b> |
|--|------------------|
| <b>Downtown Centers and Large Businesses</b>   |                  |
| Odell Avenue / Nepperhan Avenue Businesses   | Extreme          |
| Offices and Restaurant – Grey Oaks Ave   | Extreme          |
| School bus and car storage – Alexander Avenue  | High             |
| Getty Square – Downtown District   | Moderate         |
| Consumers Union  | Low              |
| <b>Employment Hub</b>  |                  |
| Proposed Alexander Street Redevelopment Area   | High             |
| Greyston Bakery  | Moderate         |
| Hudson River Waterfront  | Moderate         |
| iPark Hudson   | Moderate         |
| Nepperhan Ave Commercial Corridor  | Moderate         |
| Cross County Shopping Center   | Low              |
| Executive Boulevard Commercial Corridor  | Low              |
| Kawasaki Rail Car  | Low              |
| Ridge Hill   | Low              |
| <b>Industrial, Warehousing, and Manufacturing</b>                                    |                  |
| American Sugar   | Extreme          |
| Industrial Properties off Saw Mill River Rd / Delaware Rd                            | Extreme          |
| Alexander Street Industrial Properties   | High             |
| Industrial Buildings along Saw Mill River / Axminster St                             | High             |
| Industrial Buildings along Saw Mill River / Lake Ave                                 | High             |
| Industrial Properties along Saw Mill River / Worth St                                | High             |
| Industrial Properties off Saw Mill River Rd / Marlboro Lane                          | High             |
| Industrial Properties off Saw Mill River Rd / Old Nepperhan Ave                      | High             |
| Kimber Manufacturing   | High             |
| Tyco Plastics  | High             |
| Graphite Metallizing Corp  | Moderate         |
| Pompeian Manufacturing Co.   | Moderate         |
| <b>Banks, Marinas, Restaurants, Tourist Destinations, and other Small Businesses</b> |                  |
| Yonkers Yacht Club   | Extreme          |
| Commercial Properties - Ashburton Ave and Saw Mill River Rd                          | High             |
| The Olde Stone Mill (along Bronx River)  | High             |
| Hudson Valley Bank   | Moderate         |
| Empire City Casino at Yonkers Raceway  | Low              |

## Health and Social Services

Health and Social Services assets include fire protection, police services, hospitals, and emergency operations facilities. Other community assets include administrative and educational facilities which serve a variety of public functions, from health treatment facilities to general purpose emergency shelters, public schools, post offices, and City office buildings. During a storm event, these facilities may potentially serve as critical disaster response and recovery centers, the identification of which is essential to future disaster management and preparedness. Three of the Health and Social Services assets are located within extreme risk areas, and almost all of the assets inventoried are

classified as FEMA Critical Facilities, with the exception of Sarah Lawrence College and the Westchester County DPW Sewer Office Building.

Asset data was gathered from the Westchester County Community Facilities GIS datasets and CIRIS. Within some subcategories, assets that were located within low risk areas have been grouped in this text [e.g., “Yonkers Fire Department (12 locations)”] but were run through the Risk Assessment Tool individually.

Table II-3 lists the Health and Social Services assets organized by Asset Subcategory.

**Table II-3 Health and Social Services Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Emergency Operations/Response</b>                                      |           |
| Emergency Operations / 911 Communications / Mayor’s Call Center           | Low       |
| Emergency Shelters (13 locations)   | Low       |
| Empress Emergency Medical Services  | Low       |
| Westchester Ambulette Services  | Low       |
| Yonkers Fire Department (12 locations)                                    | Low       |
| Yonkers Police Departments (4 Precincts and H.Q)                          | Low       |
| <b>Government and Administrative Services and Public Works Facilities</b> |           |
| NYSDOT Parkway Maintenance - Odell Ave                                    | Extreme   |
| Westchester County DPW Sewer Office Building                              | Moderate  |
| NYSDOT Parkway Maintenance - Sprain Brook                                 | Low       |
| Yonkers City Hall   | Low       |
| <b>Healthcare Facilities and Hospitals</b>                                |           |
| St John’s Riverside Hospital  | Low       |
| St Joseph’s Medical Center  | Low       |
| <b>Schools and Higher Education Institutions</b>                          |           |
| Elementary School 22  | Extreme   |
| St Anthony School   | Extreme   |
| Sarah Lawrence College  | Low       |
| Other Schools (68 facilities)   | Low       |

**Table II-3 (cont'd) Health and Social Services Assets**

| Asset Name                                  | Risk Area |
|---|-----------|
| <b>Daycare and Eldercare</b>                |           |
| Professional Family Day Care                | Moderate  |
| St Casimir Apartments                       | Moderate  |
| Other Daycare and Eldercare (59 facilities) | Low       |

## Housing

A significant number of residential assets within the City are at risk of future flooding. These assets include single-family and multi-family neighborhoods and affordable, senior, and supportive housing.<sup>4</sup> A number of the housing assets are located within extreme and high risk areas, reflecting the elevated risk levels in some neighborhoods along the City’s waterways. Affordable, senior, and supportive housing assets are considered FEMA Critical Facilities. Public affordable housing in Yonkers is managed by the Municipal Housing Authority for the City of Yonkers (MHACY).

Asset data was gathered from the Westchester County and City of Yonkers parcel and land use data. Within some subcategories, assets that were located within a low risk area have been summarized strictly for presentation purposes in this table [e.g., “Other Senior Housing (8 facilities)”] but were run through the Risk Assessment Tool individually due to their different locations.

Table II-4 lists the Housing assets organized by Asset Subcategory.

**Table II-4 Housing Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Single-Family Residence</b>  |           |
| Griffith Ave and Railroad Ave Homes   | Extreme   |
| Longvale Neighborhood   | Extreme   |
| Single Family Homes - Clunie Ave and Nepperhan Ave                            | Extreme   |
| Single Family Homes - Nepperhan Ave and Executive Boulevard                   | Extreme   |
| Single Family Homes - Nepperhan Ave between Executive Boulevard and Odell Ave | Extreme   |
| Single-Family Homes - Scarsdale Rd south end                                  | High      |
| Single-Family Homes along Scarsdale Rd from Maria to Alta Vista               | High      |
| Single-Family Homes around Freddolino Park                                    | High      |
| Centre St Homes   | Moderate  |
| Single-Family Homes along Scarsdale Rd, Brookdale Drive                       | Moderate  |
| Winchester Village  | Low       |
| <b>Multi-Family Residence</b>   |           |
| Two- and Three-Family Homes – between Harrison Ave and Tibbetts Rd            | Extreme   |
| Brooklands Cooperative  | Extreme   |
| Grey Oaks Apartments  | Extreme   |

**Table II-4 (cont'd) Housing Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Multi-Family Residence</b>   |           |
| Sunnybrook Apartments   | Extreme   |
| Winchester Apartments   | Extreme   |
| Hudson Park Apartment Buildings   | High      |
| Parcels H and I (Future Development along Hudson River between Vark and Prospect Streets) | High      |
| Scrimshaw House   | High      |
| St Casimir Avenue Apartments  | High      |
| Whitney Young Manor   | High      |
| Garrett Park Apartments   | Moderate  |
| The Greystone   | Moderate  |
| <b>Affordable Housing</b>   |           |
| MHACY - Angelo R. Martinelli Manor  | Extreme   |
| MHACY - Dr. James F. X. O'Rourke Townhouses   | High      |
| MHACY - Kris Kristensen Homes   | Moderate  |
| MHACY - William. A. Walsh Homes   | Moderate  |
| The Hollows   | Moderate  |
| Other MHACY Housing Developments (16 locations)   | Low       |
| Proposed Longfellow School Development  | Low       |
| <b>Senior Housing</b>   |           |
| Trinity Senior Apartments   | High      |
| Other Senior Housing (8 facilities)   | Low       |
| <b>Supportive Housing</b>   |           |
| Yonkers Supportive Housing Facilities (10 locations)                                      | Low       |



*Housing Asset: Longvale Neighborhood*



*Housing Asset: Hudson Park Apartments*



*Housing Asset: Brooklands Cooperative*

## Infrastructure Systems

Assets in this category include transportation infrastructure, transportation-related facilities (e.g., train stations), and utilities. Utilities include public water supply, stormwater and wastewater systems, power supply, and telecommunications—the distribution and operational networks of which are dispersed throughout the City of Yonkers. The distributed nature of these systems throughout the extreme, high, and moderate risk areas makes the assessment of risk to the overall systems difficult to categorize. In general, if a principal component of a system is located in a risk area, the entire system is vulnerable. As such, it is more useful to assess the risk to specific plants, pump stations, substations, and other key facilities that are critical to the functioning of these networks. Past storms have had an adverse impact on infrastructure systems in Yonkers, causing power outages, road washouts, and

flooding that impeded travel for residents, employers/employees, and emergency service providers. Almost half of these assets are located within an extreme risk area, including the Yonkers Wastewater Treatment Plant (WWTP); however, many of these assets are bridges and rail lines that are designed to be above the flood elevation. Principal points of the wastewater, water supply, and power supply networks inventoried are considered FEMA Critical Facilities; these include sewage treatment plants, water resources, telecommunications facilities, and electric substations.

Asset data was gathered from the Westchester County Community Facilities GIS datasets.

Table II-5 lists the Infrastructure Systems assets organized by Asset Subcategory.

**Table II-5 Infrastructure Systems Assets**

| Asset Name   | Risk Area |
|--|-----------|
| <b>Wastewater and Water Supply</b>                               |           |
| North Yonkers Pumping Station (County-Owned)                     | Extreme   |
| Yonkers Wastewater Treatment Plant (WWTP) (County-Owned)         | Extreme   |
| Grassy Sprain Dam  | High      |
| Yonkers Water Treatment Plant                                    | Moderate  |
| Delaware Hudson Aqueduct Pump Station                            | Low       |
| <b>Transportation</b>  |           |
| Access R Stone PI Bridge over Bronx River                        | Extreme   |
| Bronx River Parkway  | Extreme   |
| Bronx River Parkway Interchange Bridge over Bronx River Parkway  | Extreme   |
| Bronx River Parkway Interchange Bridge over Grassy Sprain Brook  | Extreme   |
| Bronx River Parkway Interchange Bridge over Sprain Brook Parkway | Extreme   |
| Bronx River Parkway Ramp E Bridge over Bronx River Parkway       | Extreme   |
| Executive Blvd Bridge over Saw Mill River                        | Extreme   |
| Hearst Street Bridge over Saw Mill River                         | Extreme   |
| Kimball Avenue Bridge over Sprain Brook Parkway                  | Extreme   |
| Metro-North Hudson Line and Greystone Station                    | Extreme   |
| Midland Avenue Bridge over Saw Mill River Parkway                | Extreme   |
| Odell Avenue Bridge over Saw Mill River                          | Extreme   |

**Table II-5 (cont'd) Infrastructure Systems Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Transportation (cont'd)</b>  |           |
| Odell Avenue Bridge over Saw Mill River Parkway                       | Extreme   |
| Palmer Ave Bridge over Bronx River Parkway Interchange                | Extreme   |
| Palmer Road Bridge over Bronx River                                   | Extreme   |
| Palmer Road Bridge over Sprain Brook Parkway                          | Extreme   |
| Saw Mill River Parkway  | Extreme   |
| Saw Mill River Parkway Interchange Bridge over Saw Mill River         | Extreme   |
| Sherwood Avenue Bridge over Bronx River Parkway Interchange           | Extreme   |
| Sprain Brook Parkway  | Extreme   |
| Yonkers Avenue Bridge over Bronx River Parkway Interchange            | Extreme   |
| Bronx River Parkway Exit 10A Ramp Bridge over Bronx River             | High      |
| Bronx River Parkway Interchange Bridge over Bronx River (3 locations) | High      |
| Elm Street Bridge over Saw Mill River                                 | High      |
| Harney Road Bridge over Bronx River                                   | High      |
| Henry Hertz Street Bridge over Saw Mill River                         | High      |
| JFK Memorial Drive Bridge over Metro-North Hudson Line                | High      |
| Lake Avenue Bridge over Saw Mill River                                | High      |
| Ludlow Street Bridge over Metro-North Hudson Line                     | High      |
| McLean Avenue Bridge over Saw Mill Parkway                            | High      |
| Metro-North Harlem Line   | High      |
| Metro-North Hudson Line and Yonkers Station                           | High      |
| Metro-North Hudson Line Bridge over Ashburton Avenue                  | High      |
| Metro-North Hudson Line Bridge over Dock Street                       | High      |
| Metro-North Hudson Line Bridge over Main Street                       | High      |
| Metro-North Hudson Line Bridge over Wells Avenue                      | High      |
| New School Street Bridge over Saw Mill River                          | High      |
| Oak Street Bridge over Bronx River                                    | High      |
| Old Nepperhan Avenue Bridge over Saw Mill River                       | High      |
| Pedestrian Bridge over Bronx River                                    | High      |
| Pennsylvania Avenue Bridge over Troublesome Brook                     | High      |
| Pondfield Road W. Bridge over Bronx River                             | High      |
| Pondfield Rd W. Bridge over Bronx River Parkway Interchange           | High      |
| Saw Mill River Parkway Bridge over Saw Mill River                     | High      |

**Table II-5 (cont'd) Infrastructure Systems Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Transportation (cont' d)</b>                               |           |
| Saw Mill River Parkway Interchange Bridge over Saw Mill River | High      |
| Saw Mill River Road Interchange Bridge over Saw Mill River    | High      |
| Scarsdale Road Bridge over Bronx River                        | High      |
| Torre Place Bridge over Saw Mill River                        | High      |
| Tuckahoe Road Bridge over Bronx River Parkway Interchange     | High      |
| Westchester Fleet Services                                    | High      |
| Yonkers Yacht Club Bridge                                     | High      |
| Abandoned NYCRR Bridge over Saw Mill River Road Interchange   | Moderate  |
| East 241st Street Bridge over Bronx River Parkway Interchange | Moderate  |
| Metro-North Hudson Line and Glenwood Station                  | Moderate  |
| Metro-North Hudson Line and Ludlow Station                    | Moderate  |
| Pedestrian Aqueduct Bridge over Nepperhan Avenue              | Moderate  |
| Yonkers Yacht Club Bridge over Metro North Hudson Line        | Moderate  |
| Metro-North Harlem Line and Mt Vernon Station                 | Low       |
| Metro-North Harlem Line and Wakefield Station                 | Low       |
| <b>Power Supply and Telecommunications</b>                    |           |
| Con Edison Electric Substation - McLean Ave                   | Low       |
| Con Edison Electric Substation - Smart Ave                    | Low       |
| News 12 Building  | Low       |

### Natural and Cultural Resources

Natural and Cultural Resources include natural habitats, wetlands and marshes, recreational facilities, parks, open spaces, religious establishments, libraries, museums, historic landmarks, and performing arts venues. Hurricane Irene, Superstorm Sandy, and other flood events in the last 10 years have had a severe impact on multiple recreational, cultural, and historic assets in Yonkers’ natural and built environment. Five natural resources within the City are located in extreme risk areas, including four recreational areas. The Hudson River, which is a natural resource, also represents an extreme risk area.

Many of the water bodies and waterways of Yonkers have historically been, and continue to be, natural and

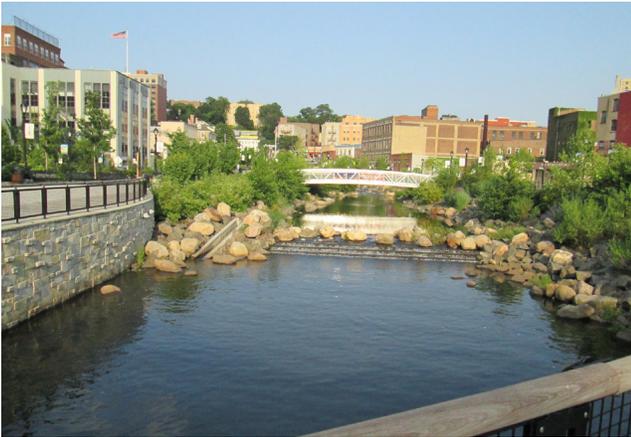
recreational resources. However, these same waters cause severe flood damage to infrastructure, businesses, and residences. These resources are not themselves at risk by virtue of their location in a risk area; nevertheless, protecting their health may be critical to the protection of other nearby assets. None of the Natural and Cultural Resources assets inventoried are FEMA Critical Facilities.

Asset data was gathered from the Westchester County and City of Yonkers parcel and land use data. Within some subcategories, assets that were located within a low risk area have been summarized strictly for presentation purposes in this table [e.g., “Other Community Centers (17 facilities)”] but were run through the Risk Assessment Tool individually due their different locations.

Table II-6 lists the Natural and Cultural Resources assets organized by Asset Subcategory.

**Table II-6 Natural and Cultural Resources Assets**

| Asset Name  | Risk Area |
|---|-----------|
| <b>Libraries and Museums</b>                              |           |
| Yonkers Public Library - Riverfront Branch                | High      |
| Yonkers Public Library - Crestwood Branch                 | Low       |
| Yonkers Public Library - Grinton I. Will Branch           | Low       |
| Hudson River Museum of Westchester                        | Low       |
| <b>Parks and Recreation and Hunting and Fishing Lands</b> |           |
| Private Boat Storage on Hudson, adjacent to JFK Marina    | Extreme   |
| Richter Park  | Extreme   |
| Science Barge   | Extreme   |
| Yonkers Paddling and Rowing Club                          | Extreme   |
| Yonkers Recreation Pier                                   | Extreme   |
| Doyle Park  | High      |
| Freddolino Memorial Playground                            | High      |
| James Scott Memorial Park                                 | High      |
| JFK Marina and Park                                       | High      |
| Tibbetts Brook County Park                                | High      |
| Van Der Donck Park - Daylighted Saw Mill River            | High      |
| Sarah Lawrence Center for the Urban River at Beczak       | Moderate  |
| <b>Community Centers</b>                                  |           |
| St Mark's Episcopal Church                                | Extreme   |
| William A. Walsh Golden Age Club                          | Moderate  |
| Other Community Centers (17 facilities)                   | Low       |
| <b>Water Bodies</b>                                       |           |
| Bronx River   | Extreme   |
| Grassy Sprain Brook                                       | Extreme   |
| Hudson River  | Extreme   |
| Saw Mill River  | High      |



*Natural and Cultural Resources Asset: Van Der Donck Park and the Daylighted Saw Mill River*



*Natural and Cultural Resources Asset: Grinton I. Will Library*

## ii. Assessment of Risk to Assets and Systems

The City of Yonkers is a community at risk of flooding from several riverine flood sources. The Hudson River defines its western boundary, while the Bronx River runs along much of its eastern border. Though the Hudson River shoreline is not an open-ocean coastline, it is tidally influenced and the combination of rising tides and floodwaters can exacerbate storm damage along its banks. Ground elevations are generally low along the Hudson River and rise away from the Hudson, reaching elevations greater than 350 feet<sup>5</sup> in some inland portions of Yonkers. The inland regions of the community are characterized by a network of rivers, streams, and brooks. The Saw Mill River, Grassy Sprain Brook, and the Bronx River are the primary inland streams that run through Yonkers; others include the Sprain Brook, Sunny Brook, Troublesome Brook, and Tibbetts Brook. These waterways create a significant risk of flooding for inland assets and systems. To mitigate flood risk effectively and improve

resiliency throughout the City, the causes and magnitude of flood risk from these flood sources must first be understood. The risk assessment process seeks to build on local knowledge using a standardized framework for identification and analysis of the risks to assets and systems throughout Yonkers.

As waterways are sources of economic, transportation, and recreational opportunities, it is not surprising that the highest concentrations of identified assets within Yonkers are along its waterways. However, many of these asset locations are also in areas of high and extreme flood hazard due to their proximity to flood sources. In particular, identified housing assets, many of which are within high-density residential neighborhoods along the Hudson and Saw Mill Rivers, are exposed to significant flood risks. The riparian corridors of the Grassy Sprain Brook and Tibbetts Brook are developed with housing and a large number of retail centers. There are also numerous residential assets along the Sprain Brook that routinely flood during storm events. As a whole, these assets are the core of the economic and residential base in Yonkers, and many are at high risk of flooding.

The results of the preliminary risk assessment indicate that the highest risk area in Yonkers is the residential area near the confluence of the Grassy Sprain Brook and the Bronx River. In particular, the Longvale Neighborhood and the Brooklands Cooperative scored in the severe risk category. The severe risk category is intended to capture those assets that are in a dangerous situation and should be prioritized in recovery and mitigation efforts. In addition, the single-family homes in the Clunie Avenue and Nepperhan Avenue areas scored in the high risk category. Assets in the downtown area along the Hudson River also scored in the high risk category, including economic, cultural, and wastewater infrastructure assets. In general, the road and rail transportation systems that encompass Yonkers are at moderate risk. However, for system-based assets such as these, risk to any individual system component can result in risk to the system as a whole.

## Background

Flooding in Yonkers is most concentrated in areas of low elevation along its inland rivers. In particular, properties along the Saw Mill River, Troublesome Brook, Grassy Sprain Brook, and the Bronx River are prone to severe flooding.<sup>6</sup> Residential neighborhoods in these areas have been observed to flood routinely during past storm events.

Superstorm Sandy caused severe flooding in the Downtown Riverfront District of Yonkers due to storm surge from the Hudson River, while storms characterized by heavy rain, such as Hurricane Irene, have historically caused flooding along the Saw Mill River, Grassy Sprain Brook, the Bronx River, and other, smaller streams. Flooding within these stream corridors occurs when the waterways overflow their bank capacity. Periods of intense rain have also been noted to cause flash flooding in streets and poorly drained areas throughout Yonkers.

There are a number of specific areas that are reported by the Committee and the City of Yonkers to be subject to repeat flooding. These include, but are not limited to, the following:

- ▶ Grassy Sprain Brook: Sunnybrook Apartments, Brooklands Cooperative, Winchester Apartments, Palmer Road, Longvale Road, Brooke Avenue, Meadow Avenue;
- ▶ Tibbetts Brook: Harrison Avenue from Jervis Road to Alan B. Shepherd Place;
- ▶ Bronx River: Maple Place, Hildreth Place, Abner Place, intersection of Yonkers Avenue and Kimball Avenue; and
- ▶ Saw Mill River: Clunie Avenue from Hearst Street to Tompkins Avenue.

These frequently-flooded areas include individual homes, entire neighborhoods, and apartment complexes, as well as commercial centers. This is consistent with land use throughout Yonkers, which is generally densely developed along waterways. Primary

areas of development in the City include clusters of high-density rental housing and industrial facilities along the Saw Mill River and the Hudson River. In addition, there are concentrations of retail and office facilities throughout Yonkers, typically in close proximity to waterways. Floodplain encroachment has been identified as a cause of flooding in Yonkers and is widespread throughout the City.

Topography within the Saw Mill River watershed includes many steep slopes, which lead to high rates of stormwater runoff, ultimately contributing to an increased risk of flooding in the area.<sup>7</sup> The topography of the Bronx River watershed, which includes the Sprain Brook, Grassy Sprain Brook, and Troublesome Brook, has been greatly impacted by development of the floodplain. In particular, the construction of the Bronx River Parkway resulted in substantial alterations to the river's course and channel.<sup>8</sup> Changes to the river and its tributaries may result in reductions of the carrying capacity of the waterways, while development of land throughout the watershed results in increased stormwater runoff flowing into these waterways.

In combination, these hydrographic, geographic, and topographic factors define the landscape of Yonkers. When storm events occur, these conditions result in flood risk throughout the City. The magnitude of that risk to the identified community assets can be determined through the risk assessment process.

## Risk Assessment

For many residents in the City of Yonkers, especially those who have experienced routine flooding from past storms, specific areas of flood risk within the community may appear to be obvious. However, experiences during past storms do not necessarily predict impact and damage from future storms. Furthermore, an understanding of the relative degree of risk to one neighborhood or building as compared to another is not always readily apparent. The standardized risk assessment process strives not only to identify assets that were damaged during past storms, but also to identify assets that may be at risk of damage

from future storms. The risk assessment tool developed by the NYRCR Program and NYS DOS enables quantification and comparison of the identified levels of risk to different community assets. Improved understanding of the severity and distribution of risk to assets throughout the community facilitates more effective resiliency and recovery planning.

The risk assessment tool combines information from the asset inventory, flood hazard maps, national and regional mapping data, and local knowledge into quantitative hazard, exposure, and vulnerability scores. This information is further combined into one quantitative risk score.

The hazard score is a measure of the likelihood that a flooding event will occur and the magnitude, or destructive capacity, of the event. For the purposes of standardized evaluation, risk scoring for all NYRCR Communities uses the hazard score corresponding to a 100-year storm event (the storm event with an annual 1% chance of occurrence) for all assets. The hazard score corresponding to the 100-year storm is 3, as defined by the risk assessment tool.

Exposure in the risk assessment tool is based on both the risk area within which an asset or asset group is located and the local topographic and geographic conditions of its surroundings—its landscape attributes. The asset’s risk area is determined by overlaying the FEMA and NYS DOS flood hazard area maps on a map of the identified assets. This indicates whether assets are located within the moderate, high, or extreme risk zones, or outside of risk areas altogether.

Assets within risk areas of similar landscape characteristics were grouped to evaluate multiple assets at once. Assets whose landscape characteristics did not conform to those of others nearby were considered individually. The landscape attribute score is determined by evaluating the presence or absence of a certain set of landscape characteristics defined by NYRCR Program guidance that may reduce an asset’s exposure to flood risk.

The exposure score, calculated within the risk assessment tool, assigns a numeric score between 1 and 5 based on the asset’s risk area and the number of protective landscape attributes determined to be absent.

Vulnerability scores are intended to represent the capacity of an asset to return to service after a storm. In the risk assessment tool, vulnerability scores range from 1 to 5, with a score of 1 corresponding to assets that are minimally affected by floods and a score of 5 corresponding to those assets that may be destroyed or permanently out of service as a result of flooding. The duration of service outages after past storms was used to determine the vulnerability score for each asset. Information on service outages for each asset was obtained through discussions with local officials and the NYRCR Planning Committee. Local officials who contributed to the vulnerability score evaluations included personnel from the Office of Emergency Management, the City Engineering Department, the Department of Sustainability, and the Department of Parks, Recreation, and Conservation.

The risk score is calculated by multiplying the hazard score, exposure score, and vulnerability score (i.e.,  $\text{Hazard} \times \text{Exposure} \times \text{Vulnerability} = \text{Risk}$ ). Risk scores range from 0 to 75, with the following ranges signifying varying degrees of risk:

- ▶ <6: Residual risk;
- ▶ 6-23: Moderate risk;
- ▶ 24-53: High risk; and
- ▶ >53: Severe risk.

The first step in applying the risk assessment tool is to calculate “unmitigated” risk scores, which represent the risk to assets and systems as they presently exist, without proposed mitigation projects in place.

To evaluate the risk reduction benefits of proposed storm recovery projects, “mitigated” risk scores have been prepared to reflect the degree to which a mitigation project may reduce risk to assets. Mitigated risk analyses have been prepared for proposed projects

and are discussed in Section IV, “Proposed and Featured Project Profiles.”

To focus on those assets that are most at risk, unmitigated and mitigated risk scores were prepared only for assets identified on the asset inventory that are located within high or extreme risk areas as identified on the FEMA and NYS DOS flood hazard area maps and those in areas identified by the Planning Committee and local experts as being subject to repetitive flooding. Assets located in moderate risk areas that serve critical functions during emergencies, such as hospitals, key infrastructure, and emergency response centers, were also considered for the risk assessment process.

The unmitigated risk scores present a profile of the current risk to assets identified in Yonkers. Analysis of these results provides insight into the factors driving flood risk in the community and what strategies could be most effective in the recovery and long-term resiliency of assets community-wide.

### Unmitigated Risk Score Results

In total, 107 assets located within high or extreme flood risk areas were identified in Yonkers. These assets are distributed throughout the community, with the highest concentrations along the Saw Mill, Hudson, and Bronx Rivers and the Grassy Sprain Brook. Of the 107 assets evaluated in the preliminary risk assessment, two scored in the severe risk category and 16 scored in the high risk category, with the remaining 89 in the moderate risk category. This high proportion of assets scoring in the moderate risk category is not unexpected, as many of these assets are bridges and rail lines, which are designed to be elevated above the flood elevation and typically experience only brief outages after storm events. The preliminary unmitigated risk score results are presented in Table II-7 below. For the purpose of clarity, road and rail assets that scored in the moderate risk category were consolidated in this table.

The unmitigated risk assessment tool, as provided in Section V.D, Table V-3, “Community Asset Inventory,” aggregates the hazard, exposure, and vulnerability information described above into the unmitigated risk score. For example, the North Yonkers Pumping Station, listed in the fourth row of the table, is located within the extreme hazard area and scored “Yes” on four of the six identified landscape attribute evaluations. Location within the extreme hazard area contributes 2 points to the exposure score, while each of the “Yes” responses for landscape attributes contributes an additional 0.5 points, for a total exposure score of 4. The hazard score for all NYRCR Community assets is 3, as described above. Based on input from the Planning Committee and city officials, it was determined that, after past storms, the asset was out of service or operating at reduced capacity for more than one month, which corresponds to a vulnerability score of 4. The hazard, exposure, and vulnerability scores (3, 4, and 4, respectively) are multiplied together and rounded to the nearest whole number to produce the risk score (48). The risk score of 48 for the pump station corresponds to the high risk category. A summary table of the assets evaluated and their risk scores is provided in Table II-7 below.

Residential assets throughout Yonkers scored in the severe, high, and moderate risk categories. The highest risk scores in the unmitigated risk assessment were those for the Brooklands Cooperative and the Longvale Neighborhood, both of which are located near the confluence of Grassy Sprain Brook and the Bronx River. The exposed nature of these locations combined with high vulnerability and reports of repetitive flooding resulted in severe risk scores. Single-family homes in the area of Clunie Avenue and Neperhan Avenue scored in the high risk category, due largely to their highly exposed locations along the Saw Mill River.

Several economic and cultural assets along the Hudson River scored in the high risk category. Many of these assets sustained significant damage during Superstorm Sandy and were out of service for a long period of time, resulting in high vulnerability scores.

These assets were evaluated as subject to riverine risk, but it is important to note that the tidal nature of the Hudson River could potentially further exacerbate the risk to these assets. Protection of the economic and cultural base in downtown Yonkers is essential to the long-term resiliency of the community.

The Yonkers WWTP and the North Yonkers Pumping Station are key elements of the City- and County-wide wastewater treatment system. Both of these assets scored in the high risk category. Since these assets function as elements of a larger system, risk to these assets presents a risk to the system as a whole. Other infrastructure systems in the community, including the roadway system and the Metro North Railroad system, scored predominantly within the moderate risk category. Again, these assets should be considered at the system level. Though the individual bridges, stations, and interchanges that make up these systems may have scored primarily within the moderate risk category, the risk that failure of these assets would present to vital regional systems should be considered when prioritizing recovery and resiliency actions.

The geographic distribution of preliminary unmitigated risk scores is depicted in Figure II-3, “Risk to Assets— City of Yonkers.” There are three primary clusters of high and severe risk assets: at the confluence of the Grassy Sprain Brook and the Bronx River, along the Saw Mill River in the northern part of the community, and along the Hudson River shoreline. These three geographic concentrations of risk are all in locations with high exposure to flood risk. Though this risk assessment only evaluated those assets located in high and extreme risk areas, there are additional assets located in the moderate risk area throughout Yonkers, which corresponds to the 500-year flood zone. These assets, such as The Hollows housing development and the proposed development at the Longfellow School, are likely at a significantly reduced risk of flooding due to their location outside of the 100-year flood zone.

Though it is not reflected in the unmitigated risk score results, there is additional risk to assets downstream of the Grassy Sprain Reservoir Dam. The dam, which is owned by the City of Yonkers, is reported by the

**Table II-7 Unmitigated Risk Assessment Results**

| Asset Name  | Asset Class                    | Critical Facility | Risk Level |
|---|--------------------------------|-------------------|------------|
| Brooklands Cooperative  | Housing                        | No                | Severe     |
| Longvale Neighborhood   | Housing                        | No                | Severe     |
| Proposed Alexander Street Redevelopment                                       | Economic                       | No                | High       |
| North Yonkers Pumping Station   | Infrastructure Systems         | Yes, FEMA         | High       |
| Yonkers WWTP (County-Owned)   | Infrastructure Systems         | Yes, FEMA         | High       |
| Yonkers Paddling and Rowing Club  | Natural and Cultural Resources | No                | High       |
| Scrimshaw House   | Housing                        | No                | High       |
| Single Family Homes - Clunie Ave & Nepperhan Ave                              | Housing                        | No                | High       |
| Sunnybrook Apartments   | Housing                        | No                | High       |
| Single Family Homes - Nepperhan Ave and Executive Boulevard                   | Housing                        | No                | High       |
| Single Family Homes - Nepperhan Ave between Executive Boulevard and Odell Ave | Housing                        | No                | High       |

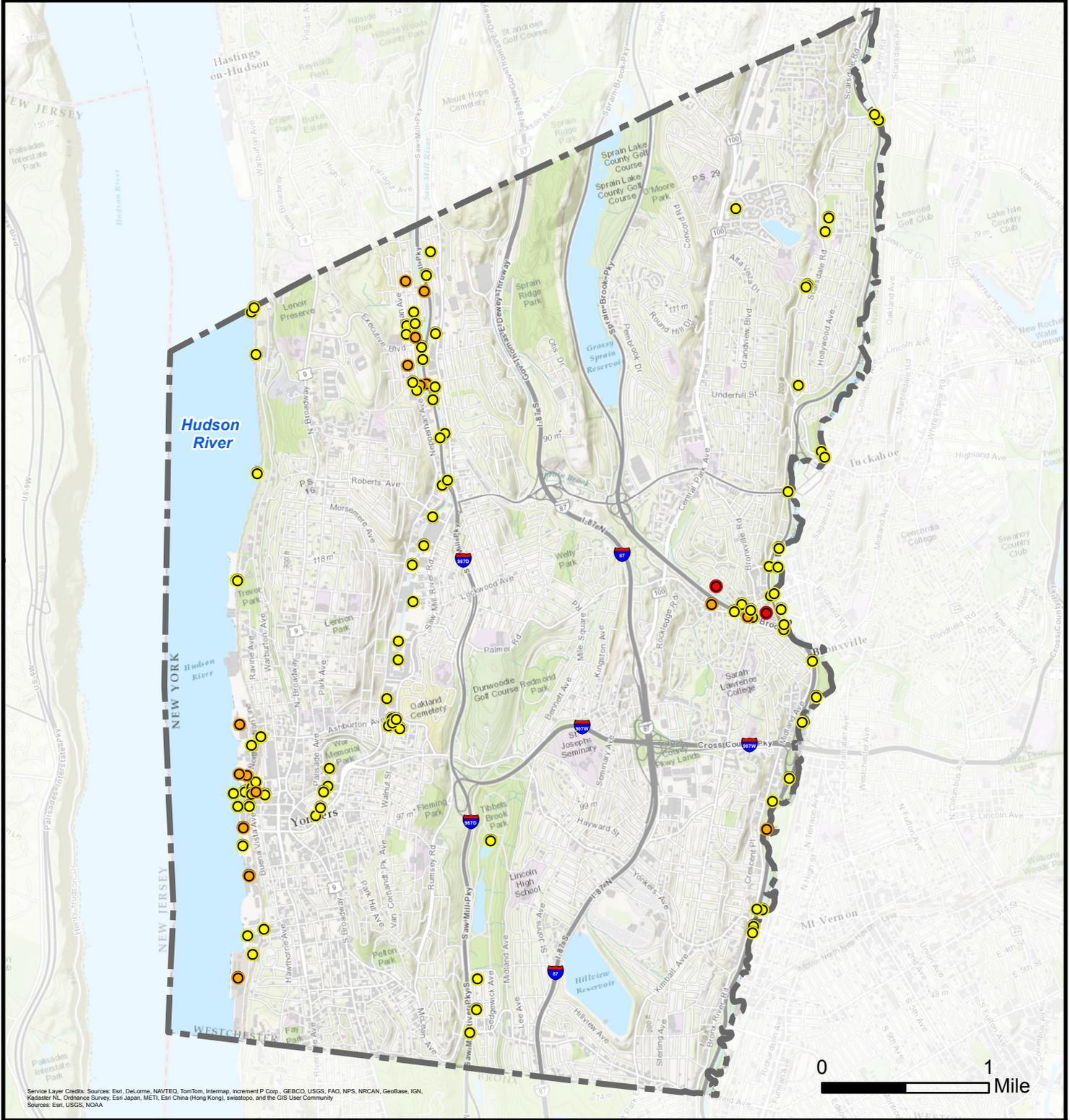
**Table II-7 (cont'd) Unmitigated Risk Assessment Results**

| <b>Asset Name</b>   | <b>Asset Class</b>             | <b>Critical Facility</b> | <b>Risk Level</b> |
|---|--------------------------------|--------------------------|-------------------|
| Riverfront Public Library   | Natural and Cultural Resources | No                       | <b>High</b>       |
| American Sugar  | Economic                       | No                       | <b>High</b>       |
| Hearst Street Bridge over Saw Mill River  | Infrastructure Systems         | No                       | <b>High</b>       |
| Sprain Brook Parkway  | Infrastructure Systems         | No                       | <b>High</b>       |
| Bronx River Parkway   | Infrastructure Systems         | No                       | <b>High</b>       |
| Odell Avenue Bridge over Saw Mill River   | Infrastructure Systems         | No                       | <b>High</b>       |
| Odell Avenue Bridge over Saw Mill River Parkway                                     | Infrastructure Systems         | No                       | <b>High</b>       |
| Single-Family Homes - Scarsdale Rd south end  | Housing                        | No                       | <b>Moderate</b>   |
| Industrial Buildings along Saw Mill River between Nepperhan Ave & Saw Mill River Rd | Economic                       | No                       | <b>Moderate</b>   |
| Industrial Properties along Saw Mill River / Worth St                               | Economic                       | No                       | <b>Moderate</b>   |
| Industrial Properties off Saw Mill River Rd   | Economic                       | No                       | <b>Moderate</b>   |
| Single-Family Homes along Scarsdale Rd from Maria to Alta Vista                     | Housing                        | No                       | <b>Moderate</b>   |
| St Casimir Avenue Apartments  | Housing                        | No                       | <b>Moderate</b>   |
| Westchester Fleet Services  | Infrastructure Systems         | No                       | <b>Moderate</b>   |
| MHACY - Angelo R. Martinelli Manor  | Housing                        | Yes, FEMA                | <b>Moderate</b>   |
| Winchester Apartments   | Housing                        | No                       | <b>Moderate</b>   |
| Offices and Restaurant - Grey Oaks Ave  | Economic                       | No                       | <b>Moderate</b>   |
| Elementary School 22  | Health and Social Services     | No                       | <b>Moderate</b>   |
| St Anthony School   | Health and Social Services     | No                       | <b>Moderate</b>   |
| Griffith Ave & Railroad Ave Homes   | Housing                        | No                       | <b>Moderate</b>   |
| Richter Park  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| St Mark's Episcopal Church  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Industrial Properties off Saw Mill River Rd / Delaware Rd                           | Economic                       | No                       | <b>Moderate</b>   |
| Odell Avenue / Nepperhan Avenue Businesses  | Economic                       | No                       | <b>Moderate</b>   |
| Yonkers Yacht Club  | Economic                       | No                       | <b>Moderate</b>   |
| 2- and 3-Family Homes between Harrison Ave and Tibbetts Rd                          | Housing                        | No                       | <b>Moderate</b>   |
| Grey Oaks Apartments  | Housing                        | No                       | <b>Moderate</b>   |

**Table II-7 (cont'd) Unmitigated Risk Assessment Results**

| <b>Asset Name</b>   | <b>Asset Class</b>             | <b>Critical Facility</b> | <b>Risk Level</b> |
|---|--------------------------------|--------------------------|-------------------|
| Saw Mill River Parkway  | Infrastructure Systems         | No                       | <b>Moderate</b>   |
| Private Boat Storage On Hudson, adjacent to JFK Marina                                    | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Science Barge   | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Alexander Street Industrial Properties  | Economic                       | No                       | <b>Moderate</b>   |
| Commercial Properties - Ashburton Ave & Saw Mill River Rd                                 | Economic                       | No                       | <b>Moderate</b>   |
| NYS DOT Pkwy Maintenance - O'Dell Ave   | Health and Social Services     | Yes, FEMA                | <b>Moderate</b>   |
| Whitney Young Manor   | Housing                        | No                       | <b>Moderate</b>   |
| Doyle Park  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Tibbetts Brook County Park  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Yonkers Recreation Pier   | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Industrial Buildings along Saw Mill River between Axminster St & Lake Ave                 | Economic                       | No                       | <b>Moderate</b>   |
| Industrial Properties off Saw Mill River Rd / Old Nepperhan Ave                           | Economic                       | No                       | <b>Moderate</b>   |
| Hudson Park Apartment Buildings   | Housing                        | No                       | <b>Moderate</b>   |
| Parcels H and I (Future Development along Hudson River between Vark and Prospect Streets) | Housing                        | No                       | <b>Moderate</b>   |
| Single-Family Homes around Freddolino Park  | Housing                        | No                       | <b>Moderate</b>   |
| Trinity Senior Apartments   | Housing                        | Yes, FEMA                | <b>Moderate</b>   |
| Freddolino Memorial Playground  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| James Scott Memorial Park   | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Van Der Donck Park  | Natural and Cultural Resources | No                       | <b>Moderate</b>   |
| Kimber Manufacturing  | Economic                       | No                       | <b>Moderate</b>   |
| School Bus and Car Storage  | Economic                       | No                       | <b>Moderate</b>   |
| Tyco Plastics   | Economic                       | No                       | <b>Moderate</b>   |
| The Olde Stone Mill (along Bronx River)   | Economic                       | No                       | <b>Moderate</b>   |
| MHACY - Dr. James F. X. O'Rourke Townhouses   | Housing                        | Yes, FEMA                | <b>Moderate</b>   |
| Vehicular and Pedestrian Bridges - moderate risk category (39 total)                      | Infrastructure Systems         | No                       | <b>Moderate</b>   |
| Metro North Bridges and Stations - moderate risk category (7 total)                       | Infrastructure Systems         | No                       | <b>Moderate</b>   |

# Figure II-3 Risk to Assets - City of Yonkers



Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community  
Sources: Esri, USGS, NOAA

### Legend

City of Yonkers (Study Area)

### Assets

- Severe Risk
- High Risk
- Moderate Risk
- Residual Risk

### Data Sources

City of Yonkers,  
NYSITS,  
Westchester County



Yonkers City Engineer to be in good condition. The dam is rated by the New York State Department of Environmental Conservation (NYS DEC) as a Class C dam. Class C dams are those with a high downstream hazard potential in the event of a dam failure. Assets subject to this increased hazard include those along the Grassy Sprain Brook downstream of the reservoir and those along the Bronx River immediately downstream of its confluence with the Grassy Sprain Brook. Several of these assets scored within the severe and high risk categories, and the additional hazard due to dam failure only further elevates that risk. This risk must be considered when planning for risk mitigation and resiliency projects and strategies.

## B. Assessment of Needs and Opportunities

The City of Yonkers has suffered from the repeated impacts of the 2007 floods, Hurricane Irene, and Superstorm Sandy. While the City has been proactive in reviewing its emergency preparedness protocols before, during, and after floods and severe storm events and adjusted its procedures based on lessons learned, each storm has uncovered the City's vulnerabilities. Following each severe storm, City officials, staff, emergency service personnel, County and State representatives, and utility providers have debriefed on measures that were effective and identified areas for improvement. Significant measures have been implemented to protect Yonkers residents and help the community become more resilient following not only catastrophic storm events, but also the frequent high-intensity, short-duration storm events that cause substantial flash floods throughout the community. Nonetheless, gaps in flood protection and prevention have highlighted areas for improvement.

This systematic reexamination of emergency preparedness and recovery needs has enabled the City to identify weaknesses and allocate resources where they are most needed. The NYRCR Program provides an additional framework for the City to evaluate its emergency preparedness needs further. While prior

emergency response systems proved strong, they were not perfect, and the need to improve future emergency response, recovery, and management operations remains a paramount goal. Prior storms have also underscored the need for vigilance in reaching out to and protecting vulnerable residents. Becoming aware of where vulnerable residents live to ensure their safety in future storms remains an ongoing challenge.

As described in Section I, "Community Overview," the NYRCR Planning Committee developed a vision and goals for the community to guide the NYRCR Program decision-making process. Identifying what works well in Yonkers and recognizing gaps in the City's flood protection measures allow the community to refine its critical needs. Identifying short-, mid-, and long-term needs, and opportunities to address those needs, establishes a foundation for strategies, projects, programs, and actions that will be developed later on in this process.

The identification of Yonkers' needs and opportunities grew out of guidance from the Committee and comments and observations from concerned citizens at the first Public Engagement Event held at the Grinton I. Will Library. Identifying key community assets (see Figure II-1, "Asset Inventory—City of Yonkers") also helped the Committee focus the assessment of needs on Yonkers' flood-prone land uses, vulnerable populations, and high-risk features. The Committee identified flood protection, community resiliency, and recovery needs, which were then presented to the larger community. Once the needs were identified, the Committee developed a list of opportunities that address those needs and build upon the long-term resiliency of the City. The resulting list was refined through in-depth discussions with community stakeholders, members of the public, and City officials and staff.

Recurring themes of critical concern to the community include repetitive flooding in residential neighborhoods, widespread power outages and coincident road closures due to downed trees and power lines, aging infrastructure including stormwater management and drainage systems, and regional coordination with adjacent municipalities and Westchester County regarding flooding issues.

## Recovery Support Functions:

- Community Planning and Capacity Building:** This is the recovery support function ensuring that communities effectively plan and implement disaster recovery activities, engaging the whole community to achieve their objectives and increase resilience. Nongovernmental and private sector resources should be considered in the public sector’s recovery planning process.
- Economic Development:** The ability to return economic and business activities to a state of health to ensure that a sustainable and economically viable community emerges after a storm event or other disaster is the purpose of this recovery support function. It is critical that the community return to self-sufficiency and vitality quickly and effectively after it has been damaged.
- Health and Social Services:** Restoring and improving health and social services networks in order to promote the resilience, health, independence, and well-being of the whole community is the focus of this recovery support function. Recovery efforts may look at public health, health care facilities and coalitions, and essential social services.
- Housing:** Disasters, like flooding and other storm events, require that many years’ worth of housing repair, rehabilitation, reconstruction, and new

construction occur at an accelerated pace. This recovery support function looks for solutions that are implementable, sustainable, and resilient. It is important to address conflicting policies and programs to effectively integrate all available housing-related resources.

- Infrastructure:** In order to efficiently restore infrastructure systems and services to support a viable, sustainable community and improve resilience to and protection from future hazards, this recovery support function is designed to protect existing infrastructure assets and construct new infrastructure that serves to protect other assets in the event of future storms.
- Natural and Cultural Resources:** Protection of natural and cultural resources and historic properties through appropriate response and recovery actions is the purpose of this recovery support function. It seeks to preserve, protect, conserve, rehabilitate, and restore natural and cultural assets within the community in order to make them more sustainable.

\* These descriptions are based on the FEMA Recovery Framework (<http://www.fema.gov/recovery-support-functions>).

An overview of the identified needs and opportunities is presented below, organized by the six NYRCR Recovery Support Functions (RSFs) that were established by President Obama in 2011 through the National Disaster Recovery Framework. The RSFs were designed to “support local governments by

facilitating problem solving, improving access to resources, and by fostering coordination among State and Federal agencies, nongovernmental partners and stakeholders.”<sup>9</sup> On the following pages are the needs and opportunities the Committee wishes to highlight under the six RSFs.

## Community Planning and Capacity Building



During the 2007 nor'easters, Hurricane Irene, and Superstorm Sandy, as well as the lower-profile but more frequent storms that regularly affect Yonkers, the same neighborhoods have been exposed to repetitive flooding.

Inadequate stormwater infrastructure (both natural and engineered) and poorly planned upstream land uses have exacerbated flooding conditions. Since these affected neighborhoods are in the lower reaches of the watershed, effective flood protection efforts have been difficult to identify. Improved policies and regulations concerning appropriate land uses within the watersheds are needed. These should include inter-municipal collaboration regarding upstream and downstream land uses, regional coordination within the watershed to implement improvements that would capture stormwater, efforts to raise awareness about flooding, and zoning changes to limit or reduce impermeable surfaces.

### Community Planning and Capacity Building Needs:

- ▶ Improved communication and coordination among City, County, State, and Federal governments regarding emergency preparedness, disaster recovery, and resiliency
  - ▶ Expanded public education/outreach programs to increase awareness of natural hazards, resilience and recovery practices, and emergency preparedness
  - ▶ Improved urban forestry management, including assessment of risks to urban forest and response to tree damage caused by storm events
  - ▶ Identification of vulnerable populations, including elderly, non-English-speaking, and transit-dependent persons and those with special needs
  - ▶ Clearly visible and publicized emergency routes
  - ▶ Regular review and improvement of City and County stormwater management regulations and ordinances
- ▶ System for identifying and tracking potential funding sources for recovery and resiliency projects
  - ▶ System to contact volunteers in each vulnerable neighborhood to participate in pre- and post-flood emergency communication, including homeowner associations and co-op/condo boards

### Community Planning and Capacity Building Opportunities:

- ▶ In advance of disaster events, encourage City to establish protocols for providing essential services during post-storm recovery periods to ease the burden on City departments in the aftermath of a storm
- ▶ Use City staff to track and pursue funding for recommended recovery and resiliency projects
- ▶ Re-assess the adequacy of resiliency initiatives in *Connections—The Yonkers Comprehensive Plan*
- ▶ Use existing City resources and communication infrastructure to educate the public about natural hazards, recovery, and resiliency topics: flood-proofing, retrofits, financial resources for recovery and resiliency, etc.
- ▶ Use existing Yonkers Department of Parks and Recreation expertise to address urban forestry issues
- ▶ Create a 'community continuity program' to ensure that existing institutional knowledge related to emergency response is passed down to future generations of City leadership
- ▶ Promote use of existing communication networks (City of Yonkers website, Mayor's call line, etc.) to warn residents of a storm or other threat
- ▶ Arrange for direct inclusion of utility representatives (Con Edison, Verizon, MTA, et al.) in emergency planning discussions
- ▶ Establish and maintain liaison with district volunteer leaders, (e.g., various homeowner association and co-op/condo boards)
- ▶ Support and build on current efforts in the State legislature to establish a Statewide flood mitigation and preparedness authority

## Economic Development



As shown in Figure II-4, “Economic Land Uses—City of Yonkers,” Yonkers has several key economic and commercial clusters, some of which have been subject to significant damage due to repetitive flooding. These include, in particu-

lar, the redevelopment of the Hudson River waterfront and the adaptive reuse of the Nepperhan Avenue commercial and industrial corridor. The ability for a community to recover from disastrous events is inherently tied to its capacity to return to business as usual following these events. Helping businesses that have suffered irreplaceable losses and bringing businesses that have been closed due to flood damage or lack of power back to working condition as soon as possible are critical to recovery.

Restoring utility services and public transportation quickly and effectively in the aftermath of flooding and wind damage is essential for Yonkers’ economic recovery and resiliency. The Metro-North trains provide a vital link to jobs in New York City for Yonkers residents and to jobs in Yonkers for workers across the region. Keeping these trains operable and efficient is critical for getting back to business. Parking at the Metro-North stations is important after storms and on an ongoing basis. Businesses benefit enormously from strategies that allow them to continue operating even if their main offices may be off-line. Off-site data storage and employee work space in upland areas away from flood zones gives companies this flexibility. Generators also allow for continuity of operations, and can prevent enormously expensive losses of perishable inventory in the case of grocery stores and other similar businesses.

### Economic Development Needs:

- ▶ Uninterrupted access to Metro-North and Bee-Line Bus transit systems and employment centers during recovery period
- ▶ Continuity and resiliency for businesses—off-site data storage and employee work space outside of affected areas

- ▶ Generators for stores that have perishable inventory, especially grocery stores, for high-rise buildings with elevators, and for other services that are critically needed after storms
- ▶ Oversight on predatory reconstruction contractors
- ▶ Tax relief for companies materially affected by storms
- ▶ Relief from high flood insurance costs that cripple businesses and residents
- ▶ Better information about green building opportunities

### Economic Development Opportunities:

- ▶ Utilize the Industrial Development Agency (IDA) as an economic recovery resource for affected businesses
- ▶ Find a way to incentivize stores to install generators—especially grocery stores (NYS already mandates certain gas stations)
- ▶ Provide training and technical resources for business owners to encourage resiliency and green building practices

## Health and Social Services

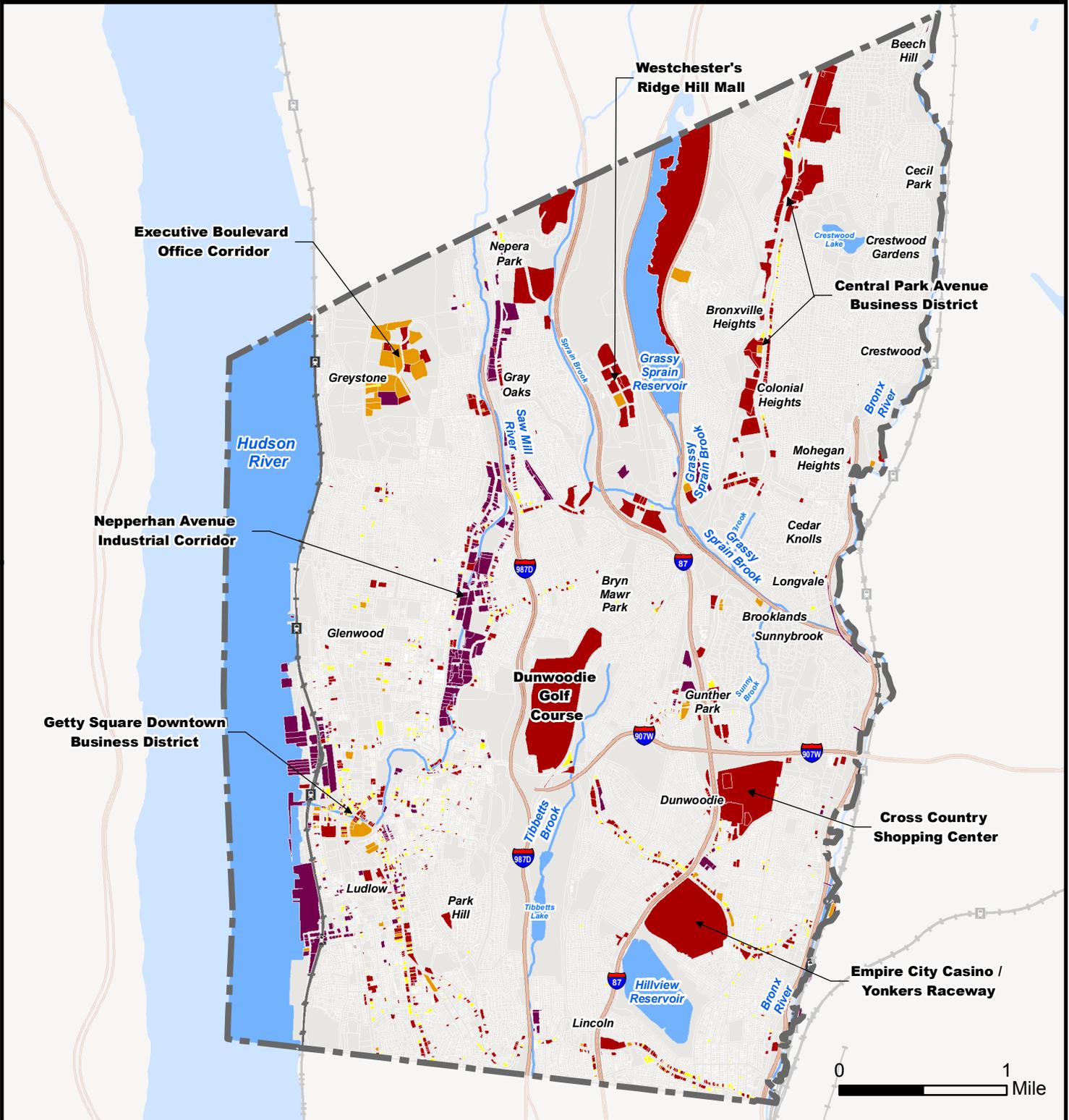


Yonkers’ community assets include numerous fire houses, police precincts, medical facilities (including two hospitals), educational facilities, libraries, elder care, and community centers.

Yonkers was lucky in that health and social service facilities fared relatively well in Hurricane Irene and Superstorm Sandy. While the Riverfront Library suffered severe damages and has required significant investment to bring it back to working condition, the City’s other libraries were unscathed by the storms, and schools, hospitals, and other facilities did not see extensive damages. In the aftermath of these storms, health and social services facilities were an essential part of the recovery effort. Libraries became ad hoc community centers where information was distributed, access to power and digital resources was available to victims of storm

# Figure II-4

## Economic Land Uses - City of Yonkers



| Legend |                              | Land Uses      | Data Sources                                |
|--------|------------------------------|----------------|---|
|        | City of Yonkers (Study Area) | Mixed-Use      | City of Yonkers, NYSITS, Westchester County |
|        | Major Highways               | Office         |   |
|        | Railroads                    | Retail         |   |
|        | Rail Station                 | Industrial     |   |
|        |                              | Other Land Use |   |



damage, and displaced workers were able to create temporary work stations at computers and desks.

In preparation for future storms, these same facilities could be used as tools for resiliency. Information and educational sessions can be provided at these facilities, giving City residents, homeowners, and business owners the tools they need to keep safe and improve their position in the face of future flooding and storm risks.

**Health and Social Services Needs:**

- ▶ Storm shelters that double as community resource centers and resiliency education centers, equipped with generators and emergency supplies
- ▶ Floodproofing of at-risk supplemental emergency facilities
- ▶ Post-storm security for evacuated neighborhoods
- ▶ Rapid elimination of blockages (downed trees or power lines, flood debris, etc.) on routes to hospitals during storm events
- ▶ Improved education for residents regarding neighborhood healthcare facilities—their location and the services they offer
- ▶ Better coordination of services/information among emergency services agencies
- ▶ Regular review and maintenance of emergency preparation and shelter areas

**Health and Social Services Opportunities:**

- ▶ Leverage cultural institutions (especially libraries, but also schools and community centers) as recovery support locations—with charging stations, access to Internet, and other recovery resources
- ▶ Build upon and connect existing databases of vulnerable populations
- ▶ Inform and educate emergency services personnel (ambulance drivers, firefighters, police) of emergency routes and driving procedures to be used during major storms

- ▶ Develop alliances with nearby municipalities to help with shelter, cooling centers, and other disaster response services

**Housing**



Yonkers’ residential neighborhoods were heavily affected by the recent storms. Neighborhoods along the Grassy Sprain Brook, Saw Mill River, and Hudson River waterfront were severely damaged, and in some cases housing units

were rendered uninhabitable for up to a year. Recurring flooding at these locations has depressed property values and led to serious hardships for many residents. Increasing flood insurance costs have also hit residents hard, adding to the difficulty many homeowners have experienced with simply being able to remain in their homes and their neighborhoods.

When discussing housing, the Committee was focused on providing homeowners with the ability to help themselves through better access to information and funding for home retrofits, elevations, conversions to natural gas (to eliminate the potential for oil tank leaks during flooding), and other improvements. Public investment in these neighborhoods is also needed, in the form of floodproofing measures such as flood walls, and to complete the construction of storm sewers to separate floodwaters and runoff from the sanitary sewer system (known as combined sewer overflows, or CSOs). The Committee also views stricter regulation and enforcement of floodplain codes and standards in residential neighborhoods as a key to successfully reducing flood losses in the long term.

**Housing Needs:**

- ▶ Better protection of homes and neighborhoods from flooding
- ▶ Improved floodwalls to protect frequently flooded neighborhoods
- ▶ Low-cost, low-tech floodproofing
- ▶ Programs to reduce the potential for leaks in home

heating oil tanks during floods

- ▶ Improved storm sewers in vulnerable residential areas
- ▶ Standardization of floodplain codes across municipalities located within Westchester County watersheds to improve upstream flood retention capacity
- ▶ Reduction of excessive paved surface coverage upstream and within flood zones, which aggravates flooding
- ▶ Assistance for homeowners and businesses in flood-prone areas to relocate or retrofit their homes/buildings to reduce flood vulnerability
- ▶ Greater availability of temporary housing for people displaced in the wake of a disaster
- ▶ Expanded programs/eligibility to elevate vulnerable housing
- ▶ Homeowner relief from skyrocketing flood insurance costs
- ▶ Regular maintenance of sanitary and storm sewers and storm drains

### Housing Opportunities:

- ▶ Utilize land management tools to create flood-safe homes and neighborhoods
- ▶ Find ways to reduce impermeable coverage throughout the City
- ▶ Improve enforcement of building and zoning laws relating to flood zones
- ▶ Create a voluntary program whereby hotels in Yonkers, existing and new, set a flat rate for storm and emergency victims who are temporarily unable to access their homes
- ▶ Take advantage of green infrastructure methods to reduce upstream runoff
- ▶ Reroute runoff from East Yonkers and Greenburgh away from the Grassy Sprain Brook
- ▶ Upgrade the sanitary and storm sewer system in high-risk zones

- ▶ Communicate the advantages/costs of elevating homes, as well as the availability of public programs providing assistance with elevations
- ▶ Use City, County, and State tax credits to offset flood insurance costs
- ▶ Encourage oil tank elevations and conversions to natural gas to remove oil tanks from flood areas, and communicate the availability of existing incentives
- ▶ Mandate that municipalities along common waterways share information regarding proposed projects that would impact the watershed

## Infrastructure Systems



Flooding from the Hudson River, Grassy Sprain Brook, Saw Mill River, Bronx River, and the other inland waterways of Yonkers is seen by the Committee as one of the greatest threats to Yonkers' residents and the City's future growth. While a great deal of investment has been made in flood walls and waterway improvements, much work remains to be done in this arena. Future improvements must include a combination of hard and soft infrastructure, with an emphasis on green infrastructure.

Yonkers' utility systems have been particularly vulnerable to flooding and wind damage in recent storms. The Yonkers Wastewater Treatment Plan (WWTP) and other facilities were inundated during Superstorm Sandy and sustained costly damage. Elsewhere, CSOs of stormwater mixed with raw sewage contaminated streams and neighborhoods. Downed trees took power lines with them, and thousands of residents were without power for extended periods. This led to cascading issues, as sump pumps ceased to operate without power and digital communication networks were unable to function.

While some improvements have been made since these storms, Yonkers' utility networks remain highly susceptible to flooding and wind damage. The Committee has described a number of specific needs in

the area of infrastructure to reduce the potential for further damage to the City’s sewer, water, and power networks.

**Infrastructure System Needs:**

- ▶ Better protection of the County WWTP from flooding
- ▶ Preservation of electrical service during storms—electrical systems are vulnerable above and below ground
- ▶ Better prevention of CSOs through increased separation of stormwater from sewage and reduction of stormwater infiltration and inflow into sanitary sewer system from leaking pipes
- ▶ Prevention of floodwater infiltration into water supply system pumps
- ▶ Prevention of flooding of parkways and feeder roadways leading to evacuation routes during all flood events
- ▶ Improved pedestrian access Citywide and especially in central commercial areas
- ▶ Protection of people, homes, and property from CSO effluent
- ▶ Regular sewer and storm drain maintenance, evaluation, and repair
- ▶ Regular maintenance of berms, culverts, and river beds by City, County, and State agencies

**Infrastructure Systems Opportunities:**

- ▶ Follow up on previously recommended stormwater infrastructure projects as identified in City and County plans
- ▶ Explore alternative power opportunities such as renewables and micro-grids for improved access to power and increased flexibility during/after storms
- ▶ Create redundancies and/or backup to the existing stormwater management system through green infrastructure interventions
- ▶ Improve upon existing stormwater system by improv-

ing flood valves and outfall pipe linings and by adding additional sump pumps at appropriate locations

- ▶ Replace undersized culverts that back up stormwater
- ▶ Draw on available expertise when developing green infrastructure projects—conservation groups, State agencies, reports of solutions from foreign countries (Dutch experience)
- ▶ Organize MTA and utilities to coordinate their plans in Yonkers and ensure compatibility with City resiliency efforts
- ▶ Pursue County, State, and Federal funds for flood mitigation and green infrastructure

**Natural and Cultural Resources**



Yonkers is a densely populated City—approximately 10,000 people per square mile—with a high proportion of impermeable land uses. As the City has grown, and developable land has become scarce, new development has pinched stream beds, encroached into critical watersheds, and altered wetlands, ponds, and lakes. Natural resources that should have naturally detained and controlled floodwaters have been so significantly altered or eliminated that engineered stormwater mitigation has become the necessary focus of flooding solutions. It is this intense land use pattern that has increased flooding in the City, leading to many of the problems seen today. Preservation and restoration of existing natural areas, combined with creation of new open spaces and a reduction in impermeable surface coverage are needed for there to be long-term positive impacts on flooding in Yonkers.

Due to the key role that Yonkers’ waterways and the Hudson River waterfront played in the development of the City, many of the key cultural assets are located in low-lying, flood-prone areas. The Yonkers Pier, Riverfront Library, Yonkers Paddling and Rowing Club, Science Barge, and many others are at very high risk due to their exposed waterfront locations. A number

of parks are also in high-risk areas; these include the JFK Marina and Park and Van Der Donck Park.

### Natural and Cultural Resources Needs:

- ▶ Restoration of streams and tributaries through the removal of debris/ obstructions according to recognized best practices
- ▶ Creation of a point of access to Grassy Sprain Brook through the Sprain Brook Parkway sound barrier wall to allow stream maintenance (owned by NYS DOT but inaccessible)
- ▶ Protocol for urban forestry management and invasive vine removal, particularly along flood-prone waterways
- ▶ Development of a plan for abandoned gas stations in flood zones along Bronx and Saw Mill Parkways to avoid potential spills/leaks by removing abandoned underground tanks
- ▶ Protection of major downtown cultural assets from flooding and storm damage—Riverfront Library, Science Barge, Sarah Lawrence-Beczak, Greyston Bakery, Van Der Donck Park
- ▶ Better information and studies on the functioning of Yonkers' watersheds and on the relationship between upstream development and downstream flooding/ecological conditions

### Natural and Cultural Resources Opportunities:

- ▶ Revise protocols for tree pruning, removal, and replanting
- ▶ Utilize existing green shorelines at public parks and open spaces as a resiliency education opportunity
- ▶ Encourage property owners to switch to permeable surfaces

- ▶ Incentivize greener building practices in new construction and renovation work
- ▶ Develop processes for acquisition of severely damaged properties for flood mitigation, storm water retention, wildlife habitat, and recreation
- ▶ Research feasibility of removing silt as needed to facilitate natural storage of existing waterways



*A Stretch of the Grassy Sprain Brook in Longvale, where it is inaccessible to maintenance crews*

- ▶ Maintain public access to open spaces (woodlands, green spaces, parks, etc.) in Yonkers for outdoor activities and recreation
- ▶ Expand floodplains along trails and within open space areas where possible
- ▶ Complete Watershed Management Plans for all of Yonkers' watersheds with a focus on the hydrology of these systems, especially the downstream effects of upstream development



# 2014 NY RISING COMMUNITY RECONSTRUCTION PLAN YONKERS NYRCR

## Section III Reconstruction and Resiliency Strategies







# Reconstruction and Resiliency Strategies

Sections I and II of the Yonkers NY Rising Community Reconstruction (NYRCR) Plan provide an overview of the Yonkers NYRCR community and identify its risks, needs, and opportunities. This section presents the strategies developed by the Committee to support reconstruction, to protect and reduce vulnerability, and to promote resiliency. These strategies address local needs, problem areas, and regional concerns, and respond to critical issues and community feedback. The list also considers known areas of vulnerability from flooding, wind, and other storm damage from Hurricane Irene and Superstorm Sandy. The goal is to ensure that the City builds back better.

The vision, goals, needs, and opportunities identified and refined through ongoing discussion at Committee meetings and Public Engagement Events helped set the foundation for these strategies. The strategies represent statements of action that will support projects that can be implemented across a wide range of time horizons and can be funded by a variety of sources.

The strategies proposed help resolve critical issues identified in Section I, “Community Overview,” address risks to assets explored in Section II, “Assessment of Risk and Needs,” and consider flood mitigation, disaster recovery, and long-term resiliency needs that remain unmet by existing planning and rebuilding initiatives. The strategies also represent ways to capitalize on identified opportunities and meet short-, medium-, and long-term goals that the Committee identified during the planning process.

The following section presents a description of each strategy followed by a table listing the projects that help realize that strategy.

## Strategy 1. Work with neighborhoods and businesses to improve flood resistance in Yonkers’ vulnerable areas

Yonkers is a City of hills and valleys built around its many waterways, large and small, and a City in which one is never far from a nearby stream or river. Development near water bodies provides economic benefits. When development encroaches into floodplains, this proximity to the water is a double-edged sword. Flooding has become an ever-present source of worry for residents in many vulnerable neighborhoods in Yonkers. The City’s experiences during Hurricane Irene and Superstorm Sandy were only the most recent in a long string of flood events that have left many neighborhoods feeling unprotected. Because of this history of inundation, efforts to continue the City’s recovery and increase future resilience must begin by building in flood resistant measures in vulnerable areas of the City.

From its first meeting, the Committee was focused on finding ways to insulate residential and commercial areas from the impacts of floodwaters. Committee members gave personal testimonies of flooding from when the waters of the Saw Mill River, the Grassy Sprain Brook, the Bronx River, and the Hudson River rose above their normal levels and flooded homes, community facilities, and places of employment. These historic floods impacted the homes

and neighborhoods of family members, friends, and co-workers. Committee members came to the first meeting filled with ideas for easing the suffering caused by these floods. Thus, the Committee’s Vision statement refers to Yonkers as a “community focused on protecting our residents, property, infrastructure, and natural resources from extreme flooding and natural disasters.” One of the enumerated Goals is to “address flooding as a Citywide problem... that requires a coordinated mitigation effort with solutions unique to each watershed.”

Local businesses and neighborhood groups are well-positioned to work with the Committee and government entities to take the lead on many flood-resistance projects. For example, the Brooklands Cooperative, located at the confluence of the Bronx River and the Grassy Sprain Brook, has worked with local and State officials to implement the Brooklands Floodwall project. Brooklands was heavily flooded during the April 2007 Nor’easter and Hurricane Irene, and the community pulled together around a project to add height to an existing floodwall. This project has begun

construction. Early on, the Committee came to the realization that individual large projects were less likely to alleviate future flooding than groups of smaller, incremental improvements designed to work together. The Longvale neighborhood has followed this approach. After it experienced serious flooding during the April 2007 Nor’easter and Hurricane Irene, the neighborhood became proactive and well-organized around flooding issues. Longvale has proposed a number of incremental projects that, if implemented together, could alleviate future flood damage. These proposals include clearing silt and storm debris from the Bronx River and Grassy Sprain Brook, repairing the Sprain Reservoir Flood Valve, and enlarging the culverts of the Metro-North Bronxville Bridge.

Similarly, the Grey Oaks/Nepera Park community, located along both sides of the Saw Mill River, has come together to consider whether several smaller projects, such as extending the Clunie Avenue berm and installing additional culverts beneath Odell Avenue, would cumulatively provide a significant reduction in flood damages.

**Table III-1 Work with neighborhoods and businesses to improve flood resistance in Yonkers’ vulnerable areas**

| Project Name   | Short Project Description   | Estimated Cost          | Proposed or Featured Project | Regional Project (Y/N) |
|--|---|-------------------------|------------------------------|------------------------|
| Bronx River and Grassy Sprain Brook Hydrologic Study | Address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using collected data, conduct a hydrologic study of these two primary watersheds and make recommendations for flood mitigation projects, and (3) implement one or more projects recommended in the study. | \$1,360,000-\$1,720,000 | Proposed Project             | Y                      |
| Saw Mill River Hydrologic Study                      | Address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using collected data, conduct a hydrologic study of this primary watershed and make recommendations for flood mitigation projects, and (3) implement one or more projects recommended in the study.       | \$1,240,000-\$1,480,000 | Proposed Project             | Y                      |

## Strategy 2. Improve on existing emergency preparedness and communications

The Committee envisions a plan that would “safeguard the public health and safety of the City’s residents through flood mitigation and effective flood recovery,” as stated in the Vision statement. A key implementing goal of this Vision is to “contribute to a coordinated Citywide preparedness and response against future storms.”

To achieve this goal, the Committee identified projects and actions that would build on and enhance the City’s existing emergency preparedness, response, and communications systems. The Yonkers Office of Emergency Management (OEM) is the agency that coordinates these efforts, so the Committee planned

the Yonkers Emergency Response and Recovery Campaign project as a collaboration with OEM. The project would upgrade and enhance the City’s early warning system for floods, including an outreach campaign to dramatically increase enrollment in the voluntary registry of residents’ phone numbers for phone, text message, email, and social media alerts; provide for improvements to the City’s existing emergency call-in line; and develop an education and outreach campaign for Yonkers residents to ensure that all residents are informed of these emergency communication systems. These and other Committee recommendations seek to improve emergency preparedness practices while ensuring all residents understand the emergency systems in place.

**Table III-2 Improve on existing emergency preparedness and communications**

| Project Name   | Short Project Description  | Estimated Cost     | Proposed or Featured Project | Regional Project (Y/N) |
|--|--|--------------------|------------------------------|------------------------|
| Emergency Power to Street Lights along Evacuation Routes | Conduct a pilot project to replace 10-15 existing conventional street lights with solar battery-powered street lights as backup power along a major evacuation route.  | \$70,000-\$135,000 | Proposed Project             | N                      |
| Yonkers Emergency Response and Recovery Campaign         | <p>Develop and implement the following programs in coordination with the City of Yonkers Office of Emergency Management (OEM) and other emergency response organizations to complement and expand on the City’s already strong package of services and programs:</p> <p>1) A fully integrated Citywide early warning system for flooding and other emergencies that builds on Yonkers’ existing notification system.</p> <p>2) An upgraded community call-in line to expand opportunities for City residents to communicate their needs to emergency responders.</p> <p>3) A comprehensive education and outreach campaign to inform the public of the enhanced flood warning system and community call-in line and enroll residents in the emergency notification contact list.</p> | \$475,000          | Proposed Project             | N                      |

### Strategy 3. Provide information and assistance to home and business owners with pre-storm floodproofing and post-storm recovery

Despite the availability of programs for assisting storm-damaged properties, access to these programs for many Yonkers home and business owners is unclear. Barriers include lack of information and a process that is sometimes indirect and confusing. The Committee concluded that the existence of a resource program is insufficient if the people in need lack the resources and tools to access the program. In response, the Committee established a goal to address this problem: “advance educational outreach to ensure our residents understand... how they can protect themselves, their homes, and their neighborhoods against future storms in an environmentally sustainable way.” The Committee is confident that if these barriers can be removed or minimized, a larger proportion of the City’s residents will avail themselves of these vital programs to protect them in advance of storms with pre-storm floodproofing and post-storm recovery.

A comprehensive Technical Assistance Program for Residential Resiliency is proposed as a means of

achieving this goal. A great deal of information currently exists on floodproofing tools, green power sources, and other means of increasing property owners’ resiliency. There are also programs that provide financial and technical assistance to put these tools to work. Combining these disparate information sources into a comprehensive menu of tools would result in a “one-stop” package for property owners recovering from storm damage or trying to prepare for a future storm. Education and outreach programs are even more powerful, giving individuals the opportunity to interact with and learn from people who specialize in recovery and resiliency. Giving residents the opportunity to meet one-on-one with qualified professionals through an individual technical assistance program would provide the resources needed to turn planning into action. The Committee hopes to be able to implement programs at each of these levels to ensure that no family in Yonkers misses the opportunity to fortify their property in advance of the next big storm.

In addition to the Proposed Project presented in Table III-3, the Committee identified Additional Resiliency Recommendations to pursue this strategy. These measures are listed in their entirety in Section V.A, “Additional Resiliency Recommendations.”

**Table III-3 Provide information and assistance to home and business owners with pre-storm floodproofing and post-storm recovery**

| Project Name  | Short Project Description  | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
|---|--|----------------|------------------------------|------------------------|
| Technical Assistance Program for Residential Resiliency | Create a comprehensive technical assistance program to assist homeowners and renters who have been affected by past storms or whose property continues to be vulnerable to future storms. The project contains an education and outreach component and an individual technical assistance component. | \$850,000      | Proposed Project             | N                      |

### Strategy 4. Promote resiliency and flood management best practices through land-use planning and regulation

In the face of storm damage to assets in high risk locations along flood-prone waterways, sensible planning can position Yonkers for resiliency. The Committee understands this, and during the visioning process it established a goal to “develop policy, design, and construction standards to make our neighborhoods more resilient in the future.” The Committee explored opportunities to avoid the impacts of natural disasters by delving into new forms of land-use planning and regulation that could have a positive impact on the City’s resiliency.

Green infrastructure initiatives are a critical piece of this effort. The Alexander Street plan, a City-sponsored redevelopment plan along the Hudson River waterfront, can be re-envisioned as a showcase of green infrastructure and design that would create a model resilient neighborhood in a high-risk, flood-prone area. Adapting land use patterns to these

flood-prone conditions, creating a desirable place to live and work with a strong sense of place, and developing state-of-the-art installations such as rain gardens and bioswales as components of green stormwater infrastructure throughout the City will create vibrant and functional green spaces that will reduce stormwater flooding during heavy rain events.

Managing the City’s waterways is another component of resiliency where planning policy initiatives can be useful. By developing a series of best management practices for the rivers, streams, and brooks that flow through Yonkers’ neighborhoods, the Committee expects that the damage caused when floodwaters originating upstream arrive in Yonkers can be limited. Managing vegetation and clearing away built-up debris and sediment will leave more room for the water to flow. But Yonkers cannot do this in isolation, so coordination across municipal boundaries and with County and State governments on flood management strategies is essential.

**Table III-4 Promote resiliency and flood management best practices through land-use planning and regulation**

| Project Name  | Short Project Description   | Estimated Cost    | Proposed or Featured Project | Regional Project (Y/N) |
|---|---|-------------------|------------------------------|------------------------|
| Planning Study to Establish Best Management Practices for Upland Waterways            | Undertake a planning study to develop best practices for managing Yonkers’ upland waterways to prevent degradation of their hydrologic function. The study would consider ways to balance the urgent need to minimize damaging overflows or backups along these waterways with the importance of protecting the habitat, ecological, and hydrologic functioning of these rivers and streams.  | \$225,000         | Proposed Project             | Y                      |
| Resilient Revitalization of the Alexander Street Waterfront— Study and Pilot Projects | Update and amend the Alexander Street Master Plan to transform this underperforming waterfront area into a showcase district for natural infrastructure and green building practices. The project would also include planning, design, and implementation of three targeted natural infrastructure projects in the Alexander Street neighborhood to showcase the ability of green infrastructure to protect the district from flooding and storm damages. | \$900,000         | Proposed Project             | N                      |
| Scout Field Engineering Study   | Determine, via hydraulic modeling, whether proposed improvements to Scout Field could adversely affect flooding in neighborhoods along the Bronx River.   | \$30,000-\$50,000 | Proposed Project             | Y                      |

### Strategy 5. Repair, rehabilitate, upgrade, and fortify critical infrastructure assets

A number of Yonkers’ critical infrastructure assets—including major roadways, bridges, wastewater treatment facilities, and the electric grid—were impacted by Hurricane Irene and Superstorm Sandy. With these damages in mind, the visioning process established a goal to “maintain and upgrade the City’s infrastructure.” Repairing and fortifying infrastructure assets to enable them to withstand levels of wind and flooding similar to those seen in these storms and remain operational is an important priority for the Committee.

Resiliency initiatives that would enable Yonkers’ infrastructure networks to continue operating with only limited interruptions in service during and after future storm events are essential to the ongoing viability of the City. Of the various infrastructure assets that were seriously impacted by Hurricane Irene and Superstorm Sandy, the most notable were the wastewater treatment system, which was heavily damaged, and the electric grid, which through numerous minor failures (such as downed power lines) left thousands of residents without power for extended periods of time. Hudson River seawalls and bulkheads were also

heavily damaged, undermined, and in some cases entirely torn away by the record storm surge of Superstorm Sandy. Other infrastructure systems that were heavily overloaded included the network of roadways and bridges; the Metro-North commuter rail system; and gas stations unable to dispense fuel due to electrical outages. Repairing and fortifying these infrastructure systems is imperative, as is the development of new and enhanced capabilities including new backup power supplies for gas stations and supermarkets, a green infrastructure network for improved stormwater management, and the burying of power lines so that they are no longer at risk from fallen tree limbs and high winds.

In addition to the Proposed Projects presented in Table III-5, the Committee identified Additional Resiliency Recommendations to pursue this strategy. These measures are listed in their entirety in Section V.A, “Additional Resiliency Recommendations.”

**Table III-5 Repair, rehabilitate, upgrade, and fortify critical infrastructure assets**

| Project Name   | Short Project Description  | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
|--|--|----------------|------------------------------|------------------------|
| Creation of Access to Grassy Sprain Brook through Sprain Brook Parkway Sound Barrier | Construct access gates in the Sprain Brook Parkway’s sound barrier to allow access to maintenance equipment in order to remove debris and obstructions in the Grassy Sprain Brook. | \$365,000      | Proposed Project             | N                      |
| Reconstruction of Seawall at Yonkers Paddling and Rowing Club                        | Design and reconstruct the seawall at the historic Yonkers Paddling and Rowing Club, one of Yonkers’ few public access points to the Hudson River.                                 | \$1.9 million  | Proposed Project             | N                      |

### Strategy 6. Enhance regional coordination in flood mitigation planning

As a City of hills and valleys that follow multiple stream corridors, Yonkers lies at the lower reaches of multiple large watersheds. These watersheds cross municipal boundaries and are managed by multiple agencies at the local, County, and State levels. In some instances the same stormwater infrastructure is managed by different governmental entities albeit at different locations. Moreover, the Committee expressed a concern that too often Yonkers is adversely affected by upstream land use decisions. Although several watershed coalitions, including the Bronx River Coalition and the Saw Mill River Coalition, have been created to aid in the management of stream corridors, they have limited resources and lack authority to enforce appropriate floodplain development and best management practices.

The Committee felt that stormwater management should be coordinated at a regional level via either a regional authority or a regional task force<sup>10</sup> to identify areas most affected by flooding, prioritize mitigation efforts, identify sources of funding, support additional research on mitigation efforts, and coordinate recovery efforts. A task force could recommend, and an authority could prescribe ordinances, rules, and regulations for floodplain and stormwater management. Both a task force and a regional authority could enter into intergovernmental agreements for the purpose of implementing stormwater management plans and providing support governing the location, width, course, and release rate of all stormwater runoff into streams and basins within the prescribed regional boundary. A regional authority could plan, implement, finance, and operate regional and local stormwater management projects in accordance with adopted stormwater management plans.

**Table III-6 Enhance regional coordination in flood mitigation planning**

| Project Name   | Short Project Description  | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
|--|--|----------------|------------------------------|------------------------|
| Feasibility Study for Creation of a Regional Flood Control Authority | Undertake a planning study to assess the feasibility of establishing a Regional Flood Control Authority with regulatory authority and power to review and harmonize regulations and ordinances across municipal boundaries. This authority would operate within the watersheds of Westchester County, including the Bronx River, Grassy Sprain Brook, and Saw Mill River watersheds. | \$75,000       | Proposed Project             | Y                      |

### Strategy 7. Harness resiliency potential of natural resources

The visioning process in Yonkers acknowledged that natural resources are critical to increasing resiliency in the City. The first goal identified by the Committee was to “address flooding as a Citywide problem—with multiple watersheds, rivers, and tributaries—that requires a coordinated mitigation effort with solutions unique to each watershed.” The Committee recognized the importance of the City’s natural resources in a community that is defined by its many waterways.

The Committee identified projects that take advantage of the City’s natural resources in a number of ways. For example, the City apprised the Committee of a project to create the Ludlow Park tidal wetlands. This project would adapt a vacant lot into a multi-use

tidal wetland and passive park on the Hudson River shoreline, creating flood storage along the river’s edge while providing new green space for local residents. The Planning Study for a Sprain Diversion Channel project would divert runoff upstream of some of Yonkers’ most flood-prone neighborhoods into the Grassy Sprain Reservoir, from which drainage from the reservoir could be strategically controlled during a heavy rainstorm—easing flooding in Longvale, Brooklands, and other neighborhoods with historic flood damage.

In addition to the Featured Project presented in Table III-7, the Committee identified Additional Resiliency Recommendations to pursue this strategy. These measures are listed in their entirety in Section V.A, “Additional Resiliency Recommendations.”

**Table III-7 Harness resiliency potential of natural resources**

| Project Name                                | Short Project Description   | Estimated Cost | Proposed or Featured Project | Regional Project (Y/N) |
|---|---|----------------|------------------------------|------------------------|
| Planning Study for Sprain Diversion Channel | Analyze the potential benefits and develop plans to divert stormwater from the Sprain Brook in the neighboring Town of Greenburgh into the Grassy Sprain Reservoir to help move flows from one subwatershed area to another with potentially greater carrying and storage capacity. | \$80,000       | Featured Project             | Y                      |

# 2014 NY RISING COMMUNITY RECONSTRUCTION PLAN YONKERS NYRCR

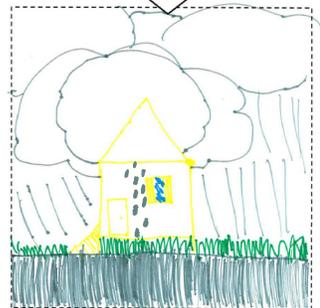
## Section IV Proposed and Featured Project Profiles



Tell us more about your experience during the storms.

I forget how the storm began but I remember it was a big Halloween and we were out in the park. I remember the wind was so strong and the rain was so heavy. We were all huddled together and we were all scared. I will never forget that day. I will never forget that day.

This is a picture of me in Yonkers during the Hurricane.





The State has allotted up to \$3 million in Federal Community Development Block Grant—Disaster Recovery (CDBG-DR) funds to implement eligible recovery and resiliency projects proposed in the Yonkers NY Rising Community Reconstruction (NYRCR) Plan. While developing projects for inclusion in this NYRCR plan, the Planning Committee took into account their alignment with reconstruction and resiliency strategies, cost estimates, cost-benefit analyses, the effectiveness of each project in reducing risk to populations and critical assets, feasibility, and community support. The Committee also considered the incremental benefit of having several smaller projects combined to achieve a measurable benefit. The projects and actions listed in the NYRCR Plan are not ranked or listed in order of priority; they are listed below in alphabetical order within their category (Proposed or Featured).

This section presents a complete project profile for each Proposed and Featured Project identified by the

Committee throughout the planning process. Proposed Projects are projects proposed for funding through an NYRCR Community's allotment of CDBG-DR funding. Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

The NYRCR Plan also includes Additional Resiliency Recommendations presented in Section V.A. These are resiliency projects and actions that the Committee would like to highlight and that are not categorized as Proposed or Featured Projects.

For additional explanation of the methodology for certain analyses described in the project profiles, including the Risk Mitigation Analysis and Cost-Benefit Evaluation, please refer to Section V.E, "End Notes."

## Bronx River and Grassy Sprain Brook Hydrologic Study – Proposed Project

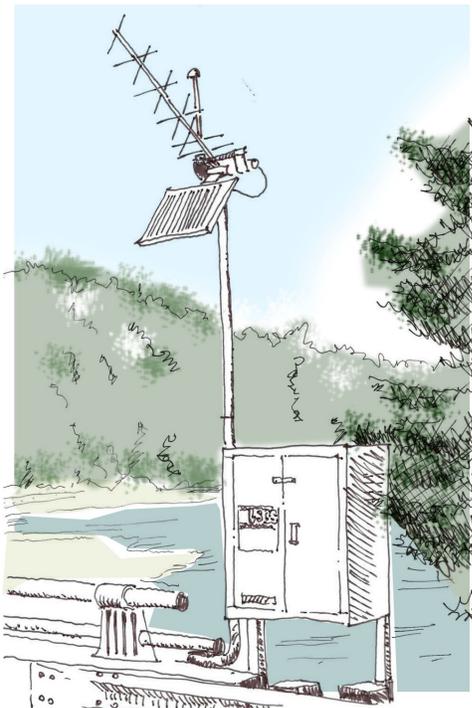
### Project Description

The Bronx River and its tributary the Grassy Sprain Brook are some of the most flood-prone waterways in Yonkers, and experienced severe flooding during the April 2007 Nor'easter and Hurricane Irene. A number of projects have been proposed to address flooding in these watersheds, but these proposals are hindered by a lack of baseline hydrologic data that would be able to determine the extent to which any given project would ameliorate flooding. This project would seek to address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using data collected from the stream gauges, conduct a hydrologic study of these two primary watersheds and make recommendations for projects to improve and restore the watersheds, and (3) implement one or more projects recommended in the study.

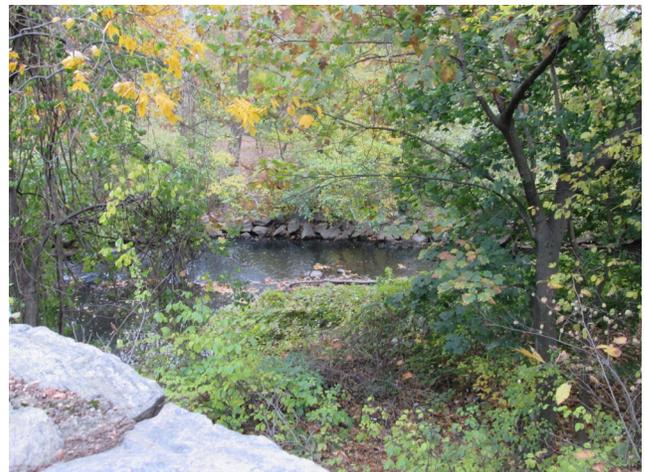
Stream gauges are the foundation of any effort to determine effective improvements in these

watersheds. The gauges are monitoring devices installed within stream channels to measure the height of the water surface and the quantity of water passing a location or area. They are critical to understanding a waterway's hydrology by characterizing stream flow and discharge over time. There are currently no stream gauges in the Bronx River or Grassy Sprain Brook.

Data from the proposed stream gauges could be used by agencies contemplating flood mitigation projects in Yonkers to develop a fact-based understanding of these watersheds and would provide input for modeling the hydrologic characteristics of the watersheds. Hydrologic models enable engineers to predict the effects of flood mitigation projects and would allow determination of the most effective measures to increase waterway capacity, stabilize riverbanks, and create additional flood storage to mitigate upstream and downstream flooding. Additional funding would be allotted for the implementation of projects that are determined by the hydrologic study to be most effective.



*A sketch of the proposed stream gauges*



*The Bronx River at Scout Field*

An important target area for this study and a critical location for new stream gauges would be the neighborhoods just upstream from the confluence of the Bronx River and Grassy Sprain Brook. These neighborhoods have routinely and consistently sustained substantial damage from flooding. The damage has been so severe that it has affected the quality of life

and significantly reduced the value of many properties. Examples of individual projects that have been recommended in the past and would be analyzed within the context of the hydrologic study include: floodwalls along the Grassy Sprain Brook and Bronx River, the relocation or removal of an existing concrete footpath under the Metro-North Bronxville bridge, repair or replacement of the floodgate on the Grassy Sprain Reservoir, and the creation of additional basins within the watershed to detain floodwaters such as at the silted-up Bronxville and Crestwood Lakes. Additional projects may emerge from the findings of the hydrologic study that would also be evaluated for funding and implementation.

The Planning Committee’s commitment to watershed-wide solutions can only be fully realized through regional coordination among the many municipalities of this watershed. Such coordination would derive great benefit from the presence of a regulatory body focused on watershed-wide stormwater and flooding issues. The Committee’s project “Feasibility Study for Creation of a Regional Flood Control Authority” would help create such a body, and would be very complementary to this project.

### Project Location

The study would consider the full watersheds of the Bronx River, Sprain Brook, and Grassy Sprain Brook, both within Yonkers and upstream in other Westchester County municipalities.



*Floodwaters Inundated the Sprain Brook Parkway during Hurricane Irene (K. Smith)*

### Estimated Cost

Project cost: \$1,630,000-\$1,840,000

Cost includes installation of 3-6 stream gauges at \$30,000 to \$50,000 each; preliminary engineering study, collection of stream data, and HEC-RAS modelling for up to 6 previously proposed flood mitigation projects requiring further study—\$90,000 each. An allotment of \$1 million would be made available to implement the most effective project(s).

### Benefit/Co-Benefits

**Economic Benefits:** If the projects identified by the study are implemented, there will likely be a reduction in the extent of flooding. This results in a reduction in future public expenditures for emergency response and recovery, as well as private expenses related to flood damages.



*The Grassy Sprain Brook in Longvale*

**Environmental Benefits:** The study would lay the groundwork for actions needed to stabilize riverbanks, increase waterway capacity, and create additional runoff and flood storage to mitigate downstream flooding. It would also lead to an integrated set of flood management projects that collectively improve flooding during severe storms.

**Health and Social Benefits:** This study and the installation of stream gauges would ultimately result in the recommendation of actions needed to enable neighborhoods in the study area to reduce recovery times and damages from future storms, protect residents and homes from contact with contaminated floodwaters, and reduce threats to personal health from mold impacts and direct injury from flood events.

### Cost-Benefit Analysis

The cost of the study is anticipated to be between \$630,000 and \$840,000, with an additional \$1 million allotted for implementation of projects determined to be the most effective at reducing flood damage. It is important to note that the project implementation costs will likely exceed \$1 million, and the balance of the costs is anticipated to be supported by other sources of funding. The projects to be implemented as a result of the study are yet to be determined, resulting in some uncertainty in estimating the project’s ultimate cost and benefits. The project has significant risk reduction potential, as the projects currently proposed target some of the highest risk areas in Yonkers. By vetting projects through engineering studies and building mitigation projects in at-risk areas, the project has the potential to achieve significant environmental, economic, and health benefits.

### Anticipated Reduction of Risk

A comprehensive hydrologic study of the Bronx River and Sprain Brook waterways has the potential to

reduce long-term risk to assets. The target areas and data identified through this study will ultimately help to inform and optimize future resiliency projects. Once stream gauges are installed, the hydrologic characteristics of the watershed can be determined, and effective flood protection measures can be evaluated individually and as a group. The incremental risk reduction gains from the individual projects can be augmented by implementing coordinated, complementary project designs throughout the watershed.

### General Timeframe for Implementing Actions

12-24 months for initial study

### Government Regulatory Requirements

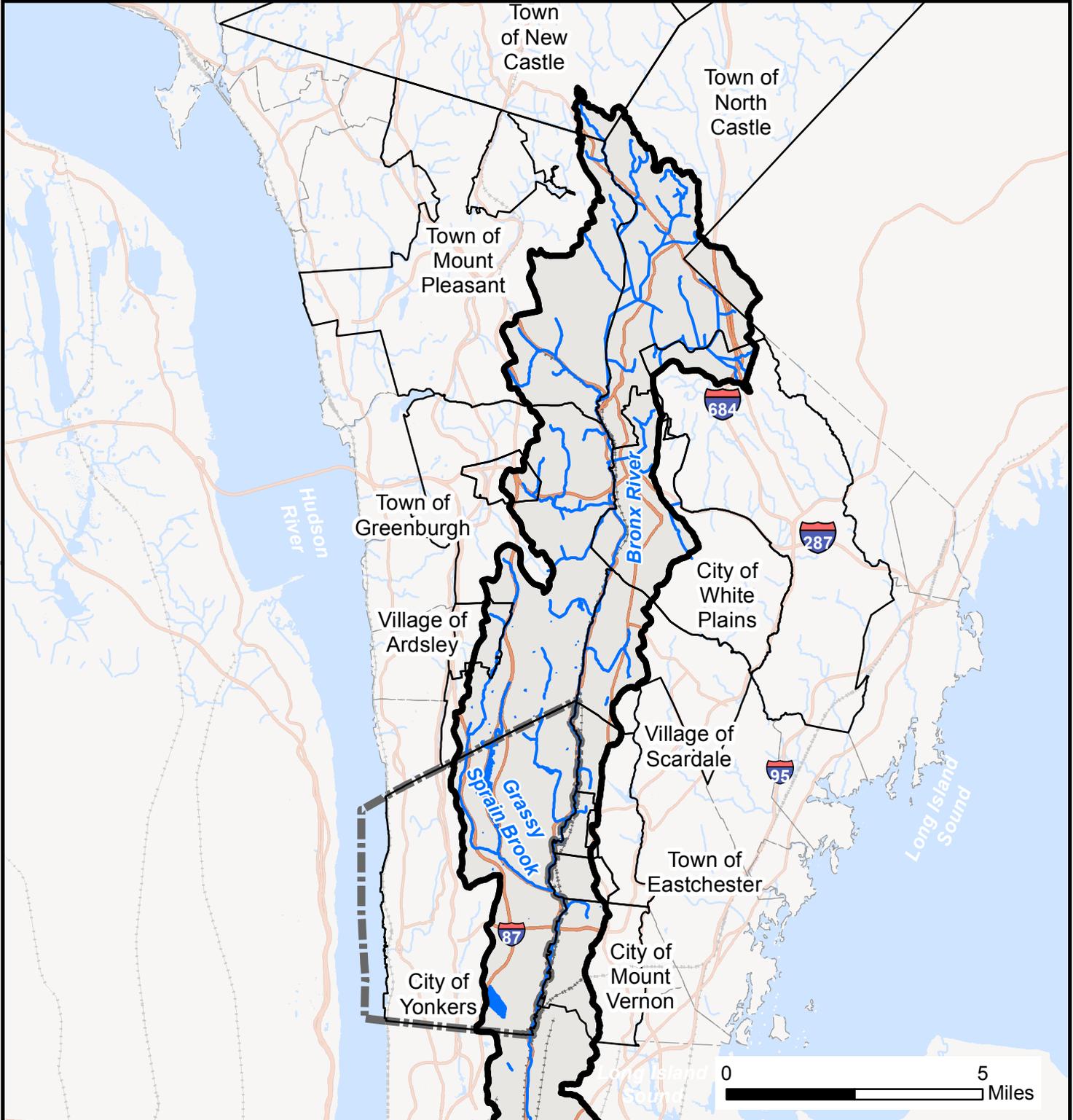
The hydrologic study component has no regulatory requirements. Installation of stream gauges would need to comply with New York State Department of Environmental Conservation (NYS DEC) and U.S. Army Corps of Engineers (USACE) regulations for work in regulated waterways, as would any in-water work for follow-up projects resulting from the study. The U.S. Geological Survey manages all stream gauges.

### Entity with Jurisdiction over Project

City of Yonkers and upstream municipalities

**Figure IV-1**

**Project Location - Bronx River Watershed**

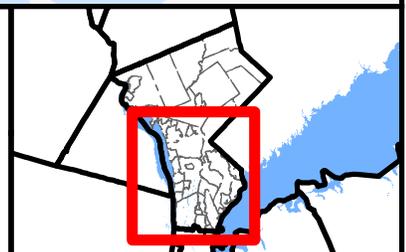


**Legend**

- City of Yonkers (Study Area)
- Major Highways
- Waterbodies
- Rivers and Streams
- Bronx River-East River Watershed
- Westchester Municipalities in Watershed

**Data Sources**

City of Yonkers,  
NYSITS,  
Westchester County  
USGS



## Creation of Access to Grassy Sprain Brook through Sprain Brook Parkway Sound Barrier – Proposed Project

### Project Description

The cluster of neighborhoods surrounding the confluence of the Grassy Sprain Brook and the Bronx River has emerged as one of the most at-risk locations for flooding in all of Yonkers. During the April 2007 Nor’easter and Hurricane Irene, these neighborhoods, including Brooklands and Longvale, experienced heavy flooding and damages. Access to the Brook in this area is blocked by a continuous sound barrier along the Sprain Brook Parkway, making it extremely complicated to undertake channel improvements and maintenance within the floodway of the Grassy Sprain Brook. The lack of access complicates an effective response to flooding in this part of Yonkers. The sound barrier was constructed without access gates to the Sprain Brook, making it impossible to remove storm debris from this segment of the waterway. This project would design and construct access gates (precise number to be determined during project design) in the Sprain Brook Parkway’s sound barrier to allow City of Yonkers staff or another entity to get maintenance equipment through the sound barrier in order to remove debris and obstructions that impede stormwater.



*A sketch of the proposed access gates in the sound barrier*

### Project Location

Sprain Brook Parkway from the Grassy Sprain Reservoir to the Bronx River

### Estimated Cost

Project cost: \$365,000

Cost includes determination of purpose and need—\$15,000; survey of potential access sites—\$20,000; acquisition of easements through property owned by the New York State Department of Transportation (NYS DOT) for ongoing maintenance access by Yonkers municipal staff—\$30,000; and design and construction of access gates—\$300,000.

### Benefit/Co-Benefits

**Economic Benefits:** This project could result in a reduction of emergency public expenditures by reducing the incidence of flooding and by facilitating easier access to the waterway. Facilitating access enables the City of Yonkers to perform regular maintenance of this flood-prone waterway, which may reduce operating costs for the City of Yonkers.

**Environmental Benefits:** Stream bank and stream channel restoration measures result in significant environmental benefits throughout the ecosystem. In addition to the critical natural flood control provided by stream systems, a high diversity of wildlife is located along streamside riparian buffers. Deer and other terrestrial animals use streams as water sources and for safe passage away from exposed fields and urban developments. Birds, insects, and aquatic organisms rely on streamside locations for food, nesting, and protection. Riparian vegetation is critically important to the organisms living within the stream. In addition, channel restoration projects reduce high sediment loads and prevent them from being transported downstream and re-depositing elsewhere.

**Health and Social Services:** This project may result in localized reductions in flooding by removing

constrictions due to debris and excessive sediment. Alleviation of flood frequency or severity may protect residents and homes from contact with contaminated floodwaters and reduce threats to personal health from mold impacts and direct injury from flood events.

### **Cost-Benefit Analysis**

The estimated cost of this project is \$365,000, which includes evaluation, construction, design, and easement costs. This project has risk mitigation benefits through facilitating the removal of waterway debris. Mitigation of flood risk in turn results in economic and environmental benefits. Although no permanent jobs are likely to be created, the project is expected to result in approximately two full-time equivalent (FTE) short-term construction related jobs for one year<sup>11</sup>.

### **Anticipated Reduction of Risk**

This project could reduce flood risk by improving the accessibility of the waterway for maintenance. This

would facilitate more regular removal of debris and other flow obstructions, which can potentially exacerbate flooding. As the project targets the confluence of Grassy Sprain Brook and the Bronx River, there could be flood mitigation benefits realized for several of the highest risk assets within Yonkers, including Brooklands Cooperative and the Longvale neighborhood.

### **General Timeframe for Implementing Actions**

12-24 months

### **Government Regulatory Requirements**

Applicable NYS DOT and Federal Highway Administration regulations for highway access points and for sound barriers. Work on a State highway would require a NYS DOT highway work permit.

### **Entity with Jurisdiction over Project**

NYS DOT, which has ownership of the roadway

# Figure IV-2

## Project Location - Grassy Sprain Brook

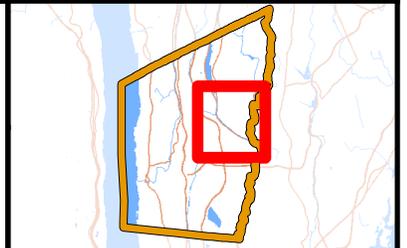


### Legend

- City of Yonkers (Study Area)
- Grassy Sprain Brook
- Waterbodies
- Rivers and Streams
- Major Highways
- Structures
- Rail Station
- Sprain Brook Parkway Sound Barrier

### Data Sources

City of Yonkers,  
NYSITS,  
Westchester County



## Emergency Power to Street Lights Along Evacuation Routes – Proposed Project

### Project Description

The heavy rains and wind from Superstorm Sandy flooded streets and cut off power to street lights, including those along critical evacuation routes used by residents and emergency responders. To prevent this from reoccurring during a future storm event, the City would like to replace the conventional street lights that are currently in use with solar battery-powered street lights as backup power along major evacuation routes. These self-contained lights would enable residents and emergency responders to move safely through the City during future flood events, even during a power outage. This project would identify an appropriate test location along a major evacuation route and would replace 10-15 existing street lights with solar lights in a pilot program.



*A sketch of the proposed emergency lighting*

### Project Location

A major evacuation route in the City. Precise location to be determined.

### Estimated Cost

Project cost: \$70,000-\$135,000

Cost includes purchase of 10-15 lights—\$4,000-\$7,000 per light; installation cost—\$30,000.

### Benefit/Co-Benefits

**Economic Benefits:** The economic benefits of this project include a reduction in energy needs and a reduced operations and maintenance burden for the included street lights. Based on a case study<sup>12</sup>, it can be assumed that for an installation of 10-15 street lights operated for 10 years, the savings of solar street lights over conventional lighting would range from \$11,000 to \$18,000. Further savings will be recognized as additional street lights are converted. Available renewable energy subsidies could potentially reduce the cost of solar lights and further improve the savings. In addition, the provision of resilient lighting in business districts may facilitate access to local businesses after storm events due to improved lighting of streets.

**Environmental Benefits:** Use of solar technology reduces the energy consumption associated with powering street lights and has a significant sustainability benefit. According to the case study mentioned above, the operation of 10-15 solar street lights averts between 30,400 and 45,500 pounds of carbon dioxide emissions each year by using renewable energy as compared to fossil fuel-based energy sources.

**Health and Social Benefits:** This pilot project would improve the safety of a major evacuation route within the community, and if successful, could be further deployed on other routes throughout the City. This is a vital health and safety benefit for populations needing to evacuate and for those requiring the services of emergency responders during a storm event.

### **Cost-Benefit Analysis**

The initial costs of this project likely range from \$70,000 to \$135,000, as the model of street light selected and the number of street lights to be replaced have not yet been determined. These costs may be offset partially by the operations and maintenance savings associated with solar street lights as compared to conventional lights. The project offers significant public safety benefits by facilitating emergency transportation and evacuation in a key City corridor. The benefits achieved by the project would be expected to increase with broader implementation of alternative street lights. Although no permanent jobs are likely to be created, the project is expected to result in approximately two full-time equivalent (FTE) short-term construction related jobs for one month<sup>13</sup>.

### **Anticipated Reduction of Risk**

This project would reduce risk to residents and emergency providers by encouraging safe evacuation from

at-risk areas. The first stage of the project would only include implementation along a single stretch of roadway as determined by the City. The risk reduction potential of the project would grow as implementation areas expand.

### **General Timeframe for Implementing Actions**

6-12 months

### **Government Regulatory Requirements**

New York State Department of Transportation (NYS DOT) lighting standards. If the selected evacuation route is a State highway, work would require a NYS DOT highway work permit.

### **Entity with Jurisdiction over Project**

City of Yonkers

## Feasibility Study for Creation of a Regional Flood Control Authority – Proposed Project

### Project Description

Because it is located at the bottom of several watersheds, Yonkers often bears the brunt of flooding along the Bronx River, Grassy Sprain Brook, Saw Mill River, and other waterways that originate in neighboring communities, as it did during the April 2007 Nor'easter and Hurricane Irene. Some of the most effective solutions to these flooding issues can only be implemented near the headwaters of these waterways or in the mid-watershed, outside of Yonkers' borders. The Planning Committee considered strategies for improving regional coordination on a larger scale to reduce flooding in these watersheds. Local legislators have already begun work to build this coordination, proposing legislation in 2013 to create a flood mitigation council that encourages inter-municipal cooperation on flooding issues throughout the State.

This project would undertake a planning study to assess the feasibility of establishing a Regional Flood Control Authority with regulatory authority and power to review and harmonize regulations and ordinances across municipal boundaries. It would operate within the watersheds of Westchester County, including the Bronx River, Grassy Sprain Brook, and Saw Mill River watersheds. Components to be assessed for feasibility include the following:

1) Multi-Jurisdictional Flood Control Authority. The proposed Regional Flood Control Authority would oversee and enforce the installation and maintenance of projects and programs that would protect regional populations and assets against future storms and flooding and increase resilience within these watersheds. The authority would be empowered to authorize watershed modeling to identify natural infrastructure practices, promote environmentally sensitive stream management programs, recommend flood protection projects, and provide education and outreach to municipal and county officials and residents. The Authority could use the

Bronx River/Grassy Sprain and Saw Mill River hydrologic studies discussed elsewhere in this section as a basis for its work.

- 2) Review of Regulations and Ordinances. The authority would review stormwater management codes for municipalities within these watersheds and develop inter-municipal agreements that would establish requirements for development in the floodplain and post-development maintenance. It would be empowered to compel local municipalities to implement any/all of the following: (A) a uniform wetlands ordinance to manage Federal wetlands and wetland buffers; (B) an inventory of critical environmental areas; (C) mandatory site plan review for large development projects proposed within its jurisdiction.
- 3) Clearinghouse for Resiliency Projects. The authority would function as a central clearinghouse to track all planned and ongoing flood mitigation and stormwater projects. This would be accomplished through a master list, reports on implementation progress, regular meetings to report on implementation progress, and plan updates.

### Project Location

Citywide

### Estimated Cost

Study cost: \$75,000

Cost includes development of approach, purpose, and need; drafting of enabling legislation; advocacy and outreach; and creation of implementation plan.

### Benefit/Co-Benefits

**Economic Benefits:** Effective implementation of coordinated regional flood mitigation projects may ultimately reduce the frequency and severity of flooding in the hardest-hit areas in Yonkers. This mitigation in flood extent may ultimately improve the value of properties in flood-prone locations.

**Environmental Benefits:** An overarching regional body with control over flood mitigation and stormwater policy would be better able to mitigate the negative effects of flooding, including reduced property values for flood-prone properties. This would lead to a reduction in the negative environmental impacts of uncontrolled flooding and stormwater runoff, including erosion and damage to waterways and polluted urban runoff.

**Health and Social Benefits:** Regional cooperation could reduce some land use conflicts between neighboring communities. Enhancement of regional planning has the potential to harmonize regulations across municipal boundaries, leading to a more effective and resilient stormwater management structure for the entire region. This improved structure would lead to decreased flood intensity and flood damages, and would thereby enhance quality of life and community health throughout the region's watersheds.

### **Cost-Benefit Analysis**

The total cost of this study is estimated to be \$75,000. The study would evaluate the feasibility of a program to facilitate regional cooperation and coordination in the development of flood mitigation and stormwater initiatives. Such a program could ultimately have far-reaching risk reduction and environmental benefits. As the flood mitigation properties of projects can be

additive, project benefits can be maximized by fostering regional collaboration.

### **Anticipated Reduction of Risk**

This project does not directly reduce risk to assets, but may ultimately result in reduced risk to existing assets and future development by improving local and regional policy. The coordination and implementation of best practices such as vegetated buffer areas, stormwater management, and site plan review may reduce the exposure to flood risk and the vulnerability to flood damage of future assets.

### **General Timeframe for Implementing Actions**

12-24 months

### **Government Regulatory Requirements**

As this is a study, no regulatory requirements apply. Implementation of a regional flood control authority, if determined feasible, would need to be enabled by the NYS Legislature.

### **Entity with Jurisdiction over Project**

City of Yonkers and upstream municipalities.

## Planning Study to Establish Best Management Practices for Upland Waterways – Proposed Project

### Project Description

Much of the flooding that occurred within Yonkers' inland watersheds during the April 2007 Nor'easter and Hurricane Irene was the result of inadequate flood-carrying capacity in the waterways, often caused by siltation and clogged stormwater infrastructure. This project would undertake a planning study to develop best management practices for managing Yonkers' upland waterways to prevent degradation of the hydrologic function of the Bronx River, Grassy Sprain Brook, and Saw Mill River.

In consultation with the New York State Department of Environmental Conservation (NYS DEC), this planning study would develop strategies for scheduling and undertaking work in advance of and during severe storm events to increase channel capacity and clear accumulations of debris. The study would consider ways to balance the urgent need to minimize damaging overflows or backups along these waterways with the importance of protecting the habitat, ecological, and hydrologic functioning of these rivers and streams. The planning study would develop best management practices to prevent channel erosion and ensure that debris does not accumulate and cause flooding, and



*Culverts are easily blocked by debris; here, the Hearst Street Bridge over the Saw Mill River*

would provide strategies for ecologically sensitive removal of obstructions to return the City's waterways to their natural flow and capacity. The study would also consider methods to control the amount of debris and pollution from yards, trees, paved surfaces, and other urban sources of storm debris that enters waterways during floods. Methods could include an education and outreach program for property owners, and research into best management practices for the urban forest, including identification of street trees and trees on private property that are at risk of collapse and could cause property damage in addition to obstructing waterways.

### Project Location

Citywide, with a focus on properties in close proximity to flood-prone waterways including the Bronx River, Grassy Sprain Brook, Saw Mill River, and Sprain Brook

### Estimated Cost

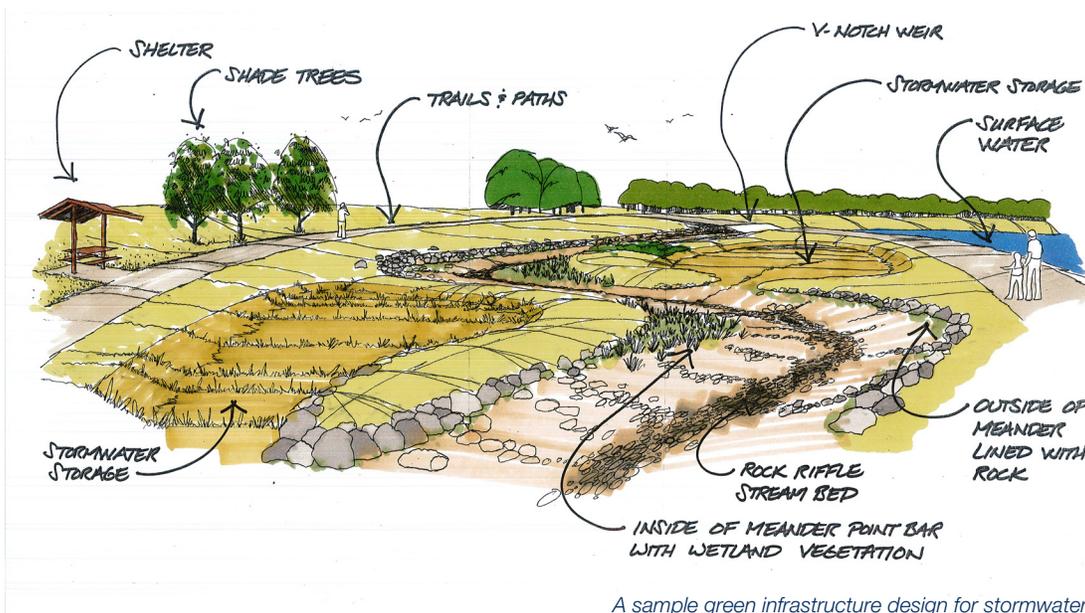
Study cost: \$100,000

Cost includes identification of best management practices for these watersheds, creation of inventory of existing conditions, documentation of channel issues and inadequacies—\$75,000; and coordination with the numerous public and private entities engaged with these waterways and an outreach and training program for municipal staff and homeowners—\$25,000.

### Benefit/Co-Benefits

**Economic Benefits:** Alleviating debris and sedimentation constrictions in waterways can result in a reduction in flood extent in the immediate vicinity of waterways. This reduction in flood extent could reduce future public expenditures for emergency response, as well as private expenses related to flood damages.

**Environmental Benefits:** With knowledge of and the application of best management practices, areas prone to collecting storm debris that routinely impedes floodwaters and causes flooding can be kept clear of obstructions, improving drainage during and after



*A sample green infrastructure design for stormwater management along an upland waterway*

flood events. Improved drainage would lead to reduced intrusion of floodwater into homes and businesses. Floodwaters are often highly contaminated with chemicals and debris from roadways, yards, and intrusion into buildings. Avoidance of flooding in these urban areas leaves waterways cleaner and healthier, and reduces the potential for residents to contact contaminated floodwaters.

**Health and Social Benefits:** This study would ultimately result in the development of a series of best management practices that could reduce peak flood levels during flood events. This would enable neighborhoods in the study area to reduce recovery times and damages from future storms, protect residents and homes from contact with contaminated floodwaters, and reduce threats to personal health from mold impacts and direct injury from flood events.

**Cost-Benefit Analysis**

The anticipated cost of this study is \$100,000, which would fund the identification and evaluation of best management practices to be employed throughout Yonkers. Ongoing maintenance and debris removal costs would be borne by the City, but there would also be a considerable savings in public and private expenditures resulting from a decreased risk of flooding and damage for nearby assets. The project presents risk

reduction potential, as well as economic and environmental benefits community-wide.

**Anticipated Reduction of Risk**

Removing debris and excessive sediment from waterways can moderately reduce the risk of flooding by removing flow constrictions and improving a channel's flood-carrying capacity. Because many important community assets are located immediately adjacent to waterways, this project has the potential to benefit numerous assets.

**General Timeframe for Implementing Actions**

12-18 months

**Government Regulatory Requirements**

As this is a planning study, there are no regulatory requirements. Implementation of plan recommendations would likely involve NYS DEC for regulation of all in-water work under a potential Article 15 permit; all work would need to meet permit issuance standards. U.S. Army Corps of Engineers (USACE) would also have permitting authority for in-water work.

**Entity with Jurisdiction over Project**

City of Yonkers

## Reconstruction of Seawall at Yonkers Paddling and Rowing Club – Proposed Project

### Project Description

During Superstorm Sandy, many of the City’s Hudson River waterfront properties experienced severe damage due to the record storm surge. As a historically significant facility and one of Yonkers’ few public access points to the Hudson River, the County-owned Yonkers Paddling and Rowing Club is on the verge of collapse. This storied nonprofit Club, which is open to all City residents, sustained significant damage to its seawall. In addition, structural elements were torn away from the bulkhead, docks were washed away and the gangway damaged, and the overall deck collapsed. The Club purchased new docks and repaired the gangway, allowing the Club to reopen after Superstorm Sandy. However, while the Club remains open, the extent of the damage has forced it to shorten its calendar of activities and there is concern that the severely compromised seawall will not be able to protect the Club from future storms. This project would design and reconstruct the seawall to restore the Club for full use by City residents and protect the Club from future storms.



*The Club’s seawall was badly damaged by Superstorm Sandy’s surge (Yonkers Paddling and Rowing Club)*

### Project Location

Yonkers Paddling and Rowing Club, 35 Alexander Street

### Estimated Cost

Project cost: \$1.9 million

Cost includes preliminary and final engineering services—\$200,000; and construction of new seawall—\$1.7 million<sup>14</sup>.

Demolition and seawall construction costs may vary based on the results of the damage condition assessment. This is a source of considerable uncertainty in the cost estimate for this project.

### Benefit/Co-Benefits

**Economic Benefits:** The damage sustained by the Club’s facilities during Superstorm Sandy was extensive and carried significant costs to the Club. Such costs could be mitigated in future storms through the use of modern, resilient building technologies in making the necessary repairs included in this project.

**Environmental Benefits:** This project would halt the deterioration of the seawall and deck and the concomitant erosion of the shoreline, improving water quality in the vicinity by abating erosion and the introduction of soil materials and other possible pollutants into the waterway.

**Health and Social Benefits:** The Club is one of the few public access points to the Hudson River in downtown Yonkers. By ensuring the ongoing viability of the Club’s facilities, this project would ensure continued access to and use of this asset, protecting it for the general public.

### Cost-Benefit Analysis

The cost of project implementation—including study, design, and construction—is estimated to be approximately \$1.9 million. The project would reconstruct the damaged seawall, resulting in safety, environmental,

and economic benefits. Providing for the continued safe operation of the Club enables public access to the Hudson River, an important community fixture and link to the natural environment. Although no permanent jobs are likely to be created, the project is expected to

result in approximately eight full-time equivalent (FTE) short-term construction related jobs for one year<sup>15</sup>.

### Anticipated Reduction of Risk

Repairs made to the seawall may have some flood risk mitigation effects for the Club by attenuating damaging storm surge wave action. More significantly, repair of the seawall provides much-needed shoreline stabilization, which reduces risk to the Club facilities and has significant personal safety benefits for anyone using the Club.

### General Timeframe for Implementing Actions

12-24 months

### Government Regulatory Requirements

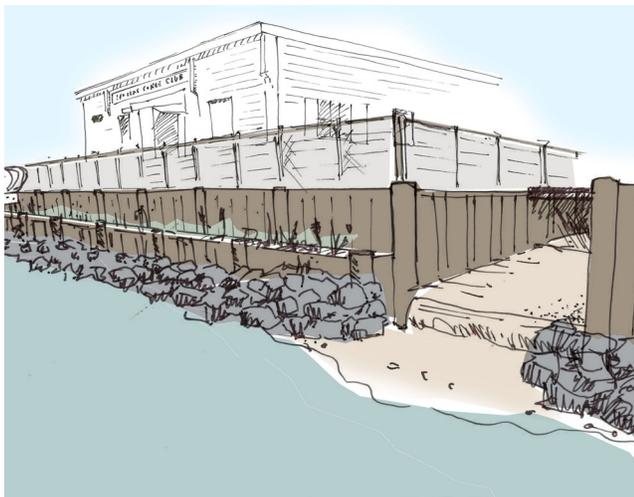
New York State Department of Environmental Conservation (NYS DEC) regulations including potential Article 15 and Article 25 permits. U.S. Army Corps of Engineers (USACE) standards for design and construction of bulkheads and seawalls.

### Entity with Jurisdiction over Project

Yonkers Paddling and Rowing Club. Westchester County is the owner of the Club property.



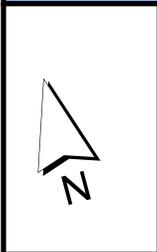
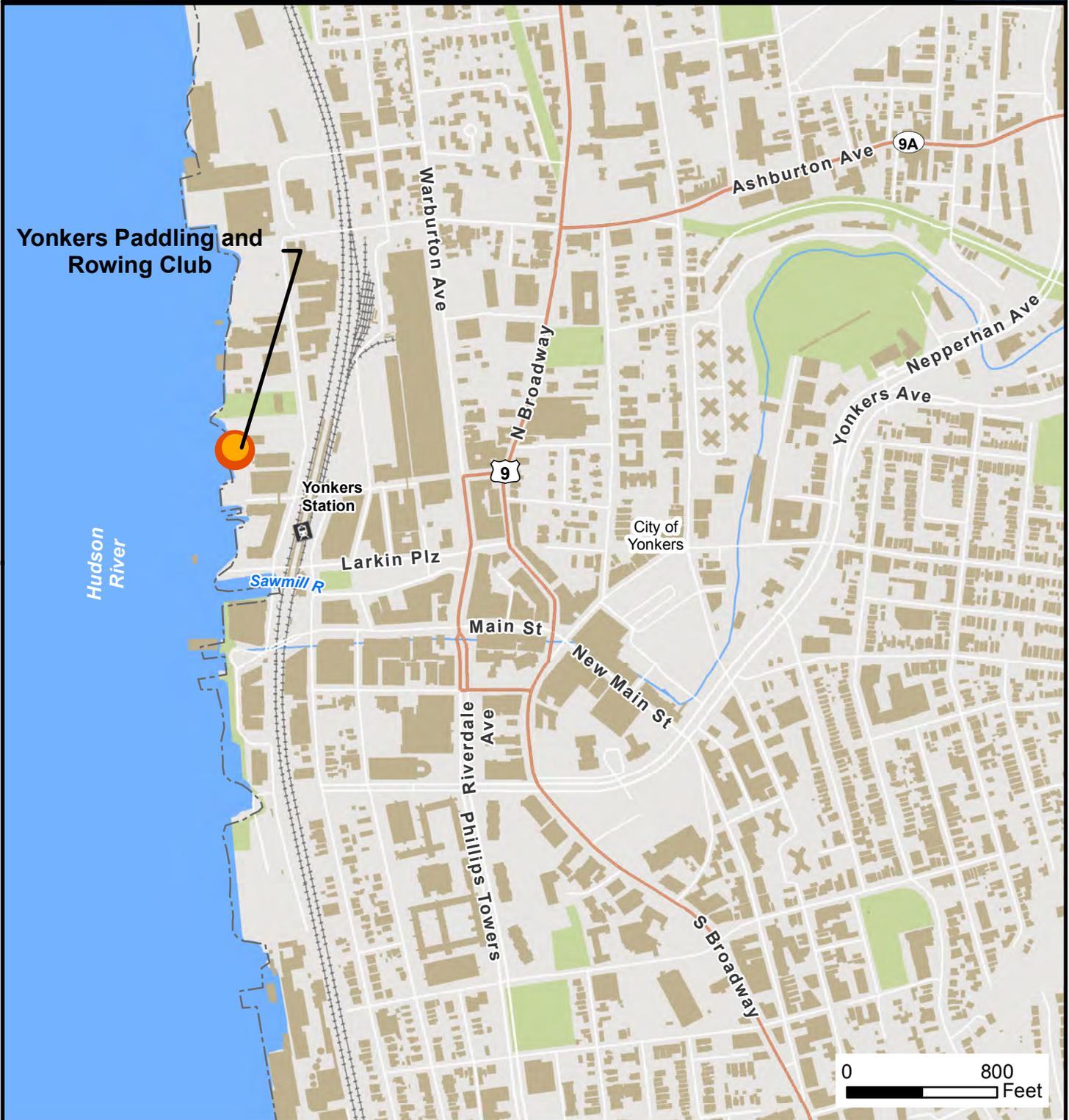
*A sketch of the proposed seawall as reconstructed*



*A sketch of the proposed seawall, if combined with some natural shoreline features such as rip-rap and plantings*

**Figure IV-3**

**Project Location - Yonkers Paddling and Rowing Club**

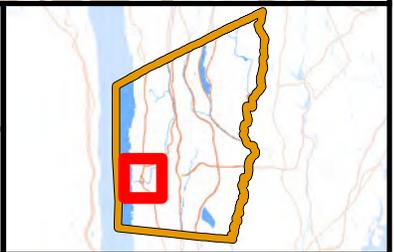


**Legend**

- City of Yonkers (Study Area)
- Major Highways
- Railroads
- Rail Station
- Waterbodies
- Rivers and Streams
- Structures
- Project Location

**Data Sources**

City of Yonkers,  
NYSITS,  
Westchester County



## Resilient Revitalization of the Alexander Street Waterfront—Study and Pilot Projects – Proposed Project

### Project Description

The Alexander Street section of the downtown Yonkers waterfront had already suffered years of neglect and disinvestment when Superstorm Sandy brought a mix of wind and storm surge up the Hudson River, flooding much of the neighborhood. Residential buildings, City assets, and local businesses were not spared. Today the neighborhood is being targeted by the City through a revitalization and economic development initiative, the Alexander Street Master Plan, that envisions the area as a vibrant mixed-use district of residences, neighborhood businesses, and riverfront parks knitted together by landscaped streets and boulevards. The City envisions that the redevelopment of the approximately 112-acre Alexander Street waterfront area will be carried out by numerous individual private developers over a period of time. The neighborhood is seen by many in Yonkers as a key to the City’s economic future. However, the master plan was prepared prior to Superstorm Sandy and needs to be updated and enhanced to respond to the flood risks exposed by the storm. To encourage future investment, state-of-the-art resiliency and flood protection initiatives must be identified so that this area

can be transformed into a resilient mixed-use waterfront environment.

This project proposes to ensure the resilient revitalization of the Alexander Street Waterfront through a two-phase process. First, the project will update and amend the 2007 Alexander Street Master Plan to transform this underperforming waterfront area into a showcase district for natural infrastructure and green building practices. Upon completion of the plan update, the project will develop and implement three model natural infrastructure projects to begin the transformation of this neighborhood.

The first component of this project—the plan update—would include the following:

- ▶ New post-Superstorm Sandy flood maps.
- ▶ Waterfront development guidelines detailing natural flood protection techniques for new development and adaptive reuse.
- ▶ Examples of state-of-the-art ecological restoration projects.
- ▶ Application of the City’s downtown green building standards to Alexander Street, requiring sustainable and resilient construction and rehabilitation projects along the waterfront.

The second phase of the project would include planning, design, and implementation of three targeted natural infrastructure projects in the Alexander Street neighborhood to showcase the ability of green infrastructure to protect the district from flooding and storm damages. These could take the form of natural flood protection projects, or green infrastructure stormwater management and drainage projects, such as rain gardens, bioswales, and pervious pavement.

A revitalized waterfront district incorporating sustainable building techniques, a mix of land uses, rejuvenated public spaces, and targeted environmental restoration projects would help ensure this key economic asset of the City is better prepared for future storms, more resilient to their impacts, and better positioned



*Some of the types of green infrastructure that could be employed in the Alexander Street planning area*

to recover from their damage. By functioning as a showcase of natural infrastructure and green building techniques, the project could also have a ripple effect elsewhere in Yonkers as solutions first used here are applied throughout the City.

### Project Location

Alexander Street district in downtown Yonkers

### Estimated Cost

Project Cost: \$900,000

Cost includes amendments to Alexander Street plan (production of new mapping, development guidelines, and green building standards)—\$150,000; and planning, design, and construction of three green infrastructure pilot projects—estimated at \$250,000 per acre, assumed \$750,000 total.



*Alexander Street, ready for redevelopment, can become a showcase of green infrastructure*

### Benefit/Co-Benefits

**Economic Benefits:** Reduced flood risk and improved flood resilience of redeveloped assets in the Alexander Street neighborhood would result in less extensive damages and lower rebuilding costs after future storms and flood events. By employing green building technologies, costs of heating, cooling, and overall energy may also be reduced for home and business

owners who move into the new neighborhood. There are also available subsidies for green buildings that may result in an additional economic benefit.

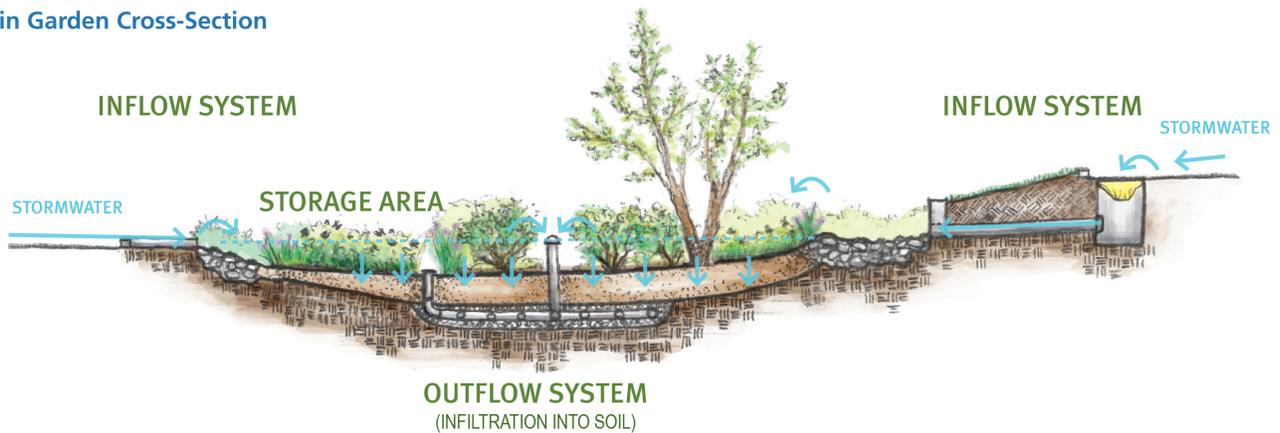
**Environmental Benefits:** Ensuring that stormwater management infrastructure is functioning properly and implementing green infrastructure practices effectively and affordably complements traditional “gray” infrastructure. Green infrastructure also gives stormwater managers the ability to create integrated multiple-benefit solutions to better serve the community and its residents. Benefits include improved water quality and reduced stormwater volume. In addition, the benefits associated with employing green building technologies are numerous and include reduced energy consumption, sustainable building materials, and reduced heat island effects in densely developed areas.

**Health and Social Benefits:** This project would result in the development of a showcase resilient neighborhood in the Alexander Street area. Residents and businesses in the neighborhood would be protected from the impacts of storm surge, which would reduce recovery times and damages from future storms, protect residents and homes from contact with contaminated floodwaters, and reduce threats to personal health from mold impacts and direct injury from flood events. The resilient development practices pioneered here could eventually be utilized throughout the City, amplifying the benefits outlined here.

### Cost-Benefit Analysis

The total project cost is anticipated to be \$900,000, which includes amendments to the Alexander Street Redevelopment plan and implementation of up to three green infrastructure projects. The inclusion of green infrastructure, resilient construction technology, and green building practices at the Alexander Street Redevelopment site could result in significant risk reduction, environmental, and economic benefits. Successful integration of these practices at this site may lead to their adoption in other local development, further increasing the benefits realized from this project.

### Rain Garden Cross-Section



*A sample rain garden—one of the types of green infrastructure that could be employed in the Alexander Street neighborhood*

### Anticipated Reduction of Risk

This project has the potential to reduce risk to the future development at Alexander Street. By implementing resilient development practices, the ability of future assets to withstand storm damage will be greatly improved, thereby reducing vulnerability. Implementation of green infrastructure practices reduces exposure by abating the additional flood risk due to stormwater. By reducing future assets' exposure and vulnerability, the project could significantly reduce the flood risk for these assets.

### General Timeframe for Implementing Actions

12-18 months

### Government Regulatory Requirements

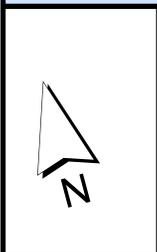
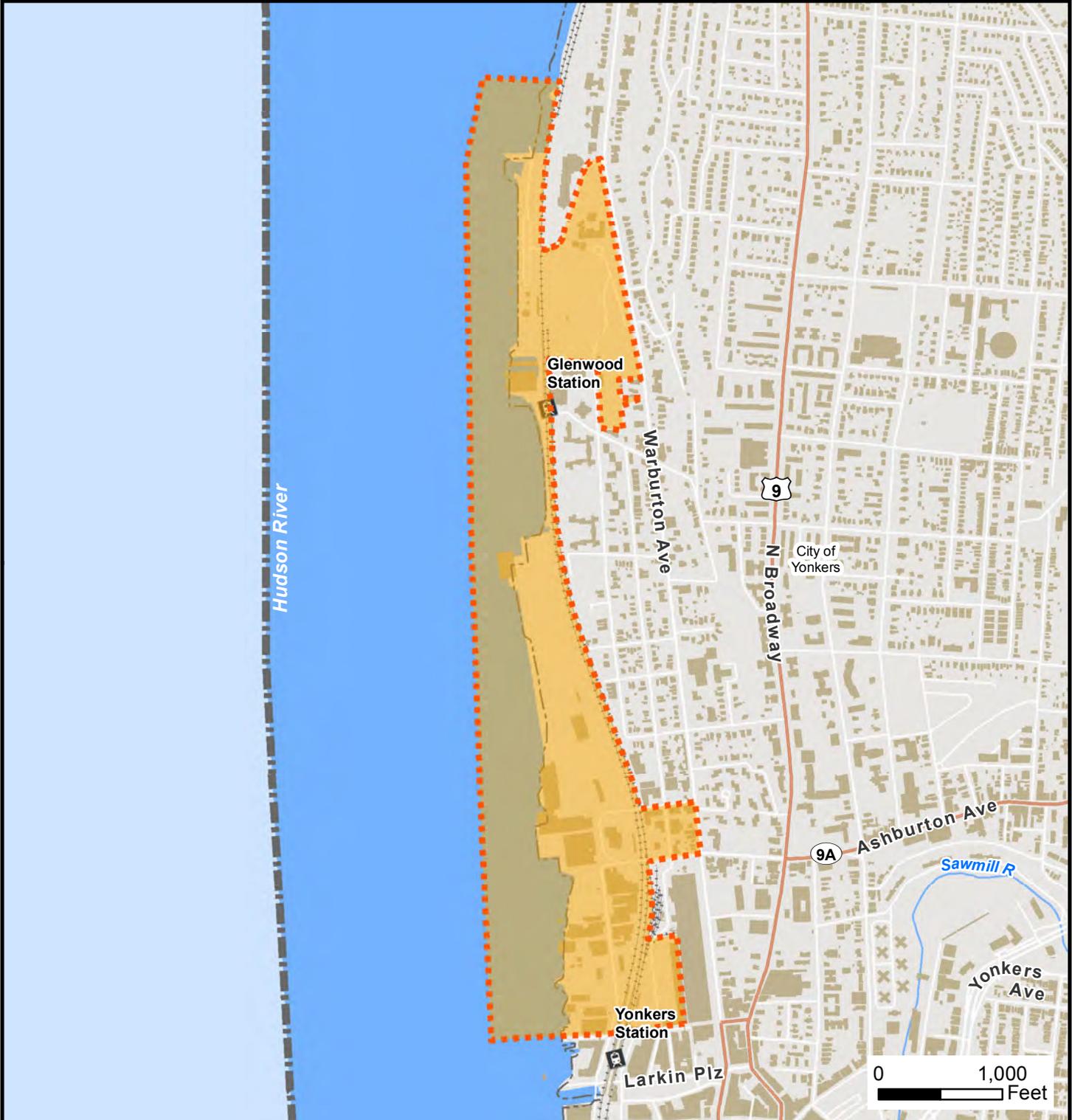
Existing Yonkers building code and green infrastructure standards. Stormwater regulations at City, County, and State levels. Work along the Hudson River may require Article 15 and Article 25 (TW) permits from the New York State Department of Environmental Conservation (NYS DEC) depending on what is proposed, and must meet permit issuance standards.

### Entity with Jurisdiction over Project

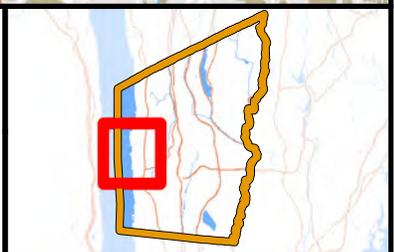
City of Yonkers

**Figure IV-4**

**Project Location - Alexander Street Waterfront**



| Legend |                                       | Data Sources                                |
|--------|---------------------------------------|---|
|        | City of Yonkers (Study Area)          | City of Yonkers, NYSITS, Westchester County |
|        | Major Highways                        |   |
|        | Railroads                             |   |
|        | Rail Station                          |   |
|        | Waterbodies                           |   |
|        | Rivers and Streams                    |   |
|        | Structures                            |   |
|        | Alexander Street Master Planning Area |   |



## Saw Mill River Hydrologic Study – Proposed Project

### Project Description

The Saw Mill River is one of the most flood-prone waterways in Yonkers and experienced severe flooding during the April 2007 Nor’easter and Hurricane Irene. A number of projects has been proposed to address flooding in this watershed, but none of these projects has moved forward due to inadequate baseline hydrologic data that could determine the extent to which any given project would ameliorate flooding. This project would address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using data collected from the stream gauges, conduct a hydrologic study of the watershed and make recommendations for projects to improve and restore the watershed, and (3) implement one or more proposed projects based on the results of the study.

Stream gauges are the foundation of any effort to determine effective improvements in this watershed. The gauges are monitoring devices installed within

stream channels to measure the height of the water surface and the quantity of water passing a location or area. They are critical to understanding a waterway’s hydrology by characterizing stream flow and discharge over time. There are currently no stream gauges in the Saw Mill River.

Data from the proposed stream gauges would be used by agencies contemplating flood mitigation projects in Yonkers to develop a fact-based understanding of these watersheds and would provide input for modeling the hydrologic characteristics of the watersheds. Hydrologic models enable engineers to predict the effects of flood mitigation projects and would allow the City to determine the most effective measures to increase waterway capacity, stabilize riverbanks, and create additional flood storage to mitigate upstream and downstream flooding. Additional funding would be allotted for the implementation of projects that are determined by the hydrologic study to be most effective.

An important target area for this study and a critical location for new stream gauges would be the Nepera Park/Grey Oaks neighborhood. This neighborhood has routinely and consistently sustained substantial damage from flooding. A berm currently runs along a portion of the Saw Mill River in this neighborhood. The engineering design and performance criteria for the berm are unavailable—and possibly non-existent. The data from the proposed stream gauges would be critical input for a hydrologic study to determine whether modifications to this berm would be beneficial. Other proposed projects that could be studied include installing an additional culvert and realigning the river beneath Odell Avenue to improve drainage, creating flood storage at upstream locations including former gas stations along the Saw Mill Parkway and the Akzo Nobel property, and restoration of minor wetlands at strategic locations in the Village of Dobbs Ferry and Town of Greenburgh.

The Planning Committee’s commitment to watershed-wide solutions can only be fully realized through regional coordination among the many municipalities of this watershed. Such coordination would derive



*A sketch of the proposed stream gauges*

great benefit from the presence of a regulatory body focused on watershed-wide stormwater and flooding issues. The Committee’s project “Feasibility Study for Creation of a Regional Flood Control Authority” would help create such a body, and would be very complementary to this project.

### Project Location

The study would consider the full watershed of the Saw Mill River, both within Yonkers and upstream in other Westchester County municipalities.

### Estimated Cost

Project cost: \$1,420,000-\$1,560,000

Cost includes installation of two to four stream gauges at \$30,000-\$50,000 each, preliminary engineering, stream data, and HEC-RAS for up to four previously proposed flood mitigation projects requiring further study—\$90,000 each; and \$1 million allotment for project implementation.

### Benefit/Co-Benefits

**Economic Benefits:** If the projects identified by the study are implemented, there will likely be a reduction in the extent of flooding. This reduction will result in a



*The Saw Mill River east of Clunie Avenue*

decrease in future public expenditures for emergency response and recovery, as well as private expenses related to flood damages.

**Environmental Benefits:** This study would lay the groundwork for actions needed to stabilize riverbanks, increase waterway capacity, and create additional flood storage to mitigate downstream flooding through best stormwater management practices. It would also lead to an integrated set of flood management projects that collectively reduce flooding during severe storms.

**Health and Social Benefits:** This study and the installation of stream gauges would ultimately result in the recommendation of actions needed to enable neighborhoods in the study area to reduce recovery times and damages from future storms, protect residents and homes from contact with contaminated floodwaters, and reduce threats to personal health from mold impacts and direct injury from flood events.

### Cost-Benefit Analysis

The cost of the study is anticipated to be between \$420,000 and \$560,000, with an additional \$1 million allotted to initiate future project implementation. It is important to note that the project implementation costs will likely exceed \$1 million, and the balance of the costs is anticipated to be supported by other sources of funding. The projects to be implemented as a result of the study are yet to be determined, resulting in some uncertainty in the project’s ultimate cost and benefits. The project has significant risk reduction potential, as the projects currently proposed target some of the highest risk residential and industrial areas in Yonkers. In addition, by vetting individual project components through engineering studies and building project components in at-risk areas, the proposed project has the potential to achieve significant environmental and economic benefits.

### **Anticipated Reduction of Risk**

As a comprehensive hydrologic study of the Saw Mill River waterway, this project has the potential to reduce risk to assets on a long-term basis. The target areas and data identified through this study will ultimately help to inform and optimize future resiliency projects. The incremental reductions in flood depth or other flood exposure reduction improvements made through this project may combine to have a significant risk reduction potential. The specific measures proposed to be evaluated for key target areas could potentially reduce the exposure to flooding of several high risk residential assets in the area.

### **General Timeframe for Implementing Actions**

12-24 months for initial study

### **Government Regulatory Requirements**

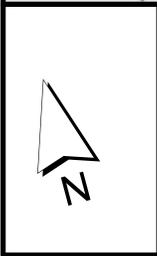
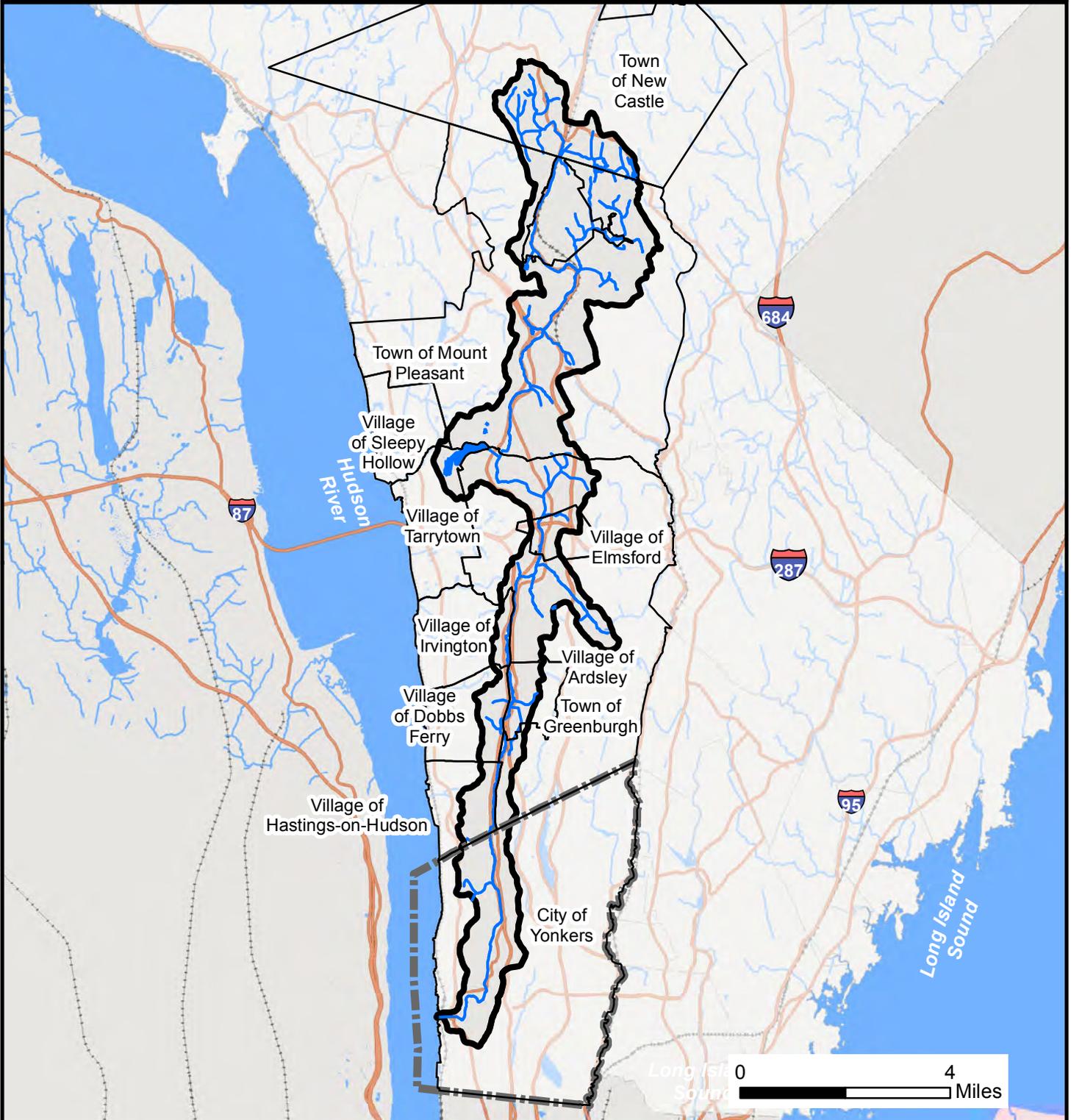
The hydrologic study component has no regulatory requirements. Installation of stream gauges would need to comply with New York State Department of Environmental Conservation (NYS DEC) and U.S. Army Corps of Engineers (USACE) regulations for work in regulated waterways, as would any in-water work for follow-up projects resulting from the study. The U.S. Geological Survey manages all stream gauges.

### **Entity with Jurisdiction over Project**

City of Yonkers and upstream municipalities

**Figure IV-5**

**Project Location - Saw Mill River Watershed**

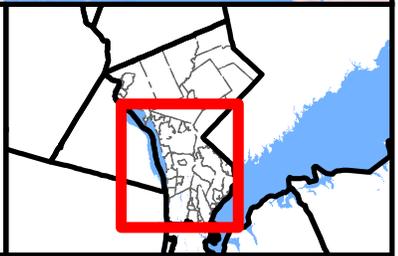


**Legend**

- City of Yonkers (Study Area)
- Major Highways
- Waterbodies
- Rivers and Streams
- Saw Mill River Watershed
- Westchester Municipalities in Watershed

**Data Sources**

City of Yonkers,  
NYSITS,  
Westchester County  
USGS



## Scout Field Engineering Study – Proposed Project

### Project Description

Scout Field is a Westchester County park located along the Bronx River, partly in Yonkers and partly in the Village of Bronxville and the City of Mount Vernon. Over a period of several years this 22.29-acre public park has been improved with playing fields—including improvements that imported fill material to elevate the site above the floodway. The Planning Committee has reported that the improvements have only exacerbated flooding in several flood-prone areas of Yonkers. Furthermore, plans are in place to undertake additional improvements to Scout Field, including adding additional recreational facilities to the park and pumping stormwater from the Bronxville High School catchment area into Lauren Brook, a small tributary of the Bronx River which flows through Scout Field. These proposed improvements would require more fill and potentially result in even greater upstream and downstream flood impacts to Yonkers.

This project would involve inter-municipal cooperation to determine, via hydraulic modeling, whether improvements to Scout Field could adversely affect flooding in neighborhoods along the Bronx River and what could be done to mitigate potentially adverse flooding impacts. Based on the results of this study, recommendations would be made to the municipalities involved to avoid upstream and downstream flooding impacts. Scout Field serves several communities, so future improvements could benefit from inter-municipal cooperation and agreements.

The Planning Committee’s commitment to a solution that works for all the stakeholders involved can only be fully realized through regional coordination. Such coordination would derive great benefit from the presence of a regulatory body focused on watershed-wide stormwater and flooding issues. The Committee’s project “Feasibility Study for Creation of a Regional Flood Control Authority” would help create such a body, and would be very complementary to this project.

### Project Location

Scout Field

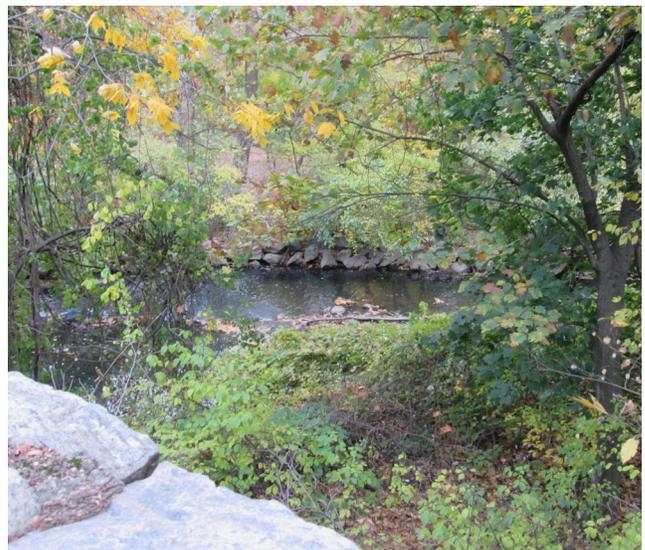
### Estimated Cost

Study cost: \$30,000-\$50,000

Cost includes completion of an engineering review and impact assessment, and determination of recommended actions.



*Scout Field*



*The Bronx River at Scout Field*

## Benefit/Co-Benefits

**Economic Benefits:** If the actions identified by the study are implemented, there will likely be a reduction in the extent of flooding in nearby areas. This will result in a reduction in future public expenditures for emergency response and recovery, as well as private expenses related to flood damages.

**Environmental Benefits:** The project would develop recommendations for this important open space area within the Bronx River floodplain. If these recommendations are able to mitigate flood extent in neighboring residential areas, it would reduce the negative environmental impacts of uncontrolled flooding, including erosion and damage to waterways and pollution of waterways when floodwaters become contaminated as they come into contact with roadways, yards, and other urbanized areas.

**Health and Social Benefits:** This study would lay the groundwork for actions needed to enable neighborhoods near Scout Field to reduce recovery times and damages from future storms.

## Cost-Benefit Analysis

The cost of this study is estimated to be between \$30,000 and \$50,000. The study would ultimately make recommendations for actions to be taken at Scout Field, and the cost of implementation of those recommendations is not included here. The recommended actions could provide risk reduction,

environmental, and economic benefits, as they would target a particularly flood-prone area of the community. In addition, the study itself promotes regional collaboration, a benefit which would be further realized through implementation of recommended actions.

## Anticipated Reduction of Risk

The project could reduce risk to assets in the vicinity of Scout Field by reducing exposure to flood conditions. By determining potentially adverse impacts and effective mitigation to alleviate upstream flooding in several flood-prone neighborhoods in Yonkers, an appropriate solution can be devised and implemented. As the recommended measures for this project have not yet been determined, there is some uncertainty in the risk reduction potential of the project.

## General Timeframe for Implementing Actions

6-12 months

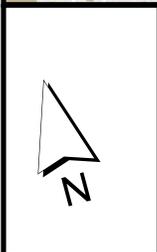
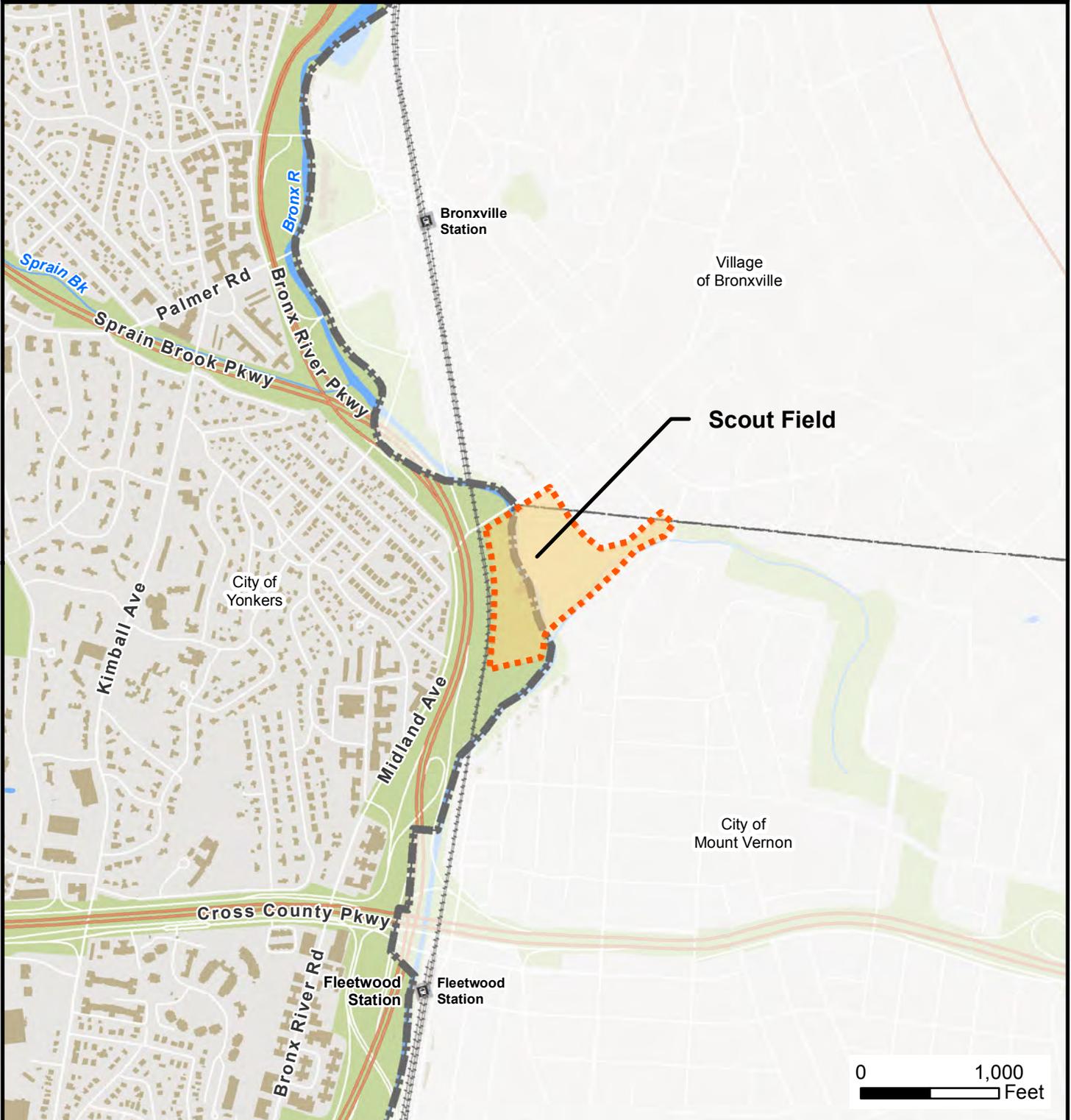
## Government Regulatory Requirements

As this is a study, there are no regulatory requirements.

## Entity with Jurisdiction over Project

City of Yonkers, in coordination with the Village of Bronxville, City of Mount Vernon, and Westchester County. The park is owned by Westchester County.

# Figure IV-6 Project Location - Scout Field

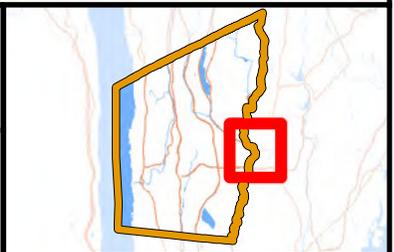


### Legend

- City of Yonkers (Study Area)
- Major Highways
- Railroads
- Rail Station
- Waterbodies
- Rivers and Streams
- Parks
- Structures
- Scout Field

### Data Sources

City of Yonkers, NYSITS, Westchester County



## Technical Assistance Program for Residential Resiliency – Proposed Project

### Project Description

Residential neighborhoods throughout Yonkers were heavily impacted by the April 2007 Nor'easter, Hurricane Irene, and Superstorm Sandy. Flooding, power outages, and downed trees left tens of thousands of residents, including some entire neighborhoods, to deal with major storm-related damages without access to many essential services. This project would empower residents by creating a comprehensive technical assistance program to assist homeowners and renters who have been affected by past storms or whose property continues to be vulnerable to future storms. The project contains an education and outreach component and an individual technical assistance component.

1) The education and outreach component of the project would develop a series of educational materials providing critical residential resiliency information. Materials would be made available to residents on the Yonkers website and in hard copy at key locations throughout the City, and a coordinated outreach campaign would ensure residents are able to access these materials. Topics would include:

- ▶ A comprehensive menu of home floodproofing tools including home retrofits, green infrastructure improvements, and energy resiliency investments such as solar panels, and would provide information on available government incentive programs where these exist.
- ▶ Information on financing, grants, and subsidies as well as fair market prices for storm-related repairs and other recovery services to help residents and property owners avoid potential rebuilding, insurance, or financial scams.
- ▶ Information on available floodproofing tools, including retrofits, home elevations, floodproof door and window barriers, backflow preventers, and replacing oil tanks with natural gas to prevent oil spills during extreme storms. There were numerous complaints

of oil spills in residential neighborhoods during the April 2007 Nor'easter and Hurricane Irene.

- ▶ Outreach to vulnerable populations and the organizations that serve them to ensure that these resources are made fully available to those populations.
- 2) The individual technical assistance program would train and employ staff to meet with residents and conduct home resiliency audits, as well as provide information and advice on resilient practices for their homes and properties. These qualified personnel would be knowledgeable in the many techniques and resources that are available to help residents with rebuilding and resiliency and would be able to offer tailored advice on the best methods for each individual.



*Residential neighborhoods may appear high and dry, but homeowners must prepare for flooding. Here, Nepera Park.*

### Project Location

Citywide

### Estimated Cost

Program cost: \$850,000

Cost includes \$100,000 for research and development of educational materials and outreach campaign and \$750,000 for the technical assistance program elements, including program administration, training, and salaries for three inspectors, one grants manager, and one supervisor for a period of two years.

### Benefit/Co-Benefits

**Economic Benefits:** Reduced damages from flooding lead to reduced impacts to the local economy: workers are able to get to their jobs and businesses may be able to stay open. In addition, the project could result in a local economic stimulus effect by encouraging residents to use local contractors to perform the necessary work. The technical assistance program would also create technical jobs in the community, as there will be a need for additional technical resources for counseling and auditing services.

**Environmental Benefits:** Encouraging the replacement of heating oil tanks with natural gas would benefit the environment, as oil tanks have been reported to spill frequently during past storm events.

**Health and Social Benefits:** The project could have significant social benefits by enabling residents to stay in their homes during minor flooding events or enabling them to return to their homes more quickly after major flooding events, thereby mitigating disturbance to social and family structures and reducing the financial burden of repetitive flood damages. Also, protection from interior flooding can reduce mold impacts on residents and speed return to the use of homes and businesses.

### Cost-Benefit Analysis

The cost of the project is estimated at \$850,000, with the funding providing program design and direct technical assistance to individual homeowners. The costs for actual improvements made to homes, as well as the maintenance of those improvements, are the responsibility of individual homeowners (grant/loan

assistance may be available upon application by homeowners). The project aims to keep costs fair and competitive by distributing information on pricing and available government subsidies. The costs for homeowners will likely vary considerably with the extent of necessary repairs and improvements. The project has significant risk reduction potential, in addition to providing social, economic, and environmental benefits throughout the community. The extent of benefits realized by the project would increase with the number of homes participating in the program.

### Anticipated Reduction of Risk

This project could potentially have moderate risk reduction benefits by making floodproofing information and resources more accessible to homeowners and encouraging implementation of residential resiliency techniques. Floodproofing measures can reduce the vulnerability of an asset by mitigating the effect of flooding. This reduces the damage sustained by residential assets as well as the time that families must spend away from their homes in the wake of flood events.

### General Timeframe for Implementing Actions

6-12 months

### Government Regulatory Requirements

Yonkers Department of Buildings would be involved with any building code updates.

### Entity with Jurisdiction over Project

City of Yonkers

## DOMED RISERS

### INFLOW & OVERFLOW CONTROLS

#### OVERVIEW

- ✓ Risers establish a high water level and regulate the overflow of stormwater from storage basins (e.g., rain gardens, stormwater bompots, etc).
- ✓ Domed risers typically consist of a vertical pipe with a grated cover.
- ✓ Materials: concrete, metal (e.g., steel, cast iron, etc), or plastic (e.g., HDPE, PVC, etc).

#### RELATED SECTIONS

- ✓ Inlet Structures
- ✓ Pipes & Fittings

#### REQUIRED SURVEY POINTS

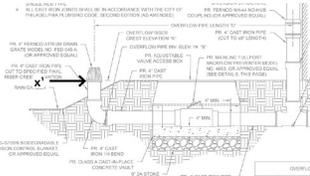
| Feature      | Required Survey Point                           | Description of Survey Point                                  |
|--------------|---|--|
| Domed Risers | X <sup>1</sup> Rim elevation of riser structure | Lowest level of the grate where water would enter the riser. |

All survey points documented must include both horizontal and vertical points.

#### DOCUMENT

- ✓ Diameter of both grate and riser pipe
- ✓ Material of grate and riser pipe\*
- ✓ Presence and model/manufacturer of water quality inert\*

\*See list of acceptable material values in Drawing section on page 72.



Rim elevation: the lowest level of the grate where water would enter the riser.



Rim elevation: the lowest level of the grate where water would enter the riser.



Rim elevation: the lowest level of the grate where water would enter the riser.

POST CONSTRUCTION SURVEY

## SWALES

### INFLOW & OVERFLOW CONTROLS

#### OVERVIEW

- ✓ Swales are open channels that convey stormwater towards or away from an SMP. These channels may provide some infiltration, storage, and water-quality treatment.
- ✓ Various channel materials such as grasses, herbaceous plants, shrubs, trees, and trap channel armor are typical for both the bottom and side slopes.

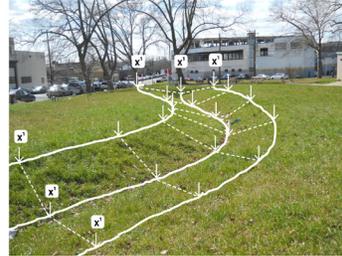
#### RELATED SECTIONS

- ✓ Surface Storage SMPs
- ✓ Splash Pads
- ✓ Swales and Weir Walls

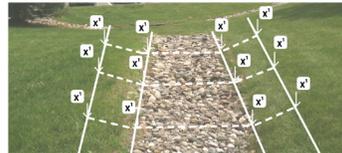
#### REQUIRED SURVEY POINTS

| Feature | Required Survey Point           | Description of Survey Point  |
|---------|---------------------------------|--|
| Swale   | X <sup>1</sup> Perimeter points | Survey lowest bottom elevation(s) and highest elevation(s) for entire length of swale. Use a 50 ft. maximum for survey point increments. |

All survey points documented must include both horizontal and vertical points.



Swale perimeter points at bottom and top of swale. Arrows represent typical locations for all survey points. Points taken using a 50 ft. maximum spacing.



Swale with flat bottom and mild side slopes; arrows represent typical locations for all survey points. Points taken using a 50 ft. maximum spacing.

#### DOCUMENT

- ✓ Surface material of swale on bottom and side slopes.

POST CONSTRUCTION SURVEY

## SPILLWAYS & WEIR WALLS

### INFLOW & OVERFLOW CONTROLS

#### OVERVIEW

- ✓ Spillways and weir walls are structures that establish a high water level and can provide a controlled overflow of stormwater.
- ✓ Surface weirs can be various shapes (e.g., rectangular, v-notch, etc) and materials (e.g., concrete, masonry, metal, carbon materials, etc) are typical.

#### RELATED SECTIONS

- ✓ Surface Storage SMPs
- ✓ Splash Pads
- ✓ Swales

#### REQUIRED SURVEY POINTS

| Feature                  | Required Survey Point  | Description of Survey Point   |
|--------------------------|--|---|
| Spillways and Weir Walls | X <sup>1</sup> Crest of weir                                   | Bottom most elevation where stormwater flows over the spillway or weir wall (i.e., crest).                                  |
|                          | X <sup>2</sup> Corners of spillway or weir wall                | Corners at the top and bottom edges of the spillway or weir crest. If weir is broad-crested, include front and rear points. |
|                          | X <sup>3</sup> Surface elevation upslope and downslope of weir | Lowest point directly upslope and downslope of weir (point must be in-line with spillway or weir crest midpoint).           |

All survey points documented must include both horizontal and vertical points.



Spillway: crest, corner points, and surface elevations.



V-notch Weir: crest and corner points (photo courtesy of Villanova University).

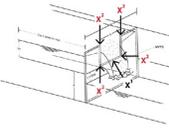
#### DOCUMENT

- ✓ Material\*
- ✓ Shape: rectangular or V-notch
- ✓ Broad-crested or sharp-crested

\*See list of acceptable material values in Drawing section on page 72.



Weir Wall: crest, corner points, and upslope surface elevations.



Sharp Crested weir section: crest and corner points.

POST CONSTRUCTION SURVEY

## SUMPS, TRAPS, & HOODS

### INFLOW & OVERFLOW CONTROLS

#### OVERVIEW

- ✓ An inlet sump is the area within an inlet below the lowest pipe invert elevation.
- ✓ Inlet traps are cast iron structures installed over sewer laterals within inlet structures to prevent the escape of sewer gas.
- ✓ Inlet hoods are structures installed over a lateral or distribution pipe to provide protection from floatable trash and debris.
- ✓ These features will not be present in all inlets.

#### RELATED SECTIONS

- ✓ Inlet Structures
- ✓ Office
- ✓ Subsurface Weir
- ✓ Pipes and Fittings

#### REQUIRED SURVEY POINTS

| Feature    | Required Survey Point        | Description of Survey Point  |
|------------|------------------------------|--|
| Inlet Sump | X <sup>1</sup> Bottom of box | Defined as the bottom interior elevation of an inlet structure (refered) |

All survey points documented must include both horizontal and vertical points.



Inlet hood: view from above.

Refer to the Inlet Structures and Pipes and Fittings sections of this manual for guidance on surveying the pipe invert at termination point.



Bottom of box: Survey the bottom interior elevation of the inlet.

Sumps, traps, and hoods may not be present in all inlets!

POST CONSTRUCTION SURVEY

Sample pages from a menu of home floodproofing tools

## Yonkers Emergency Response and Recovery Campaign – Proposed Project

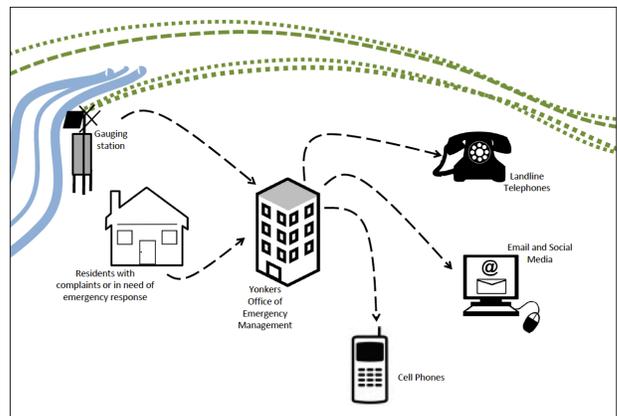
### Project Description

Although Yonkers’ emergency response systems were well-prepared for the major storm events of recent years and responded well to these crises, the extreme nature of the flooding and destruction caused by the April 2007 Nor’easter, Hurricane Irene, and Superstorm Sandy has forced Yonkers to take a fresh look at its emergency readiness and recovery programs and systems. Each storm brought unprecedented challenges, from the record flooding along the Bronx River, Grassy Sprain Brook, and Saw Mill River during the the Nor’easter and Hurricane Irene, to Superstorm Sandy’s powerful storm surge that devastated much of the local wastewater treatment infrastructure. This project would develop and implement the following programs in coordination with the City of Yonkers Office of Emergency Management (OEM) and other emergency response organizations to complement and expand on the City’s already strong package of services and programs:

1) A fully integrated Citywide early warning system for flooding and other emergencies that builds on Yonkers’ existing notification system. Currently, the City’s emergency early warning system autodials landline telephones and cell phones of Yonkers residents who are enrolled in the early warning system program. This program would expand the system to include advance emergency notifications to all landlines and cell phones registered in the City, including those not currently enrolled in the program, as well as email and social media notifications. This component would include a comprehensive community outreach program to increase enrollment with the goal of developing a Citywide phone and email emergency notification contact list. The outreach initiatives would be incorporated into all existing Yonkers preparedness programs, including Yonkers Preparedness Month. In addition, the City of Yonkers currently maintains a list of vulnerable populations, who would be automatically

enrolled in the emergency notification contact list, and concurrent outreach efforts would be made to ensure that this list stays current and complete. Organizations that serve vulnerable populations would also be contacted.

- 2) Improve on the City’s existing community call-in line to expand opportunities for City residents to communicate their needs to emergency responders. Many residents described having difficulty contacting the appropriate City staff during Hurricane Irene and Superstorm Sandy to request sandbags and report downed trees, eroded berms, and other situations requiring rapid response during a storm event. Upgrading the community call-in line by providing new software and additional staff training would address this issue, speed the delivery of services, and prioritize emergency response to the residents and neighborhoods most in need.
- 3) Conduct a comprehensive education and outreach campaign to inform the public of the enhanced flood warning system and improved community call-in line and to enroll residents in the emergency notification contact list. This would include the comprehensive outreach to increase enrollment in the City’s early warning system (outlined above), as well as further efforts to ensure that the Yonkers community is fully informed and knowledgeable regarding the services available through these City programs, such as radio announcements, TV spots, and advertisements in other mass media outlets.



*A schematic of the enhanced emergency communications systems*

## Project Location

Citywide

## Estimated Cost

Program cost: \$475,000

Cost includes setting up local early warning system (training, staff time for system setup and data entry to expand and update emergency notification contact list, and purchase of software)—\$250,000; upgrades to community call-in line (training, staff time for setup, and purchase of software)—\$150,000; and design and production of education and outreach campaign materials—\$75,000.

## Benefit/Co-Benefits

**Health and Social Benefits:** This program would enhance the strategic capabilities of OEM in severe storm planning and recovery, leading to improved response to severe storm events and other disasters. An early warning system allows citizens to prepare further in advance for severe weather events, leading to improved outcomes including reduction in damages, injury, and health impacts.

## Cost-Benefit Analysis

The cost of implementing these proposed programs is estimated to be approximately \$475,000, with moderate annual maintenance costs associated with the enhanced programs. The programs would

bring significant risk reduction potential to affected populations throughout Yonkers and would provide health and social benefits to particularly vulnerable populations.

## Anticipated Reduction of Risk

Improvements to the emergency response programs in Yonkers have the potential to reduce risk to people and property throughout the community. An early warning system facilitates early evacuation and planning for residents, and ensuring that vulnerable populations are included in notifications can help alleviate additional risk to these populations. A community call-in line can facilitate allotment of emergency response resources to areas within the community that are most at need and even provide a prevention mechanism with early reporting from community members.

## General Timeframe for Implementing Actions

6-12 months

## Government Regulatory Requirements

Follow any applicable City, State, County, or FEMA guidelines.

## Entity with Jurisdiction over Project

City of Yonkers

## Planning Study for Sprain Diversion Channel – Featured Project

### Project Description

The heavy rains of the April 2007 Nor'easter, Hurricane Irene, and other severe storm events have exceeded the capacity of the existing local stormwater systems in northern Yonkers, contributing to flooding along the Sprain Brook. This project would analyze the potential flood reduction benefits of diverting some of this excess runoff into a different subwatershed area—the Grassy Sprain Reservoir—with potentially greater capacity to handle the water.

The Sprain Diversion Channel would originate at the Sprain Brook as it passes through the Saint Andrews Golf Club, just north of Yonkers in the neighboring Town of Greenburgh. The proposed diversion channel would redirect a portion of the flow from the Sprain Brook into the Grassy Sprain Reservoir by going under Sprain Road and through Sprain Ridge Park. A preliminary engineering feasibility study<sup>16</sup> suggests that the Town of Greenburgh and the City jointly pursue diverting stream flow away from the Sprain Brook into the Grassy Sprain Reservoir, which could reduce water volumes downstream, especially during flood events. Implementation of this inter-municipal project could potentially ease flooding for downstream neighborhoods routinely flooded by severe storms. This diversion of water and the subsequent alteration of drainage area boundaries will require more detailed engineering and hydraulic modeling to ensure that the project would not exacerbate upstream or downstream flood conditions.

### Project Location

Saint Andrews Golf Club, Grassy Sprain Reservoir

### Estimated Cost

Study cost: \$80,000

Cost includes review of existing completed feasibility study—\$35,000; modeling to develop recommended actions—\$45,000.

### Benefit/Co-Benefits

**Economic Benefits:** If the actions identified by the study are determined to be effective and are implemented, there will likely be a reduction in the extent of flooding in areas adjacent to the Sprain Brook. This would result in a reduction in future public expenditures for emergency response and recovery, as well as private expenses related to flood damages.

**Environmental Benefits:** Easing flooding in the urban areas along the Sprain Brook and Grassy Sprain Brook has the potential to reduce the negative environmental impacts of uncontrolled flooding, including erosion and damage to waterways and pollution of waterways when floodwaters become contaminated as they come into contact with roadways, yards, and other urbanized areas.

**Health and Social Benefits:** This study would lay the groundwork for actions needed to enable neighborhoods along Sprain Brook to reduce recovery times and damages from future storms.

### Cost-Benefit Analysis

The cost of the study is estimated to be \$80,000. The costs associated with the recommended actions have not yet been determined and will require further analysis upon completion of the study. The recommended actions could result in risk mitigation benefits by reducing the volume of water in downstream stretches of the Sprain Brook. This can, in turn, create positive environmental effects by reducing the contact of floodwaters with contaminants. However, this project requires further in-depth environmental study, as the diversion of waterways across watershed boundaries may have effects on the surrounding ecosystem.

### Anticipated Reduction of Risk

Preliminary engineering suggests that diverting stream flow away from the Sprain Brook could reduce water volumes downstream, especially during flood events such as Hurricane Irene or the April 2007 Nor'easter. The eventual implementation of this inter-municipal

project could potentially ease flooding for downstream neighborhoods routinely flooded by these types of severe storms. As the recommended measures for this project have not yet been determined, there is some uncertainty in its risk reduction potential.

**General Timeframe for Implementing Actions**

12-18 months

**Government Regulatory Requirements**

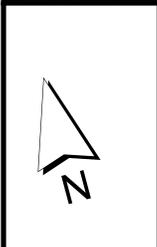
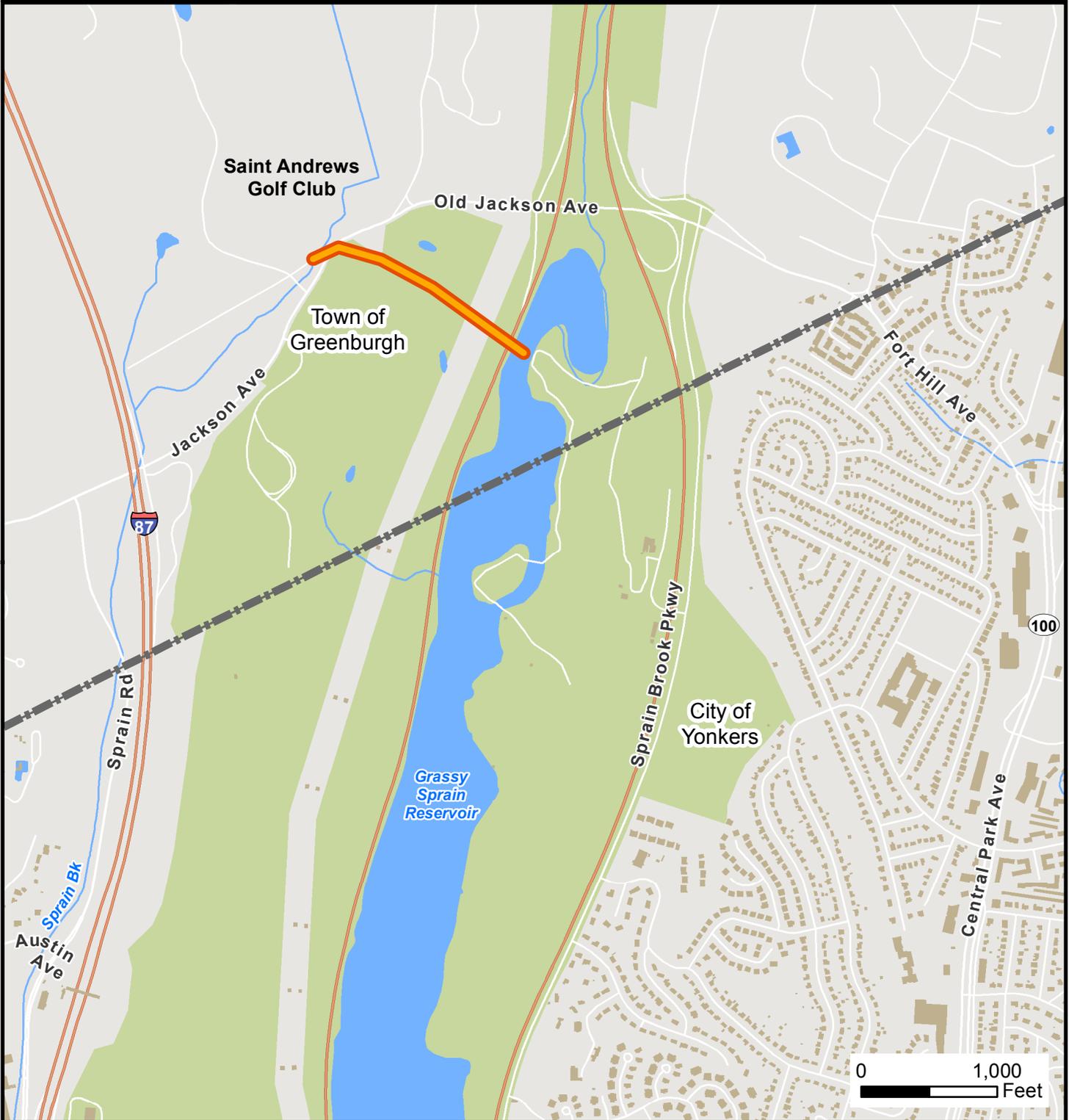
As this is a study, there are no regulatory requirements. Implementation may require permits from the New York State Department of Environmental Conservation (NYS DEC) and U.S. Army Corps of Engineers (USACE), as well as environmental review.

**Entity with Jurisdiction over Project**

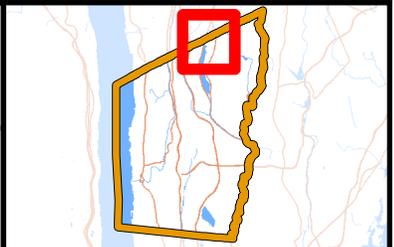
City of Yonkers

**Figure IV-7**

**Project Location: Proposed Sprain Diversion Channel**



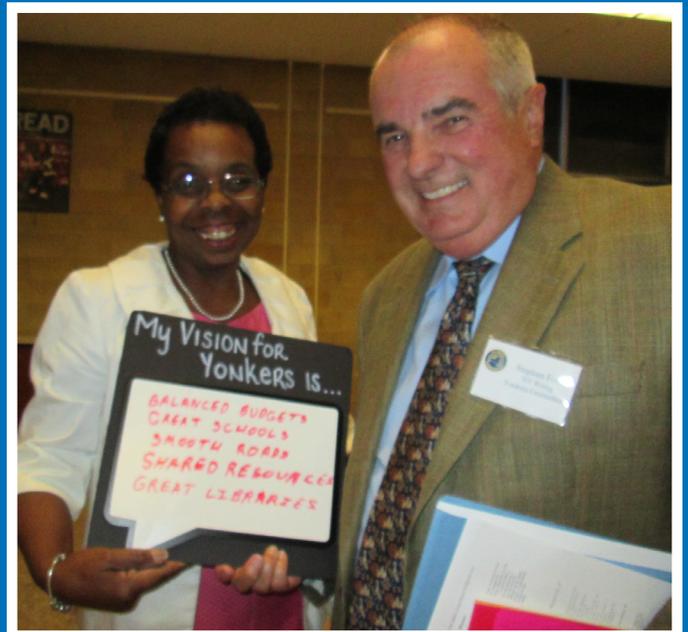
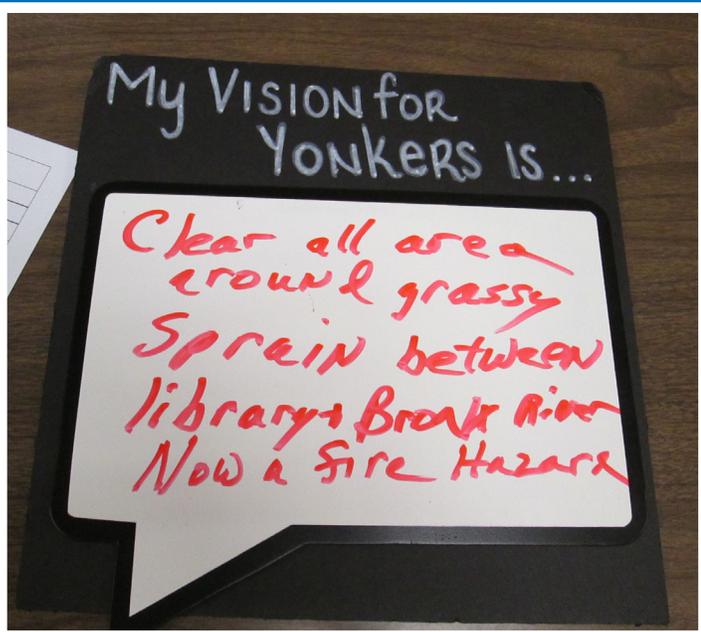
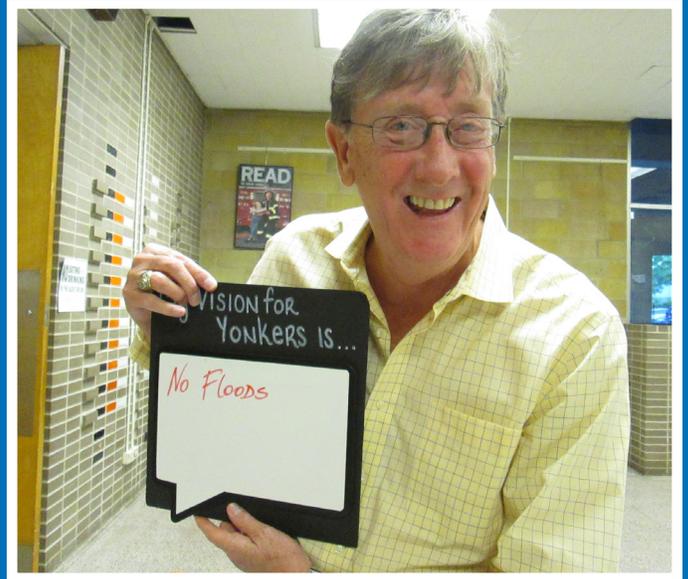
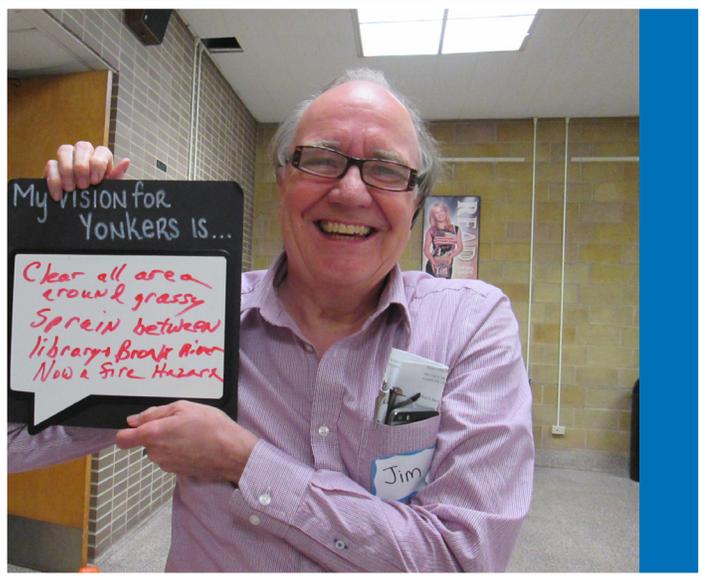
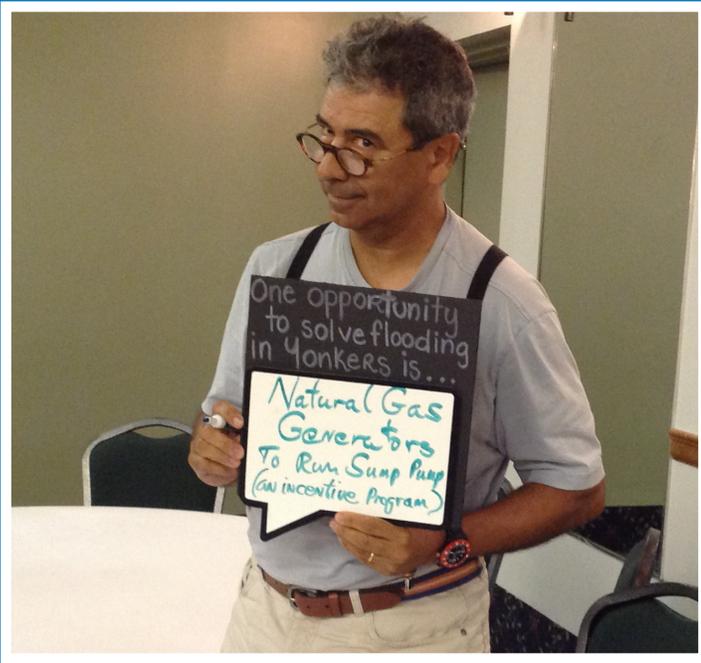
| Legend                       |                    | Data Sources                                |
|------------------------------|--------------------|---|
| City of Yonkers (Study Area) | Waterbodies        | City of Yonkers, NYSITS, Westchester County |
| Major Highways               | Rivers and Streams |   |
| Railroads                    | Parks              |   |
| Rail Station                 | Structures         |   |
| Project Location             |                    |   |



# 2014 NY RISING COMMUNITY RECONSTRUCTION PLAN YONKERS NYRCR

## Section V Additional Materials





## A. Additional Resiliency Recommendations

Throughout the NYRCR Planning process, the Planning Committee developed the Additional Resiliency Recommendations listed in Table V-1. These recommendations were developed as projects and actions

that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects. Projects are listed by Reconstruction and Resiliency Strategy. Projects are not ranked or prioritized and are presented in no particular order of importance.

**Table V-1 Additional Resiliency Recommendations**

| Strategy  | Project Name  | Short Description  | Estimated Cost | Regional (Y/N) |
|---|---|--|----------------|----------------|
| Provide information and assistance to home and business owners with pre-storm floodproofing and post-storm recovery | Facilitate Continuity and Resiliency Services through City Business Organizations | Through the Yonkers Chamber of Commerce and similar business associations, provide an opportunity for all local companies to have access to businesses providing cost effective business continuity and resiliency services as well as companies providing business interruption insurance coverage. | \$75,000       | N              |
|   | National Flood Insurance Program's Community Rating System Participation          | Encourage the City to pursue participation in the Community Rating System, which could result in improved flood mitigation efforts as well as discounts on flood insurance premiums and provide discounts to incentivize new flood protection activities.  | \$50,000       | N              |
| Repair, rehabilitate, upgrade, and fortify critical infrastructure assets   | Bronx River Sewer   | Repair the liner of the Bronx River Sewer, part of the County's wastewater treatment infrastructure, to prevent stormwater intrusion into the sewer system and decrease combined sewer overflows (CSOs) to the City's waterways.   | \$500,000      | N              |
|   | Brooklands Floodwall  | Enlarge an existing floodwall along the Sprain Brook where it borders the Brooklands Cooperative. This would protect Brooklands residents from significant storm damage during flood events.   | \$1-2 million  | N              |
|   | Burying of Power Lines  | In coordination with Con Edison, determine the feasibility and benefit of burying power lines in older neighborhoods throughout the City to limit power outages due to downed trees or other interference with overhead lines.   | \$15 million   | N              |

**Table V-1 (cont'd) Additional Resiliency Recommendations**

| Strategy   | Project Name  | Short Description  | Estimated Cost              | Regional (Y/N) |
|--|---|--|-----------------------------|----------------|
| Repair, rehabilitate, upgrade, and fortify critical infrastructure assets (cont'd) | Grassy Sprain Reservoir Flood Valve                 | Repair/replace the valve (floodgate) on the Grassy Sprain Reservoir to have an operating valve that can lower the level of the reservoir in advance of a storm, creating additional flood storage capacity.  | \$1.5 million               | N              |
|  | Hardening of WWTP                                   | Protect the Yonkers Wastewater Treatment Plant (WWTP) and related facilities through physical protective measures such as providing portable flood barriers, installing flood doors and other flood-proofing, and installing new pumps and emergency generators to remove water from basements.  | \$18 million                | N              |
|  | Redesign and Repair of Steel Bulkhead at JFK Marina | Complete the redesign and repair of the steel bulkhead at the JFK Marina begun and partially funded by the City, and would result in a revitalized structure that would have the integrity to withstand future storm surges.   | \$6 million - \$7.5 million | N              |
|  | Replacement of Metro-North Bronxville Bridge        | The low culverts of the Metro-North Bronxville Bridge may have obstructed floodwaters during the April 2007 Nor'easter and Hurricane Irene, thereby contributing to upstream flooding along the Grassy Sprain Brook and Bronx River. This project would conduct an engineering feasibility study to determine the flood reduction benefits of removing the existing bridge and constructing a new bridge with higher culverts. | \$30 million                | N              |
|  | Selected Roadway Elevations                         | Identify critical roadways and residential roadways in risk areas that feed into existing hurricane evacuation routes, whose elevation would prove beneficial during flood events.   | \$1 million per lane mile   | N              |
| Harness resiliency potential of natural resources                                  | Ludlow Park (Wetland Creation for Detention)        | Convert the land south of the American Sugar refinery and north of the Metro-North Ludlow Station into a City park that would also provide stormwater detention and a tidal wetland.   | \$4 million                 | N              |

## B. Master Table of Projects

Table V-2 presents all projects developed by the Yonkers NYRCR Committee throughout the planning process. This comprehensive list includes Proposed Projects and Featured Projects, which may be funded

through the NYRCR Program, as well as Additional Resiliency Recommendations. Projects are listed by Reconstruction and Resiliency Strategy. Projects are not ranked or prioritized, and are presented in no particular order of importance.

**Table V-2 Master Project Table**

| Strategy  | Project Name   | Short Description   | Project Category | Estimated Cost          | Regional (Y/N) |
|---|--|---|------------------|-------------------------|----------------|
| Work with neighborhoods and businesses to improve flood resistance in Yonkers' vulnerable areas | Bronx River and Grassy Sprain Brook Hydrologic Study | Address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using collected data, conduct a hydrologic study of these two primary watersheds and make recommendations for flood mitigation projects, and (3) implement one or more projects recommended in the study. | Proposed Project | \$1,630,000-\$1,840,000 | Y              |
|   | Saw Mill River Hydrologic Study                      | Address flooding in this watershed through a three-stage process: (1) install stream gauges to begin collecting data, (2) using collected data, conduct a hydrologic study of this primary watershed and make recommendations for flood mitigation projects, and (3) implement one or more projects recommended in the study.       | Proposed Project | \$1,420,000-\$1,560,000 | Y              |

**Table V-2 (cont'd) Master Project Table**

| Strategy  | Project Name  | Short Description   | Project Category                     | Estimated Cost     | Regional (Y/N) |
|---|---|---|--------------------------------------|--------------------|----------------|
| Improve on existing emergency preparedness and communications   | Emergency Power to Street Lights Along Evacuation Routes                          | Conduct a pilot project to replace 10-15 existing conventional street lights with solar battery-powered street lights as backup power along a major evacuation route.   | Proposed Project                     | \$70,000-\$135,000 | N              |
|   | Yonkers Emergency Response and Recovery Campaign                                  | Develop and implement the following programs in coordination with the City of Yonkers Office of Emergency Management (OEM) and other emergency response organizations to complement and expand on the City's already strong package of services and programs:<br><br>1) A fully integrated Citywide early warning system for flooding and other emergencies that builds on Yonkers' existing notification system.<br><br>2) An upgraded community call-in line to expand opportunities for City residents to communicate their needs to emergency responders.<br><br>3) A comprehensive education and outreach campaign to inform the public of the enhanced flood warning system and community call-in line and enroll residents in the emergency notification contact list. | Proposed Project                     | \$475,000          | N              |
| Provide information and assistance to home and business owners with pre-storm floodproofing and post-storm recovery | Technical Assistance Program for Residential Resiliency                           | Create a comprehensive technical assistance program to assist homeowners and renters who have been affected by past storms or whose property continues to be vulnerable to future storms. The project contains an education and outreach component and an individual technical assistance component.  | Proposed Project                     | \$850,000          | N              |
|   | Facilitate Continuity and Resiliency Services through City Business Organizations | Through the Yonkers Chamber of Commerce and similar business associations, provide an opportunity for all local companies to have access to businesses providing cost effective business continuity and resiliency services as well as companies providing business interruption insurance coverage.  | Additional Resiliency Recommendation | \$75,000           | N              |
|   | National Flood Insurance Program's Community Rating System Participation          | Encourage the City to pursue participation in the Community Rating System, which could result in improved flood mitigation efforts as well as discounts on flood insurance premiums and provide discounts to incentivize new flood protection activities.   | Additional Resiliency Recommendation | \$50,000           | N              |

**Table V-2 (cont'd) Master Project Table**

| Strategy  | Project Name  | Short Description   | Project Category                     | Estimated Cost            | Regional (Y/N) |
|---|---|---|--------------------------------------|---------------------------|----------------|
| Promote resiliency and flood management best practices through land-use planning and regulation | Planning Study to Establish Best Management Practices for Upland Waterways            | Undertake a planning study to develop best practices for managing Yonkers' upland waterways to prevent degradation of their hydrologic function. The study would consider ways to balance the urgent need to minimize damaging overflows or backups along these waterways with the importance of protecting the habitat, ecological, and hydrologic functioning of these rivers and streams.  | Proposed Project                     | \$100,000                 | Y              |
|   | Resilient Revitalization of the Alexander Street Waterfront— Study and Pilot Projects | Update and amend the Alexander Street Master Plan to transform this underperforming waterfront area into a showcase district for natural infrastructure and green building practices. The project would also include planning, design, and implementation of three targeted natural infrastructure projects in the Alexander Street neighborhood to showcase the ability of green infrastructure to protect the district from flooding and storm damages. | Proposed Project                     | \$900,000                 | N              |
|   | Scout Field Engineering Study   | Determine, via hydraulic modeling, whether proposed improvements to Scout Field could adversely affect flooding in neighborhoods along the Bronx River.   | Proposed Project                     | \$30,000 - \$50,000       | Y              |
| Repair, rehabilitate, upgrade, and fortify critical infrastructure assets                       | Creation of Access to Grassy Sprain Brook through Sprain Brook Parkway Sound Barrier  | Construct access gates in the Sprain Brook Parkway's sound barrier to allow access to maintenance equipment in order to remove debris and obstructions in the Grassy Sprain Brook.  | Proposed Project                     | \$365,000                 | N              |
|   | Reconstruction of Seawall at Yonkers Paddling and Rowing Club                         | Design and reconstruct the seawall at the historic Yonkers Paddling and Rowing Club, one of Yonkers' few public access points to the Hudson River.  | Proposed Project                     | \$1.9 million             | N              |
|   | Bronx River Sewer   | Repair the liner of the Bronx River Sewer, part of the County's wastewater treatment infrastructure, to prevent stormwater intrusion into the sewer system and decrease CSOs to the City's waterways.   | Additional Resiliency Recommendation | \$500,000                 | N              |
|   | Brooklands Floodwall  | Enlarge an existing floodwall along the Sprain Brook where it borders the Brooklands Cooperative. This would protect Brooklands residents from significant storm damage during flood events.  | Additional Resiliency Recommendation | \$1 million - \$2 million | N              |

**Table V-2 (cont'd) Master Project Table**

| Strategy   | Project Name   | Short Description  | Project Category                     | Estimated Cost              | Regional (Y/N) |
|--|--|--|--------------------------------------|-----------------------------|----------------|
| Repair, rehabilitate, upgrade, and fortify critical infrastructure assets (cont'd) | Burying of Power Lines   | In coordination with Con Edison, determine the feasibility and benefit of burying power lines in older neighborhoods throughout the City to limit power outages due to downed trees or other interference with overhead lines.   | Additional Resiliency Recommendation | \$15 million                | N              |
|  | Grassy Sprain Reservoir Flood Valve                                  | Repair/replace the valve (floodgate) on the Grassy Sprain Reservoir to have an operating valve that can lower the level of the reservoir in advance of a storm, creating additional flood storage capacity.  | Additional Resiliency Recommendation | \$1.5 million               | N              |
|  | Hardening of WWTP  | Protect the Yonkers Wastewater Treatment Plant (WWTP) and related facilities through physical protective measures such as providing portable flood barriers, installing flood doors and other flood-proofing, and installing new pumps and emergency generators to remove water from basements.  | Additional Resiliency Recommendation | \$18 million                | N              |
|  | Redesign and Repair of Steel Bulkhead at JFK Marina                  | Complete the redesign and repair of the steel bulkhead at the JFK Marina begun and partially funded by the City, and would result in a revitalized structure that would have the integrity to withstand future storm surges.   | Additional Resiliency Recommendation | \$6 million - \$7.5 million | N              |
|  | Replacement of Metro-North Bronxville Bridge                         | The low culverts of the Metro-North Bronxville Bridge may have obstructed floodwaters during the April 2007 Nor'easter and Hurricane Irene, thereby contributing to upstream flooding along the Grassy Sprain Brook and Bronx River. This project would conduct an engineering feasibility study to determine the flood reduction benefits of removing the existing bridge and constructing a new bridge with higher culverts. | Additional Resiliency Recommendation | \$30 million                | N              |
|  | Selected Roadway Elevations  | Identify critical roadways and residential roadways in risk areas that feed into existing hurricane evacuation routes, whose elevation would prove beneficial during flood events.   | Additional Resiliency Recommendation | \$1 million per lane mile   | N              |
| Enhance regional coordination in flood mitigation planning                         | Feasibility Study for Creation of a Regional Flood Control Authority | Undertake a planning study to assess the feasibility of establishing a Regional Flood Control Authority with regulatory authority and power to review and harmonize regulations and ordinances across municipal boundaries. This authority would operate within the watersheds of Westchester County, including the Bronx River, Grassy Sprain Brook, and Saw Mill River watersheds.   | Proposed Project                     | \$75,000                    | Y              |

**Table V-2 (cont'd) Master Project Table**

| Strategy  | Project Name                                 | Short Description   | Project Category                     | Estimated Cost | Regional (Y/N) |
|---|--|---|--------------------------------------|----------------|----------------|
| Harness resiliency potential of natural resources | Planning Study for Sprain Diversion Channel  | Analyze the potential benefits and develop plans to divert stormwater from the Sprain Brook in the neighboring Town of Greenburgh into the Grassy Sprain Reservoir to help move flows from one subwatershed area to another with potentially greater carrying and storage capacity. | Featured Project                     | \$80,000       | Y              |
|   | Ludlow Park (Wetland Creation for Detention) | Convert the land south of the American Sugar refinery and north of the Metro-North Ludlow Station into a City park that would also provide stormwater detention and a tidal wetland.  | Additional Resiliency Recommendation | \$4 million    | N              |

## C. Public Engagement Process

The public and stakeholder engagement process incorporated a range of techniques to involve Yonkers residents in shaping their NYRCR Plan:

### Public Engagement Techniques

The goal of public communications related to the NYRCR Program was to engage a broad representation of stakeholders and the public in the process and to ensure that a wide range of ideas and viewpoints were incorporated into discussions of how to build back better for a more resilient Yonkers. A variety of techniques were used, including:

#### Flyers

Flyers were created for Public Engagement Events, in English and Spanish, and were distributed to Committee members who were encouraged to post and distribute them in their respective neighborhoods. Flyers were also sent via email to Committee members and stakeholder groups, providing an opportunity to share and spread the word digitally.

#### Canvassing

Members of the project team placed flyers at key stakeholder locations including libraries, civic organizations, and places of worship, and shared them with elected officials in a further effort to increase participation. Flyers were also placed on the Yonkers NYRCR webpage.

#### Constant Contact

The project team utilized Constant Contact, a marketing tool used to design, send, and track digital mailings to mass audiences. Constant Contact emails were sent out in advance of all Public Engagement Events, and included meeting time and date information and meeting flyers.

### Public Events

Members of the project team and the Committee staffed a booth at Riverfest, an annual event held in early September in downtown Yonkers. There, residents were invited to learn about the NYRCR Program, tell the story of their flooding experiences, and offer suggestions on ways to make the City more resilient in the face of future flooding. In addition, there was the opportunity for children to tell their flood and storm story via narratives and pictures. General information about the NYRCR program was made available, and flyers for an upcoming Public Engagement Event were distributed to the public.

### Regular Committee Meetings

The Yonkers NYRCR Committee was comprised of 11 members including two co-chairs. This group was comprised of municipal staff, civic leaders, and storm-impacted residents. Committee members met twice a month to review progress and provide input on every aspect of the plan—study area, vision, community assets, needs and opportunities, strategies, and projects. These meetings typically took the form of group conversations, with key points and decisions recorded in meeting summaries.

The expertise and local knowledge provided by the 11 Committee members was instrumental at each step of the NYRCR process. Committee members provided their own testimonies of their storm experiences and reached out to their networks to understand the work that was still needed to build back better in Yonkers. Committee members were passionate about being sure that the needs of all members of the community were represented in the final NYRCR Plan.

### Four Public Engagement Events

Each Public Engagement Event was an opportunity for community members to learn about the NYRCR planning process, review progress, and provide input that would inform the final elements of the NYRCR Plan.

## Event #1: Vision, Assets, Critical Issues, Storm Damage

Goals for the first NY Rising Public Engagement Event were to:

- ▶ Familiarize community members with the NYRCR process, goals, and expected outcomes;
- ▶ Gather input on the draft community vision;
- ▶ Review and comment on the community asset list; and
- ▶ Give the public an opportunity to express their storm stories and understand the many forms of storm damage in Yonkers.



*A resident reveals her vision for Yonkers at Public Engagement Event #1*

This was accomplished through a presentation that gave an introduction to the NYRCR program and process, provided an overview of the program time line, and reported on the progress to date. This informational presentation was followed by an open-house

community break-out session during which community members provided input on the draft community vision, added to the list of community assets, and told their storm stories at stations set up around the room. Poster-size maps of each of the focus areas were displayed which allowed residents to locate their flooding issues. Residents had the opportunity to have conversations with the Committee members and project team, provide their feedback, and contribute ideas in a very informal format.



*Residents viewed maps of Yonkers' watershed areas to identify storm impacts and assets. In the background are posters where Committee and project team members recorded additional assets suggested by residents. These were added to the master list of assets in initial drafts of the NYRCR Plan.*

## Event #2: Needs and Opportunities & Preliminary Project Assessment

The primary goals for the second NYRCR Public Engagement Event were to:

- ▶ Engage with and listen to members of the public who have firsthand knowledge of flooding in Yonkers and the issues being addressed by the Committee;
- ▶ Review and comment on the asset list;
- ▶ Review preliminary lists of community needs and opportunities; and
- ▶ Identify reconstruction strategies and gather project ideas.



*Residents in attendance at the second Public Engagement Event listened to an overview of the NYRCR Program.*

Residents were welcomed to the meeting and then given a brief presentation about the NYRCR program and the current status of the planning process. They then participated in small group discussions in which they assessed the lists of assets, needs, and opportunities drafted by the Committee and project team for a particular recovery support function. Everyone at the table was given an opportunity to explain their views and provide suggestions. Two table sessions were held in order that meeting participants would have the opportunity to discuss multiple recovery support functions with the Committee and each other.

At the close of the session, representatives from each table summarized their group discussions for the rest of the attendees. These meaningful public comments helped set the groundwork for the Committee’s next round of reviewing strategies and project ideas.



*A small group discussion in progress. Residents viewed lists of assets and needs and opportunities that had been prepared by the Committee, and provided comments and clarification.*

### Event #3: Analysis and Categorization of Projects, Programs, and Actions

Goals for the third Public Engagement Event included:

- ▶ Promoting community understanding of the NYRCR Plan;
- ▶ Presenting the Committee’s list of projects and assessing community support for these projects; and
- ▶ Gathering feedback and detailed local knowledge about projects in order to inform project development.

This Public Engagement Event began with a brief overview presentation providing background about the NYRCR Program and process and briefly summarizing the projects that have risen to the top of the draft Yonkers NYRCR Plan. After the presentation, residents transitioned into an open-house format to visit posters detailing each project. Residents were given “passports”—packets of worksheets with



*Display boards characterized the six Recovery Support Functions used to categorize Yonkers’ needs and opportunities*

information, questions, and rating opportunities for each of the listed projects, as well as space for additional questions and feedback about the projects. Committee members and members of the Consultant Team answered questions and further explained the projects to residents.

#### **Event #4: Implementing the NYRCR Plan**

A fourth Public Engagement Event will be held in January 2015, after the final plan has been completed, to discuss implementation goals and initial plans with Yonkers residents and business owners. This meeting will include a presentation summarizing the final plan and a discussion around the implementation strategy and action plan. While this meeting will be after the official submittal of the NYRCR Plan, it will be an important opportunity for community members to discuss its benefits and the projects within it.



## D. Community Asset Inventory

Table V-3 Community Asset Inventory

| Asset Name  | Asset Class                    | Asset Subcategory                         | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|---|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| AARP Chapter 2028- Hudson Chapter   | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| AARP- St John's Episcopal Church  | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Abandoned NYCRR Bridge Over Saw Mill River Road Interchange                     | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Access R Stone PI Bridge Over Bronx River                                       | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Alexander Street Industrial Properties  | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| Amal's Day Care   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| American Sugar  | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 2                   | 27         |
| Ana's Group Daycare   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Annunciation School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bartholomew School  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bright Future Child Care Training   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bright Horizons at South Westchester Executive Park                             | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Broadway Manor  | Housing                        | Supportive Housing                        | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bronx River   | Natural and Cultural Resources | Water Bodies                              | No                              | No                | Medium          | Extreme   |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bronx River Parkway   | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 2                   | 24         |
| Bronx River Parkway Exit 10A Ramp Bridge over Bronx River                       | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Bronx River Parkway Interchange Bridge over Bronx River (3 locations)           | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Bronx River Parkway Interchange Bridge over Bronx River Parkway                 | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Bronx River Parkway Interchange Bridge over Grassy Sprain Brook                 | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | No                  | Yes                         | Yes                                  | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Bronx River Parkway Interchange Bridge over Sprain Brook Parkway (987F87011000) | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Bronx River Parkway Ramp E Bridge over Bronx River Parkway (987G87019000)       | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 3.5            | 1                   | 11         |
| Bronx River Road Community Center   | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory             | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|-------------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Bronxville Montessori School                                | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Brooklands Cooperative                                      | Housing                        | Multi-Family Residence        | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | Yes                         | Yes                                  | 3                         | 3            | 5              | 5                   | 75         |
| Bryn Mawr Children's Learning Center                        | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Bryn Mawr Presbyterian Church                               | Natural and Cultural Resources | Community Centers             | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Busy B's Family Day Care                                    | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Butler-Nursery School                                       | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| C M Child Care Services                                     | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Carol & Frank Biondi Education Center                       | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Casimir Pulaski Early Childhood Elementary                  | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Cedar Place School  | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Center for Continuing Education                             | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Centre St Homes   | Housing                        | Single-Family Residence       | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Charles S. Cola Community Center                            | Natural and Cultural Resources | Community Centers             | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Chema Center (Shelter)                                      | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Children's Village  | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Christ The King School (Rented to YPS - P.S. #16 Annex)     | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| City Harvest Christian Academy                              | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| City Harvest Preschool                                      | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Cola Community Center (Shelter)                             | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Commercial Properties - Ashburton Ave and Saw Mill River Rd | Economic                       | Small Business                | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| Con Edison Electric Substation - McLean Ave                 | Infrastructure Systems         | Power Supply                  | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Con Edison Electric Substation - Smart Ave                  | Infrastructure Systems         | Power Supply                  | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Consumers Union   | Economic                       | Large Business                | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Coyne Park Community Center (Shelter)                       | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Coyne Park Senior Center                                    | Natural and Cultural Resources | Community Centers             | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Cross Country Shopping Center                               | Economic                       | Employment Hub                | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Cross Hill Academy  | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Daycare Yonkers   | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Delaware Hudson Aqueduct Pump Station                       | Infrastructure Systems         | Water Supply                  | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Dodson School   | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory              | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|--------------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Doyle Park  | Natural and Cultural Resources | Parks and Recreation           | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| Dunwoodie Family Daycare, Ltd.                                  | Health and Social Services     | Daycare and Eldercare          | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Early Childhood - Sarah Lawrence College                        | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Early Childhood Elementary Center                               | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Early Einstein Childcare Center                                 | Health and Social Services     | Daycare and Eldercare          | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Early Einstein Learning Center, Inc.                            | Health and Social Services     | Daycare and Eldercare          | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| East 241st Street Bridge Over Bronx River Parkway Interchange   | Infrastructure Systems         | Transportation                 | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 5   | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 9   | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 13  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 16  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 17  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 21  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 22  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Elementary School 23  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 29  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elementary School 30  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Elm Street Bridge Over Saw Mill River                           | Infrastructure Systems         | Transportation                 | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Embur Golden Age Club   | Natural and Cultural Resources | Community Centers              | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Emergency Operations / 911 Communications / Mayor's Call Center | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Emerson Middle School (Shelter)                                 | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Empire City Casino at Yonkers Raceway                           | Economic                       | Tourism Destinations           | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Empress Emergency Medical Services                              | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Enrico Fermi School - Performing Arts (Shelter)                 | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Enrico Fermi School for the Performing Arts                     | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Eugene School   | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Eugenio Maria de Hostas Microsociety School                     | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Executive Blvd Bridge Over Saw Mill River                       | Infrastructure Systems         | Transportation                 | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Executive Boulevard Commercial Corridor                         | Economic                       | Employment Hub                 | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name   | Asset Class                    | Asset Subcategory                         | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|--|--------------------------------|---|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Eyes and Ears of the World Elementary School             | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Family School 32   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Ferncliff Manor  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Fessenden House  | Housing                        | Supportive Housing                        | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Foxfire School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Freddolino Memorial Playground                           | Natural and Cultural Resources | Parks and Recreation                      | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Friendly Faces Daycare Center                            | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Fun - N - Learn, Inc.                                    | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Garrett Park Apartments                                  | Housing                        | Multi-Family Residence                    | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Getty Square - Downtown District                         | Economic                       | Downtown Center                           | No                              | No                | Medium          | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Gorton High School                                       | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Gorton High School (Shelter)                             | Health and Social Services     | Emergency Operations/ Response            | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Graham Secondary School (Special Ed.)                    | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Graphite Metallizing Corp                                | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Grassy Sprain Brook                                      | Natural and Cultural Resources | Water Bodies                              | No                              | No                | Medium          | Extreme   |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Grassy Sprain Dam  | Infrastructure Systems         | Water Supply                              | No                              | Yes, FEMA         | Medium          | High      |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Grey Oaks Apartments                                     | Housing                        | Multi-Family Residence                    | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Greyston Bakery  | Economic                       | Employment Hub                            | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Greyston Family Inn Day Care                             | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Griffith Ave and Railroad Ave Homes                      | Housing                        | Single-Family Residence                   | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Harney Road Bridge Over Bronx River                      | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Hearst Street Bridge Over Saw Mill River                 | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 2                   | 27         |
| Henry Hertz Street Bridge Over Saw Mill River            | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Hudson Park Apartment Buildings                          | Housing                        | Multi-Family Residence                    | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Hudson River   | Natural and Cultural Resources | Water Bodies                              | No                              | No                | Medium          | Extreme   |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Hudson River Museum of Westchester                       | Natural and Cultural Resources | Historic Landmarks and Facilities         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Hudson River Waterfront                                  | Economic                       | Employment Hub                            | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Hudson Valley Bank                                       | Economic                       | Banks and Financial Services              | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Hudson View Christian Academy                            | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Industrial Buildings along Saw Mill River / Axminster St | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Industrial Buildings along Saw Mill River / Lake Ave     | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory                         | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|---|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Industrial Properties along Saw Mill River / Worth St           | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |
| Industrial Properties off Saw Mill River Rd                     | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |
| Industrial Properties off Saw Mill River Rd / Delaware Rd       | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Industrial Properties off Saw Mill River Rd / Old Nepperhan Ave | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| iPark Hudson  | Economic                       | Employment Hub                            | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| James Scott Memorial Park                                       | Natural and Cultural Resources | Parks and Recreation                      | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| JFK Marina and Park   | Natural and Cultural Resources | Parks and Recreation                      | No                              | No                | Low             | High      |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| JFK Memorial Dr Bridge Over Metro North Hudson Line             | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| John The Baptist School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Kahlil Gibran School  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Kawasaki Rail Car   | Economic                       | Employment Hub                            | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Kid & Play Day Care   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Kids Power  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Kimball Avenue Bridge Over Sprain Brook Parkway (987F87011003)  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Kimber Manufacturing  | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Krayola Kid LLC.  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Lake Avenue Bridge Over Saw Mill River                          | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Learning Made Fun Group Day                                     | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Lil Rascals Daycare   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Lincoln High School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Lincoln High School (Shelter)                                   | Health and Social Services     | Emergency Operations/ Response            | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Lincoln Park Community Day Care Center                          | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Linden Day Care   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Liss Child Care   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Little Dreamers Day   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Little Munchkins Day Care                                       | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Locust Hill   | Housing                        | Supportive Housing                        | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Longvale Neighborhood   | Housing                        | Single-Family Residence                   | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | Yes                         | Yes                                  | 3                         | 3            | 5              | 4                   | 60         |
| Ludlow Street Bridge Over Metro North Hudson Line               | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Mark Twain Middle School  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                | Asset Subcategory  | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|----------------------------|--------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Martin Luther King Elementary School                          | Health and Social Services | Schools            | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| McLean Avenue Bridge over Saw Mill Parkway                    | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Metro North Harlem Line                                       | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Metro North Harlem Line and Mt Vernon Station                 | Infrastructure Systems     | Transportation     | No                              | No                | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Metro North Harlem Line and Wakefield Station                 | Infrastructure Systems     | Transportation     | No                              | No                | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Metro North Hudson Line and Glenwood Station                  | Infrastructure Systems     | Transportation     | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Metro North Hudson Line and Greystone Station                 | Infrastructure Systems     | Transportation     | No                              | No                | High            | Extreme   | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 3.5            | 1                   | 11         |
| Metro North Hudson Line and Ludlow Station                    | Infrastructure Systems     | Transportation     | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Metro North Hudson Line and Yonkers Station                   | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Metro North Hudson Line Bridge Over Ashburton Ave             | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| Metro North Hudson Line Bridge Over Dock Street               | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Metro North Hudson Line Bridge Over Main Street               | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Metro North Hudson Line Bridge Over Wells Ave                 | Infrastructure Systems     | Transportation     | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| MHACY - Andrew Smith Townhouses                               | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Angelo R. Martinelli Manor                            | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | Yes                         | Yes                                  | 3                         | 3            | 5              | 1                   | 15         |
| MHACY - Charles L. Curran Court                               | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Cottage Place Gardens                                 | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Croton Heights Apartments                             | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Dr. James F. X. O'Rourke Townhouses (Shoreview Drive) | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Dr. James F. X. O'Rourke Townhouses (Beaumont Circle) | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| MHACY - Francis Reagan Townhouses                             | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - James E. Hall Homes                                   | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - John E. Flynn Manor                                   | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Joseph F. Loehr Court                                 | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Judge Albert Fiorillo Townhouses                      | Housing                    | Affordable Housing | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name   | Asset Class                    | Asset Subcategory              | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|--|--------------------------------|--------------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| MHACY - Judge Arthur J. Doran Sr. Townhouses                     | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Kris Kristensen Homes                                    | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Lawrence Christopher Townhouses                          | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Msgr. Cajetan J. Troy Manor                              | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Raleigh Valentine Townhouses                             | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Ross F. Calcagno Homes                                   | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - William. A. Walsh Homes                                  | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| MHACY - Wm. A Schlobohm Houses                                   | Housing                        | Affordable Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Midland Avenue Bridge over Saw Mill River Parkway (987F87011000) | Infrastructure Systems         | Transportation                 | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | No                                   | 2                         | 3            | 4              | 1                   | 12         |
| Montessori Elementary School 11                                  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Montessori Elementary School 27                                  | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Montessori School 31   | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Mt Carmel St Anthony School                                      | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Museum Elementary School   | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| My Children's Day Care   | Health and Social Services     | Daycare and Eldercare          | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| My Sister's Place  | Housing                        | Supportive Housing             | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Nepperhan Ave Commercial Corridor                                | Economic                       | Employment Hub                 | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Nepperhan Community Center (Shelter)                             | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| New Little Branches Day Care/ Lanza Learning Center              | Health and Social Services     | Daycare and Eldercare          | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| New School Street Bridge Over Saw Mill River                     | Infrastructure Systems         | Transportation                 | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| News 12  | Infrastructure Systems         | Telecommunications             | No                              | No                | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Nodine Hill Community Center (Shelter)                           | Health and Social Services     | Emergency Operations/ Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| North Yonkers Pumping Station (County-Owned)                     | Infrastructure Systems         | Water Supply                   | No                              | Yes, FEMA         | High            | Extreme   | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Northeast Jewish Center  | Natural and Cultural Resources | Community Centers              | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| NYSDOT PKWY Maintenance - Odell Ave                              | Health and Social Services     | Public Works Facilities        | No                              | Yes, FEMA         | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | No                                   | 1.5                       | 3            | 3.5            | 1                   | 11         |
| NYSDOT PKWY Maintenance - Sprain Brook                           | Health and Social Services     | Public Works Facilities        | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Oak Street Bridge Over Bronx River                               | Infrastructure Systems         | Transportation                 | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Oakview Prep School of SDA                                       | Health and Social Services     | Schools                        | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory                         | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|---|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Odell Avenue / Nepperhan Avenue Businesses  | Economic                       | Large Business                            | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Odell Avenue Bridge Over Saw Mill River   | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 2                   | 24         |
| Odell Avenue Bridge Over Saw Mill River Parkway (987D87011041)                            | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 2                   | 24         |
| Offices and Restaurant - Grey Oaks Ave  | Economic                       | Large Business                            | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Old Nepperhan Ave Bridge Over Saw Mill River  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Orchard School - Andrus Child Home  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Our Lady of Fatima Church   | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Our Lady of Fatima School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| P A Dichiario Early Childhood Elementary School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Paideia School 15   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Paideia School 24   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Palisade Gardens  | Housing                        | Senior Housing                            | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Palisade Preparatory School   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Palmer Avenue Bridge Over Bronx River Parkway Interchange                                 | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Palmer Road Bridge Over Bronx River   | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Palmer Road Bridge Over Sprain Brook Parkway  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Parcels H and I (Future Development along Hudson River between Vark and Prospect Streets) | Housing                        | Multi-Family Residence                    | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Parkledge Apartments  | Housing                        | Senior Housing                            | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pearls Hawthorne Elementary School  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pedestrian Aqueduct Bridge Over Nepperhan Ave   | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pedestrian Bridge Over Bronx River  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Pennsylvania Ave Bridge Over Troublesome Brook  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2              | 1                   | 8          |
| Peter Chema Seniors- Community Center   | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pneuma Child Care & Play  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pompeian Manufacturing Co.  | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Pondfield Road W. Bridge Over Bronx River   | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory             | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|-------------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Pondfield Road W. Bridge Over Bronx River Parkway Interchange | Infrastructure Systems         | Transportation                | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Private Boat Storage on Hudson, adjacent to JFK Marina        | Natural and Cultural Resources | Parks and Recreation          | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Professional Day Care Center                                  | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Professional Family Day Care                                  | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Proposed Alexander Street Redevelopment                       | Economic                       | Employment Hub                | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 5                   | 53         |
| Proposed Longfellow School Development                        | Housing                        | Affordable Housing            | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Queens Daughters Day Nursery                                  | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Renee Burke Manor Senior Citizens Club                        | Natural and Cultural Resources | Community Centers             | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Richmond Children Center                                      | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Richmond Community Services                                   | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Richter Park  | Natural and Cultural Resources | Parks and Recreation          | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| Ridge Hill  | Economic                       | Employment Hub                | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Righteous Kidz Camp   | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Riverside High School   | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Rivertown Preschool Program                                   | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Riverview Towers  | Housing                        | Senior Housing                | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Roosevelt High School - Early College Studies                 | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Roosevelt High School (Shelter)                               | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Rosemarie Ann Siragusa School                                 | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Runyon Heights Civic Association                              | Housing                        | Senior Housing                | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sacred Heart Elementary School                                | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sacred Heart High School                                      | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sacred Heart Senior Apartments                                | Housing                        | Senior Housing                | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sans Souci  | Health and Social Services     | Daycare and Eldercare         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sarah Lawrence Center for the Urban River at Beczak           | Natural and Cultural Resources | Parks and Recreation          | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sarah Lawrence College  | Health and Social Services     | Higher Education Institutions | No                              | No                | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Saunders Tr. & Tech. High School                              | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Saunders Trades And Technical High School (Shelter)           | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Saw Mill River  | Natural and Cultural Resources | Water Bodies                  | No                              | No                | Medium          | High      |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Saw Mill River Parkway  | Infrastructure Systems         | Transportation                | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name   | Asset Class                    | Asset Subcategory       | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|--|--------------------------------|-------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Saw Mill River Parkway Bridge over Saw Mill River (987D87011036)   | Infrastructure Systems         | Transportation          | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Saw Mill River Parkway Interchange Bridge over Saw Mill River (near wastewater treatment facility on Nepperhan Avenue) | Infrastructure Systems         | Transportation          | No                              | No                | High            | Extreme   | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 3              | 1                   | 9          |
| Saw Mill River Parkway Interchange Bridge over Saw Mill River (near Walgreens on Nepperhan Avenue)                     | Infrastructure Systems         | Transportation          | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Saw Mill River Road Interchange Bridge over Saw Mill River (at Ashburton Avenue)                                       | Infrastructure Systems         | Transportation          | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | Yes                         | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Scarsdale Road Bridge Over Bronx River   | Infrastructure Systems         | Transportation          | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Scholastic Academy For Academic Excellence Elementary School   | Health and Social Services     | Schools                 | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| School bus and car storage - Alexander Ave   | Economic                       | Large Business          | No                              | No                | Low             | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Science Barge  | Natural and Cultural Resources | Parks and Recreation    | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Scrimshaw House  | Housing                        | Multi-Family Residence  | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 5                   | 45         |
| Shepherd's Flock   | Housing                        | Supportive Housing      | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sherwood Avenue Bridge Over Bronx River Parkway Interchange  | Infrastructure Systems         | Transportation          | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Single Family Homes - Clunie Ave and Nepperhan Ave   | Housing                        | Single-Family Residence | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 3                   | 41         |
| Single Family Homes - Nepperhan Ave and Executive Boulevard  | Housing                        | Single-Family Residence | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 3                   | 36         |
| Single Family Homes - Nepperhan Ave between Executive Boulevard and Odell Ave  | Housing                        | Single-Family Residence | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 3                   | 36         |
| Single-Family Homes - Scarsdale Rd south end   | Housing                        | Single-Family Residence | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 3.5            | 2                   | 21         |
| Single-Family Homes along Scarsdale Rd and Brookdale Dr  | Housing                        | Single-Family Residence | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Single-Family Homes along Scarsdale Rd from Maria to Alta Vista  | Housing                        | Single-Family Residence | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |
| Single-Family Homes around Freddolino Park   | Housing                        | Single-Family Residence | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Small World Nursery Pre-K  | Health and Social Services     | Daycare and Eldercare   | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Smith Loving Care  | Health and Social Services     | Daycare and Eldercare   | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sprain Brook Parkway   | Infrastructure Systems         | Transportation          | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 4.5            | 2                   | 27         |
| St Ann School  | Health and Social Services     | Schools                 | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Anthony School  | Health and Social Services     | Schools                 | Yes                             | Yes, FEMA         | Medium          | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory      | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| St Barnabas Elementary & High Schools                   | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Casimir Apartments                                   | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Casimir Avenue Apartments                            | Housing                        | Multi-Family Residence | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |
| St Casimir School                                       | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Denis School   | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Eugene's Church                                      | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St John the Baptist Seniors                             | Natural and Cultural Resources | Community Centers      | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St John's Riverside Hospital                            | Health and Social Services     | Healthcare Facilities  | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Joseph's Geriatric Day Care                          | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Joseph's Hospital Home/Aging                         | Housing                        | Senior Housing         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Joseph's Medical Center                              | Health and Social Services     | Healthcare Facilities  | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Mark Lutheran School                                 | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Mark's Episcopal Church                              | Natural and Cultural Resources | Community Centers      | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 4.5            | 1                   | 14         |
| St Mary School (Rented to YPS - Thomas Cornell Academy) | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Michael's Home                                       | Housing                        | Senior Housing         | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Paul The Apostle                                     | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| St Peter School   | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sunnybrook Apartments                                   | Housing                        | Multi-Family Residence | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | No                          | Yes                                  | 2.5                       | 3            | 4.5            | 3                   | 41         |
| Sunnyside Daycare                                       | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Sunrise of Crestwood                                    | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Tabernacle Faith Christian Academy                      | Health and Social Services     | Schools                | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Tender Learning Family Day Care                         | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| The Children's Club Day Care                            | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| The Children's Playhouse Preschool                      | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| The Greystone   | Housing                        | Multi-Family Residence | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| The Hollows   | Housing                        | Affordable Housing     | Yes                             | Yes, FEMA         | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| The Olde Stone Mill (along Bronx River)                 | Economic                       | Restaurants            | No                              | No                | Low             | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| The Sharing Community                                   | Housing                        | Supportive Housing     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Tibbetts Brook County Park                              | Natural and Cultural Resources | Parks and Recreation   | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| Tiny Tots Group Day Care                                | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| TLC Daycare of Yonkers                                  | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Torre Place Bridge Over Saw Mill River                  | Infrastructure Systems         | Transportation         | No                              | No                | High            | High      | Yes   | No                  | No                          | No                                   | No                          | Yes                                  | 1                         | 3            | 2              | 1                   | 6          |
| Tots On Hudson View                                     | Health and Social Services     | Daycare and Eldercare  | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Travers House   | Housing                        | Supportive Housing     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Trinity Senior Apartments                               | Housing                        | Senior Housing         | Yes                             | Yes, FEMA         | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory                         | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|---|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Tuckahoe Childcare & Preschool  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Tuckahoe Road Bridge Over Bronx River Parkway Interchange                 | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Two- and Three- Family Homes - between Harrison Ave and Tibbetts Rd       | Housing                        | Multi-Family Residence                    | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Tyco Plastics   | Economic                       | Industrial, Warehousing and Manufacturing | No                              | No                | Medium          | High      | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 2.5            | 1                   | 8          |
| Van Der Donck Park - Daylighted Saw Mill River                            | Natural and Cultural Resources | Parks and Recreation                      | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 1                   | 9          |
| Vanctla Head Start Program  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| VFW - Rauso Post  | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Watch Me Grow Learning Center   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Westchester Ambulette Services  | Health and Social Services     | Emergency Operations/ Response            | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Westchester Center for Independent & Assisted Living                      | Housing                        | Senior Housing                            | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Westchester County DPW Sewer Office Building                              | Health and Social Services     | Government and Administrative Services    | No                              | No                | High            | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Westchester Fleet Services  | Infrastructure Systems         | Transportation                            | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 2                   | 18         |
| Westchester School For Special Children                                   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Westhab New Windham Residence   | Housing                        | Supportive Housing                        | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| White House Day Care  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Whitney Young Head Start Center   | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Whitney Young Manor   | Housing                        | Multi-Family Residence                    | No                              | No                | High            | High      | Yes   | Yes                 | Yes                         | No                                   | Yes                         | Yes                                  | 2.5                       | 3            | 3.5            | 1                   | 11         |
| William A. Walsh Golden Age Club  | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Moderate  |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Winchester Apartments   | Housing                        | Multi-Family Residence                    | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | Yes                                  | Yes                         | Yes                                  | 3                         | 3            | 5              | 1                   | 15         |
| Winchester Village  | Housing                        | Single-Family Residence                   | No                              | No                | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Wonder Years Family Day Care  | Health and Social Services     | Daycare and Eldercare                     | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yeshiva Day School of Lincoln Park  | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Avenue Bridge Over Bronx River Parkway Interchange (984E87011025) | Infrastructure Systems         | Transportation                            | No                              | No                | High            | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 1                   | 12         |
| Yonkers Christian Academy   | Health and Social Services     | Schools                                   | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers City Hall   | Health and Social Services     | Government and Administrative Services    | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Community Action Program  | Natural and Cultural Resources | Community Centers                         | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Bronxville Road                                 | Health and Social Services     | Emergency Operations/ Response            | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Central Park Avenue                             | Health and Social Services     | Emergency Operations/ Response            | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |

**Table V-3 (cont'd) Community Asset Inventory**

| Asset Name  | Asset Class                    | Asset Subcategory             | Socially Vulnerable Populations | Critical Facility | Community Value | Risk Area | Lack of Defensive Flood Protection Measures | Elevation Below BFE | Occupied <= 2 ft. above BFE | At Confluence of Two or More Streams | Flood Risk from Storm Water | Lack of Vegetated Stream Bank Buffer | Landscape Attribute Score | Hazard Score | Exposure Score | Vulnerability Score | Risk Score |
|---|--------------------------------|-------------------------------|---------------------------------|-------------------|-----------------|-----------|---|---------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|--------------|----------------|---------------------|------------|
| Yonkers Fire Department – Central Park Ave-Roxbury Dr | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Fortfield Avenue            | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Kimball Avenue              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – New School Street           | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Oak Street                  | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Radford Street              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Saw Mill River Road         | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Shonnard Place              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Vark Street                 | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Fire Department – Warburton Avenue            | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Gospel Mission                                | Housing                        | Supportive Housing            | Yes                             | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Middle/High School                            | Health and Social Services     | Schools                       | Yes                             | Yes, FEMA         | Medium          | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Middle/High School (Shelter)                  | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Paddling and Rowing Club                      | Natural and Cultural Resources | Parks and Recreation          | No                              | No                | Low             | Extreme   | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 4              | 4                   | 48         |
| Yonkers PAL (Shelter)                                 | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Police Department - 1st Precinct              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Police Department - 2nd Precinct              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Police Department - 3rd Precinct              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Police Department - 4th Precinct              | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Police Department Headquarters                | Health and Social Services     | Emergency Operations/Response | No                              | Yes, FEMA         | High            | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Public Library - Crestwood Branch             | Natural and Cultural Resources | Libraries                     | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Public Library - Grinton I. Will Branch       | Natural and Cultural Resources | Libraries                     | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Public Library - Riverfront Branch            | Natural and Cultural Resources | Libraries                     | No                              | No                | Low             | High      | Yes   | Yes                 | Yes                         | No                                   | No                          | Yes                                  | 2                         | 3            | 3              | 3                   | 27         |
| Yonkers Recreation Department                         | Natural and Cultural Resources | Community Centers             | No                              | No                | Low             | Low       |   |                     |                             |                                      |                             |                                      |                           |              |                |                     |            |
| Yonkers Recreation Pier                               | Natural and Cultural Resources | Parks and Recreation          | No                              | No                | Low             | Extreme   | Yes   | No                  | Yes                         | No                                   | No                          | Yes                                  | 1.5                       | 3            | 3.5            | 1                   | 11         |



## **Figures V-1 through V-6 Landscape Attribute Determination Worksheet Completed Example**

These figures illustrate the analysis used to determine landscape attributes (shown above in Table V-3) using a completed sample worksheet for the Yonkers Wastewater Treatment Plant.

## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Defensive Flood Protection Measures

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

- Determination:**
- Defensive flood protection measures are absent, below BFE, in poor condition, or lack maintenance commitment (YES)
  - Defensive flood protection measures are present, above BFE, in good condition, and have maintenance commitment (NO)

- Determination methodology:**
- 1) Use aerial or site imagery to observe presence, condition, and height of flood protection measures between the asset and flood source. Compare structure height to base flood elevation (BFE) levels from FEMA Flood Hazard Area maps. Determine base ground elevation using elevation maps.
  - 2) If conclusive evidence of flood protection measures is not available, assume YES, flood protection measures are absent.

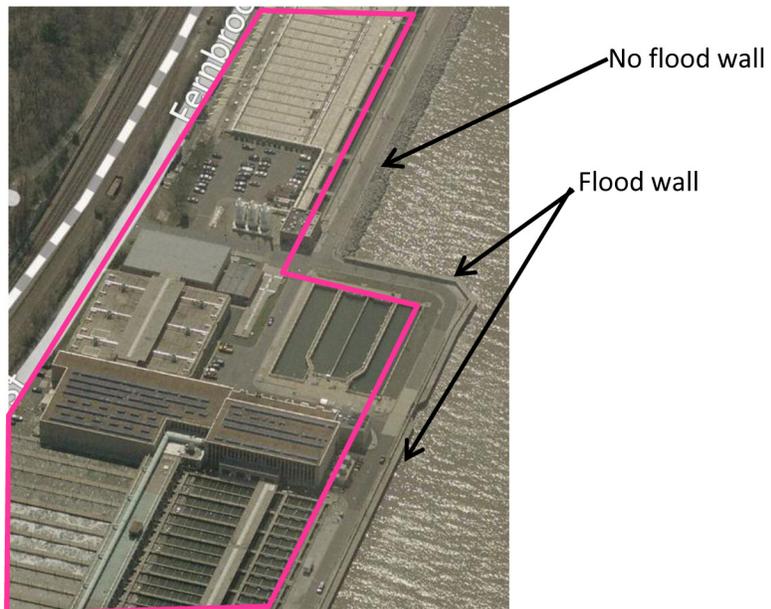
**Justification:** The asset is built on a strip of land on the Hudson River. There appears to be a concrete wall along the perimeter of a portion of the asset. However, the wall appears to be discontinuous and thus does not provide flood protection to the entire asset.

**Data gaps/questions:** None.

**Aerial photograph:**

**Legend**  
 Asset

**Source Citation:**  
Bing Maps Bird's Eye  
© 2014 Microsoft  
Pictometry Bird's Eye



## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Elevation

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

**Determination:**  Elevation of the asset site is below BFE. (YES)  
 Elevation of the asset site is above BFE. (NO)

**Determination methodology:**

- 1) Refer to the appropriate FEMA Flood Hazard Area map to determine preliminary Base Flood Elevation (BFE) for the asset area. Compare to the elevation map of the area to determine base ground elevation of the asset. Compare this value to the BFE.
- 2) If appropriate FEMA maps for the asset area do not list a BFE, assume that assets in the 100-year flood zone are below BFE (YES), and that assets within the 500-year flood zone or outside mapped flood zones are above BFE (NO).
- 3) If appropriate FEMA maps are not published for the asset area, assume that asset is above BFE (NO) - maps are not published due to absence of flood zones.

**Justification:** The asset elevation is 5.22 feet (NAVD88). The BFE is 7 feet (NAVD88). The asset is below the BFE.

**Data gaps/questions:** None.

**Aerial photograph:**

**Legend**

 Asset

**Source Citation:**

LiDAR elevations from  
 Westchester.gov  
<http://giswww.westchestergo.com/wcgis/Lidar.htm>



## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Freeboard

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

- Determination:**
- Elevation of the habitable or occupied portion of the asset is less than two (2) feet above BFE. (YES)
  - Elevation of the habitable or occupied portion of the asset is more than two (2) feet above BFE. (NO)

**Determination methodology:**

- 1) Refer to the appropriate FEMA Flood Hazard Area map to determine Base Flood Elevation (BFE) for the asset area. Compare to the elevation map of the area to determine base ground elevation of the asset. If the ground elevation in the asset location is more than two feet above the BFE, answer NO. If the ground elevation is less than two feet above the BFE or is below the BFE, answer YES.
  
- 2) If BFE or ground elevation is not available, assume that assets within 100- or 500-year flood zones are less than 2 feet above BFE (YES). Assume that assets outside of flood zones are more than 2 feet above BFE (NO).

**Justification:** The asset elevation is 5.22 feet (NAVD88). The BFE is 7 feet (NAVD88). The asset is less than two feet above the BFE.

**Data gaps/questions:** None.

**Aerial photograph:**

Legend

 Asset

**Source Citation:**

LiDAR elevations from  
Westchester.gov  
<http://giswww.westchestergov.com/wcgis/Lidar.htm>



## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Point of Confluence

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

- Determination:**
- Asset is located within area subject to increased flood risk due to confluence of merging streams (YES)
  - Asset is not located within area subject to increased flood risk due to confluence of merging streams (NO)

- Determination methodology:**
- 1) Locate the asset on the National Hydrography Dataset map. Determine whether there are points of confluence of streams, rivers, or other waterbodies within 1000 feet of the asset and without significant topographic barriers between the stream and the asset. If so, answer YES. If points of confluence are more than 1000 feet from the asset or if significant barriers exist between the asset and the point of confluence, answer NO.
  - 2) If mapping data is unavailable, assume YES, that asset is subject to increased flood risk due to confluence of merging streams.

**Justification:** There are no points of confluence near the asset, therefore it is not subject to increased flood risk due to merging streams.

**Data gaps/questions:** None.

**Aerial photograph:**

**Legend**  
 Asset

**Source Citation:**  
 National Hydrography Dataset  
<http://nhd.usgs.gov>

LiDAR elevations from  
 Westchester.gov

<http://giswww.westchestergov.com/wcgis/Lidar.htm>



GIS  
 Yonkers Wastewater Treatment Facility

IFE ft: 7

## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Stormwater Discharge

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

- Determination:**
- Asset is located within area subject to increased flood risk due to storm water system discharge (YES)
  - Asset is not located within area subject to increased flood risk due to storm water system discharge (NO)

- Determination methodology:**
- 1) Compare historic aerial imagery of the asset location (using Google Earth or equivalent). If the area up-grade from the asset location has developed significantly within the timeframe of available imagery or if there is a known point of stormwater discharge in the area, answer YES. Note years of available images in justification area below. If land use in asset area is unchanged, answer NO.
  - 2) If historical imagery is unavailable or inconclusive and asset is within a sewered area, assume YES, that asset is subject to increased flood risk from storm water discharge.
  - 3) If no information is available, assume YES, that asset is subject to increased flood risk from storm water discharge.

**Justification:** The aerial images from 1995 and 2010 show no significant difference in land development. Therefore, it is assumed that there is no increased flood risk to the asset from storm water discharge.

**Data gaps/questions:** None.

**Aerial photograph:**

**Legend**  
 Asset



**Source Citation:**  
 1995 Imagery  
 Imagery date 3/12/1995  
 U.S. Geological Survey

2010 Imagery  
 Imagery Date 6/17/2010  
 © 2014 Google

## Riverine Landscape Attribute Determination Worksheet

**Attribute:** Vegetated Streambank Buffers

**Asset:** YONKERS WASTEWATER TREATMENT FACILITY

**Asset ID:** YCRA259

- Determination:**
- Asset is within floodway fringe of stream and without adequate vegetated buffers to absorb or divert flood waters (YES)
  - Asset is not within floodway fringe of stream and has adequate vegetated buffers to absorb or divert flood waters (NO)

- Determination methodology:**
- 1) Identify asset location on FEMA flood hazard area map. If located in 100- or 500-year flood zone, asset is within flood fringe. If asset is not within flood fringe, answer NO. If within flood fringe, continue to step 2.
  - 2) Locate the asset on USGS National Land Cover Database map. Determine whether there are vegetated buffers between the asset and the flood source. Alternatively, use aerial or site imagery to determine presence or absence of vegetated buffers.
  - 3) If mapping data or imagery are unavailable, assume YES, that asset lacks adequate vegetated buffers.

**Justification:** The asset is located on the Hudson River. There are no vegetated streambank buffers.

**Data gaps/questions:** None.

**Aerial photograph:**



**Legend**  
 Asset

**Source Citation:**  
 Google Earth  
 Imagery Date: 6/17/2010  
 © 2014 Google

## E. End Notes

### End Notes

1. 2012 American Community Survey. U.S. Census Bureau, 2014. Accessed August 15, 2014. <<http://www.census.gov/acs/>>
2. Yonkers City Engineer.
3. Bultman, M. "One Year Later, Yonkers Still Recovering from Hurricane Irene." *Yonkers Daily Voice*, 27 August 2012. Web. Accessed August 18, 2014.
4. Supportive housing is defined as a package of housing and services intended to benefit individuals who have been confronted with homelessness, addiction, mental health issues, and other challenges.
5. North American Vertical Datum 1988.
6. Delta Development Group, Inc. and Barton & Loguidice, P.C. *Draft City of Yonkers Multi-Hazard Mitigation Plan 2013*. City of Yonkers, 2013.
7. *Stormwater Reconnaissance Plan for the Saw Mill River—Pocantico River Watershed, Westchester County, New York*. Westchester County Department of Planning and Westchester County Department of Public Works and Transportation, December 2012.
8. Center for Watershed Protection, Inc. and Biohabitats, Inc. *Bronx River Watershed Management Plan (Volume 1): Bronx River Watershed Assessment and Management Report, Westchester County, New York*. October 2007.
9. "Recovery Support Functions." Federal Emergency Management Agency, July 24, 2014. Accessed Oct 22, 2014. <<http://www.fema.gov/recovery-support-functions>>.
10. A 6537-B was introduced in the NYS Assembly (sponsor-Mayer) to establish a flood mitigation and prevention task force based within the NYS Department of Environmental Conservation (NYS DEC).
11. Full-time equivalent (FTE) estimates for job creation for each project are based upon total estimated project labor divided by \$100,000/year annual FTE salary (assumed average between engineering [\$56 per hour] and construction [\$40 per hour] labor force in Yonkers, NY).
12. Case study conducted by Sky Solar Technology.
13. Full-time equivalent (FTE) estimates for job creation for each project are based upon total estimated project labor divided by \$100,000/year annual FTE salary (assumed average between engineering [\$56 per hour] and construction [\$40 per hour] labor force in Yonkers, NY).
14. Estimate provided by Yonkers Paddling and Rowing Club.
15. Full-time equivalent (FTE) estimates for job creation for each project are based upon total estimated project labor divided by \$100,000/year annual FTE salary (assumed average between engineering [\$56 per hour] and construction [\$40 per hour] labor force in Yonkers, NY).
16. The detailed study was commissioned by the Town of Greenburgh. It was performed by Dolph Rotfeld Engineering and is dated September 17, 1985. The study is currently being updated by Rotfeld for the Town of Greenburgh.

### Photo Credits

All photographs and illustrations provided by the Consultant Team unless otherwise noted.

#### Cover Page

The Hudson River at Getty Square, Yonkers' Downtown Waterfront

#### Dividers

##### Section I

The Hudson River at Getty Square, Yonkers' Downtown Waterfront

Public Engagement Event 2

Yonkers Paddling and Rowing Club Seawall (John Magiotto)

Yonkers City Hall

##### Section II

Hudson River Museum

Public Engagement Event 2

Saw Mill River at Van Der Donck Park

The Historic Yonkers Pier on the Hudson River Waterfront

### Section III

Bronx River running behind Scout Field  
 Seawall at Yonkers Paddling and Rowing Club (John Maggiotto)  
 Public Engagement Event 2  
 JFK Park Overlooking the Hudson River

### Section IV

Brooklands Apartments  
 A Yonkers Resident Show Her Support for Unity at Yonkers Riverfest  
 A Child's Drawing Illustrates Her Recollection of Hurricane Sandy  
 Saw Mill River running under Hearst Street

### Section V

NY Rising Booth at Hudson Riverfest  
 Deteriorating Seawall at the Yonkers Paddling and Rowing Club (John Maggiotto)  
 Water Pooling on Residential Street  
 John Maggiotto at Public Engagement Event 1  
 Jim Walkup and Leon Nanton at Public Engagement Event 1  
 Jim Walkup at Public Engagement Event 1  
 Tom Ryan at Public Engagement Event 1  
 Jim Walkup's Vision for Yonkers at Public Engagement Event 1  
 Symra Brandon and Stephen Force at Public Engagement Event 1

## Methodology and Other Technical Notes

### Risk Mitigation Analysis

The risk mitigation analysis evaluates the extent to which Proposed and Featured Projects will mitigate storm damage and flooding risk to specific community assets when the project is in place. The risk mitigation analysis is different from the risk assessment process, described in Section II. The risk assessment evaluated existing storm and flood risks to community assets as they stand today, whereas risk mitigation analysis evaluates the reduced risk that would result from putting a specific project in place.

To determine how the level of risk to assets would be affected by potential projects developed by the Planning Committee, the risk assessment tool, discussed in Section II, was re-run for projects that are intended to reduce the risk of flood damage to assets and which have a sufficiently defined scope. Proposed Projects and Featured Projects were analyzed and "mitigated" risk scores were calculated for assets and asset groups that would be affected by each project.

The mitigated risk evaluation was completed by making assumptions regarding the changes in exposure and/or vulnerability of assets as a result of a project and altering these factors to reflect the project's effects.

It should be noted that some of the Proposed and Featured Projects are studies and programs, and while these may ultimately result in a reduced risk of flooding for assets, they lack the detailed design needed to run the risk mitigation model. Consequently, the risk reduction analyses for those projects will be conducted subsequent to the identification of recommended actions and implementation measures that will emerge from these studies. In addition, some projects reduce the risk to citizens or enable the continuity of operations within the community. These projects, though valuable, do not reduce risk as defined within the NYRCR risk assessment tool.

The risk mitigation analysis process uses a limited number of variables and ranges to alter the risk score: landscape attributes, risk area, and vulnerability score. These variables are changed as appropriate in the risk assessment tool for the assets that are presumed to be affected by each project. These changes result in quantitative risk score reductions for applicable projects, which may result in a shift in risk score category for some assets.

For example, the Resilient Waterfront Revitalization project proposes to combine green infrastructure improvements with resilient construction technology in the redevelopment plan for Alexander Street. The use of resilient construction methods and materials improves the ability of redeveloped assets to

withstand storm damage and to continue to function during storm events. This results in a one point reduction in vulnerability score for assets in the Alexander Street redevelopment area. Additionally, implementation of green infrastructure improvements alleviates the additional risk of flooding due to stormwater. This results in a change in the stormwater discharge landscape attribute for applicable assets, which contributes to 0.5 point reduction in exposure score for the assets. The improvements in vulnerability and exposure associated with this project combine to result in 17 point reduction in risk score for the identified assets in the Alexander Street redevelopment area.

The results of the risk reduction analysis demonstrate a reduction in the risk scores for particular assets based on a number of assumptions made regarding exposure, vulnerability, and other factors. However, it should be noted that these analyses are not based on detailed engineering and will require further evaluation as projects are developed in greater detail.

### Cost-Benefit Evaluation

The cost-benefit evaluation seeks to compare the costs and benefits of each project to assess whether the project has benefits that are commensurate with or greater than the cost components of the project. This comparison is used in concert with evaluations of project feasibility, public support, environmental and social impact, and funding eligibility to inform the Committee's decision-making regarding the projects.

Cost-benefit evaluation involves data gathering and analysis, requiring detailed information on the project, its associated costs, and its community-wide benefits and effects. Given the very conceptual extent of engineering design for most of the projects proposed in this Plan, a detailed cost-benefit analysis is neither possible nor useful. However, general assessment of project effectiveness following the broad process of cost-benefit evaluation is still useful in understanding projects. The level of detail available from the cost-benefit evaluation is proportional to the level of detail available from project plans. (It is also useful to note

that many proposed actions involve the preparation of feasibility studies and performance evaluations, and are not capital improvements that are subject to detailed cost-benefit evaluation.)

The collected data was first used to inform a preliminary opinion regarding project costs. Costs considered for projects include both direct costs and external costs. Direct costs include the capital costs required for project construction. External costs are any economic costs that may result from a project, such as lost revenue from businesses affected by a road closure.

Direct and external cost information was compiled from existing project documentation, available data, Committee knowledge of projects, and professional opinions regarding project cost.

Projects were also evaluated for a variety of benefits. Risk reduction benefits were determined as outlined in the Risk Mitigation Analysis section above. Co-benefits that may result from projects, including economic, environmental, or health and social improvements, were also evaluated.

The potential project benefits in each of the categories above (risk reduction, economic, environmental, and health and social benefits) were assessed with a methodology similar to that used to estimate costs. Project locations and affected areas were referenced against available datasets to understand the demographic, economic, and environmental characteristics of the area(s) benefitting from project implementation. Analysis was augmented by local knowledge of neighborhoods, businesses, and projects.

Full-time equivalent (FTE) estimates for job creation for each project are based upon total estimated project labor divided by \$100,000/year annual FTE salary (assumed average between engineering [\$56 per hour] and construction [\$40 per hour] labor force in Yonkers, NY).

## F. Glossary

|                |   |
|----------------|---|
| <b>CDBG-DR</b> | Community Development Block Grant—Disaster Recovery                                       |
| <b>CEA</b>     | Critical Environmental Area   |
| <b>CIRIS</b>   | Critical Infrastructure Response Information System                                       |
| <b>CSO</b>     | Combined Sewer Overflow   |
| <b>DPW</b>     | City of Yonkers Department of Public Works  |
| <b>EOC</b>     | City of Yonkers Emergency Operations Center   |
| <b>FEMA</b>    | Federal Emergency Management Agency   |
| <b>FTE</b>     | Full-Time Equivalent  |
| <b>GIS</b>     | Geographic Information Systems  |
| <b>HMGP</b>    | Hazard Mitigation Grant Program   |
| <b>IDA</b>     | Yonkers Industrial Development Agency   |
| <b>LED</b>     | Light-Emitting Diode  |
| <b>LEED</b>    | Leadership in Energy and Environmental Design<br>(a rating system for green construction) |
| <b>LWRP</b>    | Local Waterfront Revitalization Plan  |
| <b>MHACY</b>   | Municipal Housing Authority for the City of Yonkers                                       |
| <b>MTA</b>     | Metropolitan Transportation Authority   |
| <b>NFIP</b>    | National Flood Insurance Program  |
| <b>NYPA</b>    | New York Power Authority  |
| <b>NYRCR</b>   | NY Rising Community Reconstruction  |
| <b>NYS</b>     | New York State  |
| <b>NYS DEC</b> | New York State Department of Environmental Conservation                                   |

|                |   |
|----------------|---|
| <b>NYS DOS</b> | New York State Department of State          |
| <b>NYS DOT</b> | New York State Department of Transportation |
| <b>OEM</b>     | Yonkers Office of Emergency Management      |
| <b>RSF</b>     | Recovery Support Function                   |
| <b>SAV</b>     | Submerged Aquatic Vegetation                |
| <b>USACE</b>   | U.S. Army Corps of Engineers                |
| <b>WWTP</b>    | Yonkers Wastewater Treatment Plant          |