NY Rising Community Reconstruction Plan for the

TOWNS AND VILLAGES OF ESPERANCE, SCHOHARIE, AND MIDDLEBURGH

Prepared for the
NY Rising Community Reconstruction Program

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This document was developed by the NYRCR Towns and Villages of Esperance, Schoharie, and Middleburgh Planning Committee as part of the New York Rising Community Reconstruction (NYRCR) Program within the Governor's Office of Storm Recovery. The NYRCR Program is supported by NYS Homes and Community Renewal, NYS Department of State, and NYS Department of Transportation. The document was prepared by the following consulting firms:

Foreword

Introduction

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

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

Program Overview

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

One hundred and two storm-affected localities across the State were originally designated to participate in the NYRCR Program. The State has allocated each locality between $3 million and $25 million to implement eligible projects identified in the NYRCR Plan. The funding for these projects is provided

through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) program.[1]

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

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

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

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

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

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

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

The NYRCR Plan

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

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

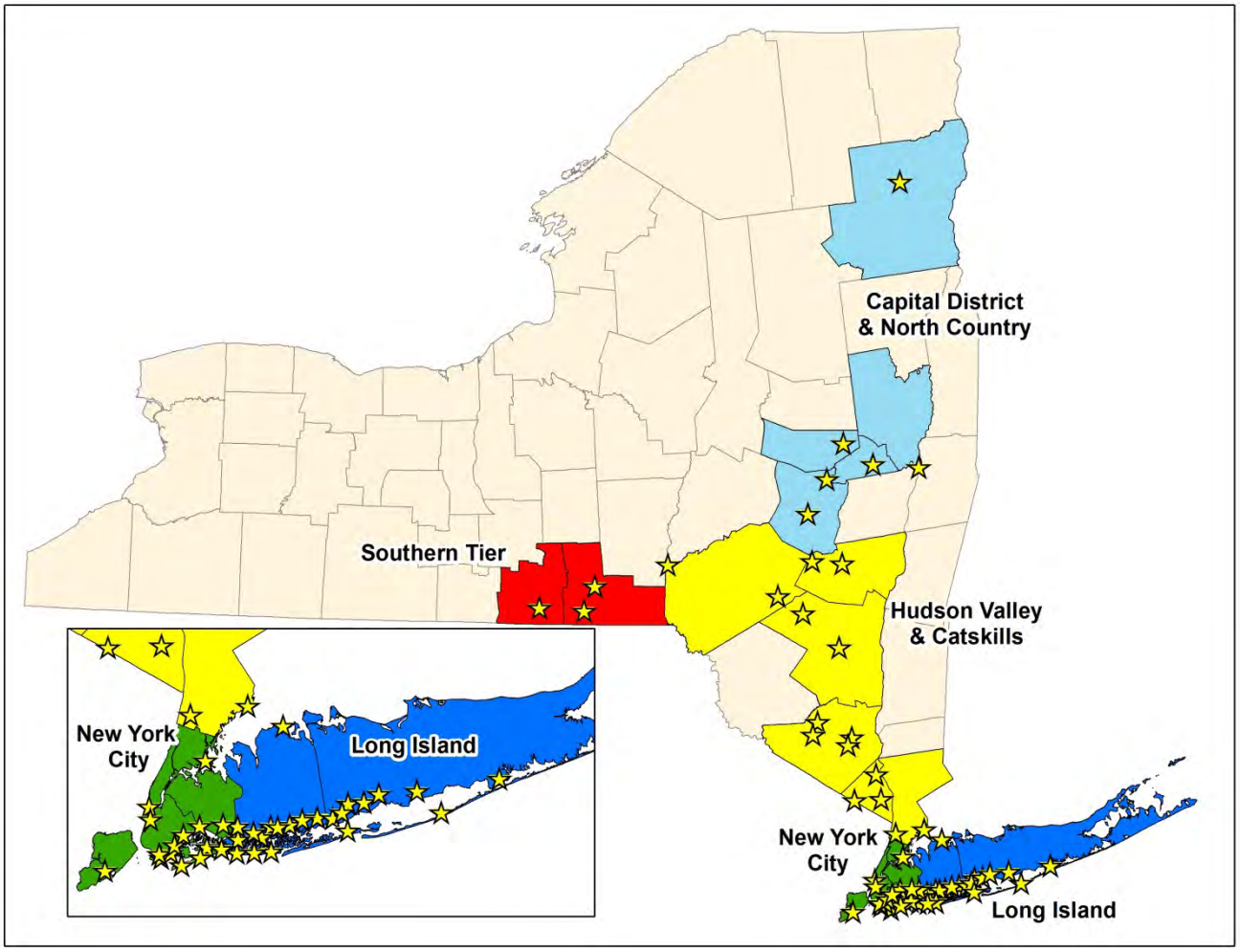
NYRCR Towns and Villages of Esperance, Schoharie, and Middleburgh are eligible for up to $18 million in CDBG-DR implementation funds.[2]

[2] The following localities' allocations comprise the NYRCR Community's total allocation: Town of Esperance $3 million; Village of Esperance $3 million; Town of Schoharie $3 million; Village of Schoharie $3 million; Town of Middleburgh $3 million; Village of Middleburgh $3 million.

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

The total cost of Proposed Projects in this NYRCR Plan exceeds the NYRCR Community's CDBG-DR allocation to allow for flexibility if some Proposed Projects cannot be implemented due to environmental review, HUD eligibility, technical feasibility, or other factors. Implementation of the projects and actions found in this NYRCR Plan are subject to applicable Federal, State, and local laws and regulations, including the Americans with Disabilities Act (ADA). Inclusion of a project or action in this NYRCR Plan does not guarantee that a particular project or action will be eligible for CDBG-DR funding or that it will be implemented. The Governor's Office of Storm Recovery will actively seek to match projects with funding sources.

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



www.stormrecovery.ny.gov/nyrcr

NYRCR Communities[3]

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

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Flooding of the Schoharie Valley After Hurricane Irene
Source: Tim Hogan

Executive Summary

The NY Rising Community Reconstruction (NYRCR) Program was established by New York Governor Andrew M. Cuomo to provide rebuilding and revitalization assistance to communities damaged by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. The NYRCR Program is managed by the Governor's Office of Storm Recovery partnership with New York State Department of State and New York State Department of Transportation. Additional State support in project review has been provided through the Regional Economic Development Council's State Agency Resource Team.

Overview

Residents of the rural and tight-knit Schoharie Valley have a complex relationship with Schoharie Creek. The Creek created the Valley long ago, carving through rock to create the especially fertile soil that continues to sustain the residents along its winding northward path to the Mohawk River. The natural beauty of the Creek brings tourists looking to recapture the simplicity of days spent hiking through forests, searching for pollywogs, and stopping at roadside stands for apples and pumpkins. Visitors help to support Main Street businesses and buoy the local economy. Yet while the Schoharie Creek offers the promise of fertile soils and an unparalleled natural beauty beckoning to tourists and residents alike, floodwaters that have raged from the Schoharie Creek and its tributaries have also caused incredible destruction and loss as the Schoharie Creek has attempted to carry ice melt and rain water away.

Geographic scope

The three towns and three villages that make up the study area of this NYRCR Schoharie Valley Plan (NYRCR Plan) are (from north to south): the Town and Village of Esperance, the Town and Village of Schoharie, and the Town and Village of Middleburgh. All are located within the Schoharie Valley, which includes the watersheds of Schoharie Creek and its tributaries.

Storm damage and critical issues

Hurricane Irene dumped more than sixteen inches of rain in the headwaters of the Schoharie Creek. This excessive rainfall led to raging creeks and streams that quickly swelled and spilled their banks, flooding towns and local communities more rapidly than residents had ever seen. Schoharie Creek rose to a historic level of more than 17 feet in just 12 hours, and produced flow rates that were higher than at any other period since creek flow rates began to be measured in 1939.

The flooding caused widespread destruction of homes, businesses, agriculture, and public infrastructure. As a result of Hurricane Irene, 57 homes were destroyed and 367 homes sustained severe damage, rep-

resenting approximately 20% of the total housing stock within the Community. Residents that managed to escape direct damage suffered from power loss and isolation. National Grid reported 3,370 customer outages in Schoharie County on August 31, 2011. Numerous roads and bridges were flooded, damaged, and impassable, leaving residents in many neighborhoods stranded. This damage was in part the result of an aging infrastructure and undersized stormwater systems which were unable to cope with the massive influx of water and highlighted the need for them to be more robust and resilient.

Photo credit:Ken Hubert

Flooding of the Schoharie Valley after Hurricane Irene

Businesses and public buildings located within the Community's main street business districts also suffered major damage from the storms. Two years later, businesses are still reeling from significant losses of inventory, extensive repairs, and the loss of a customer base due to population dispersal.

The lack of available and redundant communication systems and emergency plans which did not address this magnitude of a flooding disaster compounded the issues faced by community members and emergency responders during and after Hurricane Irene and Tropical Storm Lee. Additionally, the disruption of emergency medical services and county health services as a result of the flooding of the County Health Department underscored the fragility of the existing health and social service system throughout the Community.

Community-driven process

The damage illustrated a need and an opportunity to better manage the interaction between the Community and this powerful waterbody. Looking to the future, the Community has committed to take active steps to avoid or mitigate future impacts from flooding, while highlighting Schoharie Creek as a Community asset. This includes collaborating regionally to study the Schoharie Creek and its tributaries and identify flood mitigation options, and improving local infrastructure that can resist impacts from flooding or that can resiliently recover from flooding without permanent damage. Other needs include ensuring that first responders have the resources they need to respond to the community, providing emergency shelters to house people who are displaced by disaster, and restoring natural stream patterns and reconnecting floodplains. Economic revitalization presents a particularly poignant challenge, as many businesses have not been able to recover to levels preceding the two storms.

It was in this context that the NYRCR Schoharie Valley Planning Committee, a group of civic leaders from the six communities included in this process, came together to define and implement a vision of resilience for the community. This vision developed by the Planning Committee was informed by public input collected during four public engagement events held as part of the planning process.

Community Vision

We commit to the flood resiliency and sustainable revitalization of our towns and villages.
With this plan, we strive to:

1. Support local residents, businesses, and farms with storm recovery, technology improvements, and future planning assistance;
2. Increase the vitality of main streets and downtown centers, and their resilience to future storms;
3. Preserve open spaces and their natural ability to provide resiliency since wetlands, floodplains, and riparian zones are an important part of long-term planning;
4. Maintain and upgrade the facilities and assets of first responders to enable continuous services during an emergency including providing safe evacuation routes for residents and timely communication;
5. Expand the range of housing options by rehabilitating and reinforcing existing housing stock, promoting "green" development, and focusing on new construction in strategic areas.;
6. Promote historic and cultural assets as a draw for tourism;
7. Adapt housing and service improvements to serve vulnerable populations;
8. Treat the Creek as an asset through Improved public access for tourism, kayaking, and enjoyment;
9. Support ongoing economic development efforts for local businesses and farms, and to grow and sustain the Community's population; and
10. Develop and maintain long-range strategic plans to prepare for the future needs of the Community.

The community vision led to the selection of strategies and projects to mitigate or recover from flooding while meeting other community goals. The selected strategies and projects have helped to meet community goals related to economic recovery; capacity building; and supporting other regional planning efforts. Planning efforts of the Regional Economic Development Council, local comprehensive plans, the Mohawk Valley Regional Sustainability Plan, the Schoharie County Multi-Jurisdictional Hazard Mitigation Plan, and the Schoharie County Hurricane Irene and Tropical Storm Lee After Action Report have been incorporated into and bolstered by the NYRCR planning process.

Esperance/Schoharie/ Middleburgh assets of community value include:

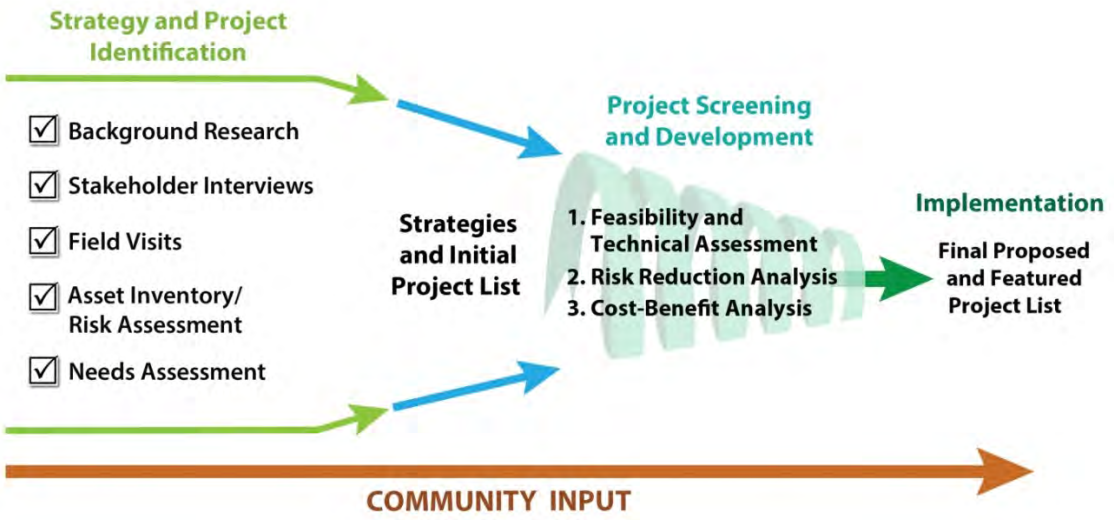
- Homes/neighborhoods vulnerable to flooding;
- Emergency services;
- Historic structures;
- Parks/open spaces;
- Drinking water systems;
- Wastewater systems;
- Healthcare facilities;
- Potential shelters;
- Bridges;
- Dams;
- Schools; and
- Main Street business districts.

A blueprint for implementation

Strategy and project identification

Strategies and projects were developed based on Planning Committee and public input, a comprehensive asset inventory, a risk assessment, and an assessment of needs. The Planning Committee identified 106 critical assets of community value and assessed the flood risk to those assets. The importance of assets and the public support for projects that would protect those assets was determined at public meetings and workshops.

The following graphic outlines the process taken by the Planning Committee to develop resiliency strategies and identify projects for Community reconstruction and resiliency.



NYRCR process for developing strategies and projects

Project screening and development

This NYRCR Plan highlights projects and actions the Community proposes to take in order to recover, and to maximize resilience to future major flood events. Under the NYRCR Program, the Towns and Villages of Esperance, Schoharie, and Middleburgh are each eligible for up to $3 million to fund the projects highlighted in this final NYRCR Plan to reach the Community's collective goal of building back better. These projects are classified into three categories: Proposed; Featured; and Additional Resiliency Recommendations.

- Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding.
- Featured Projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.
- Additional Resiliency Recommendations are projects and actions that the Planning Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

The projects identified by the Community are presented in the table below and are grouped by their associated strategy. In many cases a project may cross multiple strategies but for the purposes of this document, projects are associated with their primary strategy. Projects are all Proposed except for those marked with an asterisk (*), which are Featured projects. Projects are not listed in any particular order.

Schoharie Valley NYRCR Plan Proposed and Featured projects by planning strategy

Strategy 1: Enhance storm preparation and emergency preparedness planning across the region, including improving communication capacities and processes, and educating the public to prepare for, respond to, and recover from flooding.	
Flood Warning and Response System	Generators for Healthcare Facilities and Emergency Services
Flood Resilience Public Education Campaign	
Recruit Volunteer First Responders	Resources for Homeowners
Strategy 2: Build a vibrant economic base by supporting and improving businesses, services, and attractions in the region.	
Commercial Node Development and Public Utility Extension Feasibility Study	Multi-use Trail from Central Bridge through Schoharie to Middleburgh*
Local Disaster Recovery Manager	Business Restoration and Incentives Program*
Strategy 3: Address the lack of detailed data and analysis to quantify flood risks and to plan measures, including green infrastructure projects, to reduce flooding risks and increase resiliency of stream systems in the event of future storms.	
Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)	Gorge Creek Hydrologic Study
	Fox Creek Study*
Strategy 4: Strengthen each jurisdiction's storm preparation and emergency preparedness planning, including improving communication capacities and processes.	
Central Bridge Firehouse Relocation	Town Highway Garage Replacement
Town of Esperance Town Hall Restoration and Flood Proofing	Contribution to Firehouse Replacement
Equip Landis Arboretum as an Emergency Shelter	Rebuilding Police Emergency Services
Village of Esperance Firehouse Rescue Facility	Alternate Emergency Route*
New Ambulance Building and Shelter	Become a FEMA CRS Community*
Emergency Response Equipment	Town of Schoharie Comprehensive Plan Update *
Strategy 5: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood proofing and flood preparedness measures.	
Hilgert Parkway Stormwater Pumping Station	Gorge Creek Culvert Repair and Stormwater and Drainage Infrastructure Improvements
Install Sewer to Prevent Future Health Risks in the Village of Esperance, Phase I	Install Sewer to Prevent Future Health Risks in the Village of Esperance, Phase II*
Young's Spring Intake Line Replacements	Implementation of the Commercial Node Town of Middleburgh Utility Extension*
Drinking Water Intake Improvements	
Cemetery Road Repair	Spring Brook Drainage Improvements*
Central Bridge Main Street Repairs	Evaluate and Install Photovoltaic Systems*
South End Drainage Improvements	Central Bridge Water Reservoir Restoration*
Town of Middleburgh Watershed Restoration Project	
Strategy 6: Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.	
Parrott House	Stream Bank Erosion Control—Schoharie Creek off of Baker Avenue
Taylor Block	
Huntersland Volunteer Fire Department Berm Enhancement	Land Use Study for Floodplain Management
Strategy 7: Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure.	
Master Drainage Plan	Re-purpose Destroyed Mobile Home Park
Northern Drainage/Stream Improvement	Stony Brook Mitigation
Tributary Mitigation Program	Karkerdorf Boat Launch*
Town of Middleburgh Watershed Restoration Project	Add the Village to the Town of Middleburgh's Comprehensive Plan Update*

A bridge under the floodwaters of the Schoharie Creek
Source: Tim Hogan

I. Community overview

Section I sets the stage for the Towns and Villages of Esperance, Schoharie and Middleburgh's NYRCR Plan. It includes the following:

- **An overview of the Schoharie Valley community;**
- **The geographic scope of this plan;**
- **A description of storm damage from Hurricane Irene and Tropical Storm Lee;**
- **A discussion of critical issues facing the community;**
- **The Community vision; and**
- **A discussion of the relationship of the NYRCR Plan to other regional plans and initiatives.**

Residents of the rural and tight-knit Schoharie Valley have a complex relationship with Schoharie Creek. The Creek created the Valley long ago, carving through rock to create the especially fertile soil that continues to sustain the residents along its winding northward path to the Mohawk River. The natural beauty of the Creek brings tourists looking to recapture the simplicity of days spent hiking through forests, searching for pollywogs, and stopping at roadside stands for apples and pumpkins. Visitors help to support Main Street businesses and buoy the local economy.

Schoharie Creek, Middleburgh, looking north up valley

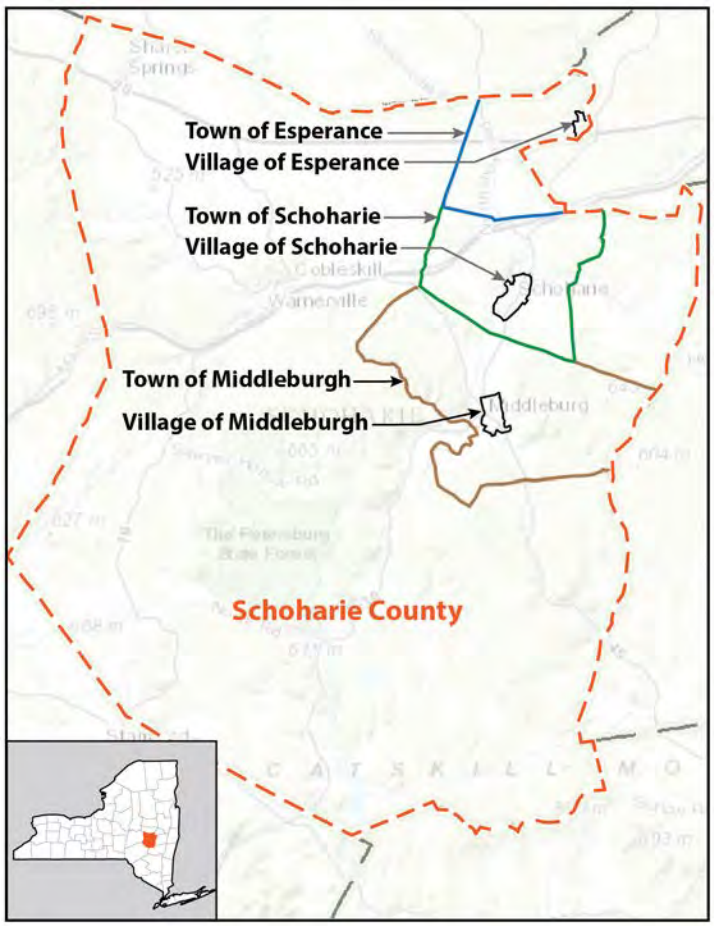
A northward-flowing tributary of the Mohawk River, the Schoharie Creek drains the Catskill Mountains and most of Schoharie County. The Creek's watershed defines the Schoharie Valley and spans an area of approximately 950 square miles west of the capital district including portions of both Schoharie and Greene Counties. The Valley bisects Schoharie County north to south and is one of the most distinctive physical features of the area, with a terrain that is a mix of rounded mountainsides and flat, narrow valleys. The rich soils of the Valley provided early settlers with a tremendous resource on which to build a bustling agriculture-based economy. The area became known as "the Breadbasket of the American Revolution," since food products from the Valley were a primary source of nutrition for troops. The Schoharie Creek and its tributaries are tremendous resources but have also caused historic damage. For example, the community of "State Bridge," known as Esperance today, established a bridge over Schoharie Creek in the 1790's that was washed away by a flood within six years.

Community characteristics

As shown on the following page, the study area of this NY Rising Community Reconstruction (NYRCR) Schoharie Valley Plan (NYRCR Plan) is located in Schoharie County and is comprised (from north to south) of the Town and Village of Esperance, the Town and Village of Schoharie, and the Town and Village of Middleburgh. The Towns and Villages of Schoharie, Esperance, and Middleburgh are simply known as "the Valley" to longtime residents, who are connected by the Creek, the land, and by a shared way of life – marked by a slower pace, volunteer service, church activities, and community involvement. While these municipalities are linked by shared history, each community is distinct and defined by its unique historic features, landscapes, and community character. This NYRCR Plan covers these differ-

ences but also shows the interdependence among the communities, with specific focus on shared flood risk and associated mitigation strategies.

The massive flooding caused by Hurricane Irene and Tropical Storm Lee severely stretched the limited human and material resources of these six Schoharie Valley communities, all of which relied on the resilience, adaptive ability and strength of their neighbors and strangers to withstand the impacts of the storm. Through the NYRCR Program, the communities came together to continue to recover from the storms, build resiliency and become better prepared for future flood events.



Location of the Schoharie Valley Community

Town of Esperance

The Town of Esperance, the northernmost of the Schoharie Valley communities, is rural and sparsely populated. The Town's geography is characterized by low and flat terrain closest to the Schoharie Creek, with rolling hills moving away from it, as opposed to the high, rough, mountainous terrain of the lower Catskill Mountains. The Town has one incorporated village, Esperance; and a few small hamlets, the two most prominent being Sloansville and Central Bridge, which is partly located in the Town of Schoharie. Other hamlets in the Town of Esperance include Schoharie Junction, Dwelley Corners, Rockwell Corners, and Burtonsville.

U.S. Route 20 runs east-west through the Town and is the main transportation corridor. The Town is also easily accessible from New York State Route 30A and Interstate I-88. Schoharie Creek borders part of the Town and flows through the center of its southern half. Cripplebush Creek and Fly Creek are the main tributaries of the Schoharie Creek in the Town, and both flood during major storms, threatening property and infrastructure.

Village of Esperance

The Village of Esperance is located in the far eastern part of the Town of Esperance. It is bounded on the east by Schoharie Creek, a natural boundary between the Village of Esperance in Schoharie County and the Town of Duanesburg in Schenectady County. As the town center, the Village is generally developed with the exception of 35.5 acres of floodplain, which has only 11 buildings on its footprint[1]. The Village has a historic character and small town atmosphere which the residents want to protect and enhance in order to promote economic development and increase the non-residential tax base of the Village.

Town of Schoharie

The Town of Schoharie, which includes within its borders the Village of Schoharie and part of the Hamlet of Central Bridge, is located south of the Town of Esperance. Schoharie is easily accessible by car from New York State Routes 30 and 443, and Interstate 88. The creek floodplains are located primarily in the southwestern and eastern portions of the Town where there is scattered rural development. The Schoharie Creek bisects the Town and is paralleled by Route 30, the primary north – south transportation routes, to the east. Cobleskill Creek, a main tributary of Schoharie Creek, is also located in the Town near Central Bridge where it empties into the Schoharie Creek, and has a major influence on the drainage systems and flooding in the Town. The valley portions of the Town of Schoharie are dominated by agricultural and rural residential land uses. Valley soils are very fertile and well drained. Outside the Valley, steep, forested slopes and plateaus are common. The Town of Schoharie is home to several larger retail businesses that lie outside the Village's boundaries.

Village of Schoharie

The Village of Schoharie is located in the southern portion of the Town of Schoharie. Route 30 is the main transportation corridor through the Village, where it is known as Main Street. As the county seat, the Village of Schoharie has a concentration of critical County government facilities and services, including the Sheriff, jail, courthouse, and Department of Public Works. Within the Village, a number of regional emergency management services are located including Scho-Wright Ambulance, Schoharie County Critical Care Team, and the Schoharie Fire and Police Departments.

The eastern boundary of the Village is a steep rock escarpment rising from 600 to about 780 feet. Valley soils are very fertile and well drained, and a significant amount of agriculture takes place in and around the Village. Much of the Village of Schoharie lies in the Schoharie Creek floodplain. Both Schoharie Creek and Fox Creek form the borders of the Village, in part, to the north and west.

Town of Middleburgh

Farther south in the Schoharie Valley is the Town of Middleburgh, set among the rolling hills of southern Schoharie County at the northern end of the Catskill Mountains. New York State Routes 30 and 145 traverse the town in a north - south direction and serve as the Town's primary access routes. The landscape includes the Schoharie Valley, which is located at the center of the Town, and hillsides extending on either side of the Valley. The Town has scattered development located in the Valley's floodplain.

Village of Middleburgh

The Village of Middleburgh is located in the central part of the Town of Middleburgh and is the only incorporated village in the town. Compared to the communities in the northern portion of the Valley, the Village is surrounded by steeper hills and more dramatic topography more identifiable with the Catskill Mountains to its south. Schoharie Creek is a prominent feature in the Village. In fact, the Village of Middleburgh is situated almost entirely in the Schoharie Creek floodplain. The major transportation routes for the village are routes 30 and 145. North of the village center Route 30 parallels the Schoharie Creek on the eats and Route 145 parallels it on the west. In the village center, both routes cross the same bridge to opposite sides of the creek. Route 145 then becomes Main Street, with its immediate stretch becoming the village business district.

There has been a steady increase in population over the past two decades (8.5 %), primarily occurring between 2000 and 2010; but the population is aging. The Village of Middleburgh has roughly the same number of businesses as the Village of Schoharie, but with a focus on eating and drinking establishments. In addition, there are more occupied storefronts in the Village of Middleburgh than the Village of Schoharie, with fewer commercial buildings in disrepair.

New York State Route 30 (River Street) and New York State Route 145 (Main Street) intersect in the Village at the bridge over Schoharie Creek. South of the Village, Little Schoharie and Line Creeks intersect Route 145.

Community Economy

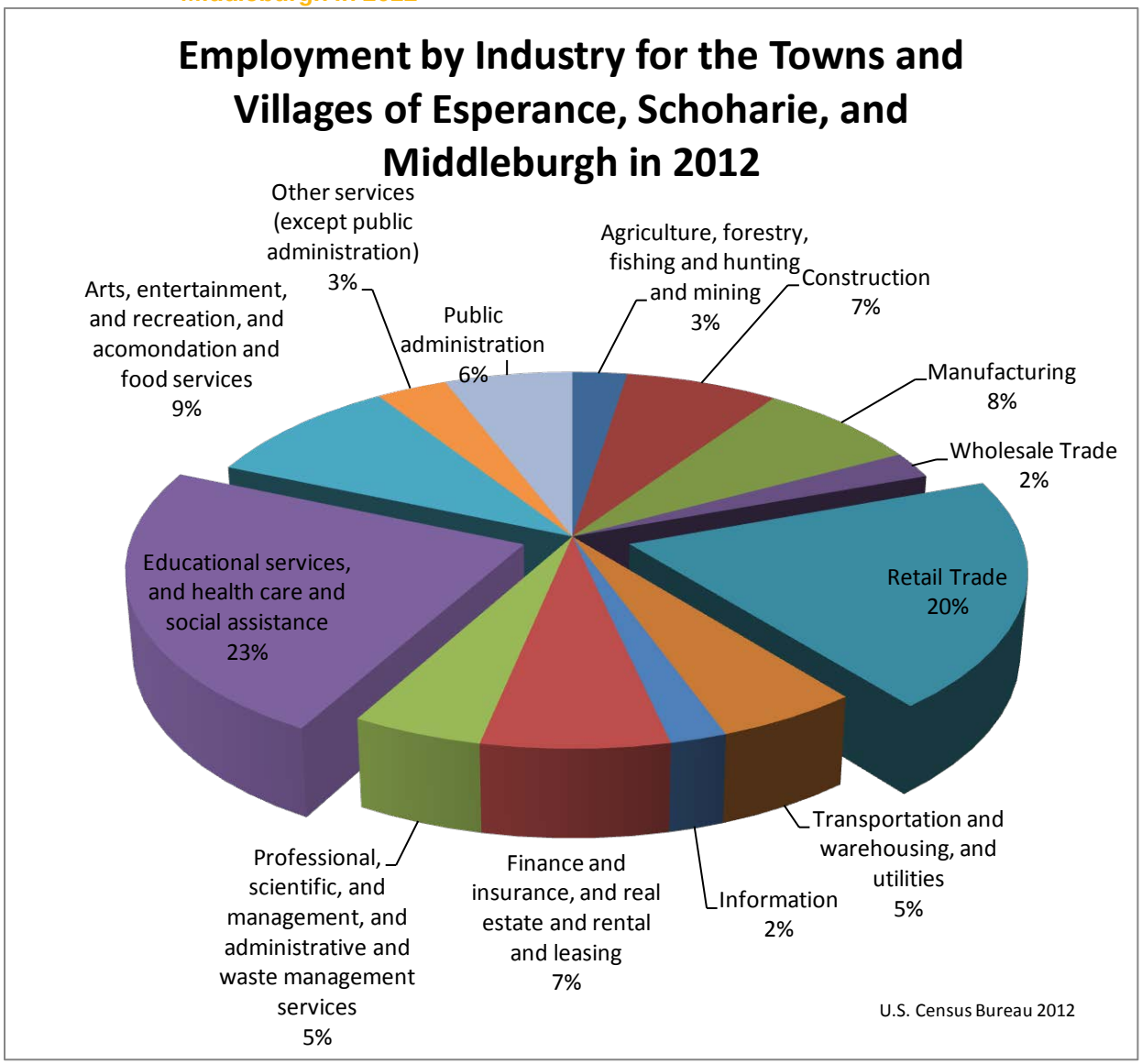
The economy in the six communities is dominated by small businesses, located primarily along traditional main streets and other Route 30 locations, home occupations, and agriculture. The majority of employment within these communities is centered on the retail trade and education industries which held 43% of all employment in the area in 2012 (**Figure 1**).

Aside from government, most of the largest employers in Schoharie County are located in the Village of Cobleskill, considered the economic center of the County. The Town of Schoharie is home to several larger retail businesses that lie outside Village boundaries including Schoharie Valley Farms (The Carrot Barn), the Apple Barrel, and Miller's Tractor. The largest employers in the Town and Village of Schoharie are the County and the Schoharie Central School District. In Middleburgh, the Central School District is the largest employer. Recent business additions in the Town of Middleburgh include Dollar General and Dr. Reddy's Pharmaceuticals. There are no major employers in the Town of Esperance.

The Villages of Schoharie, Middleburgh and Esperance, have well-developed historic main streets with a mix of businesses, civic, and higher density residential development. The Village of Middleburgh has roughly the same number of businesses as the Village of Schoharie but with a focus on eating and drinking establishments. In addition, there are more occupied storefronts in the Village of Middleburgh than in the Village of Schoharie, with fewer commercial buildings in disrepair. In comparison, the Village of

Esperance has fewer businesses and a more residential-oriented or mixed-use main street. The Village of Schoharie also serves as the county seat.

Figure 1 **Employment by industry for the Towns and Villages of Esperance, Schoharie, and Middleburgh in 2012**



A. Geographic scope of the NYRCR plan

Photo credit: Ken Hubert
Road damage from Hurricane Irene

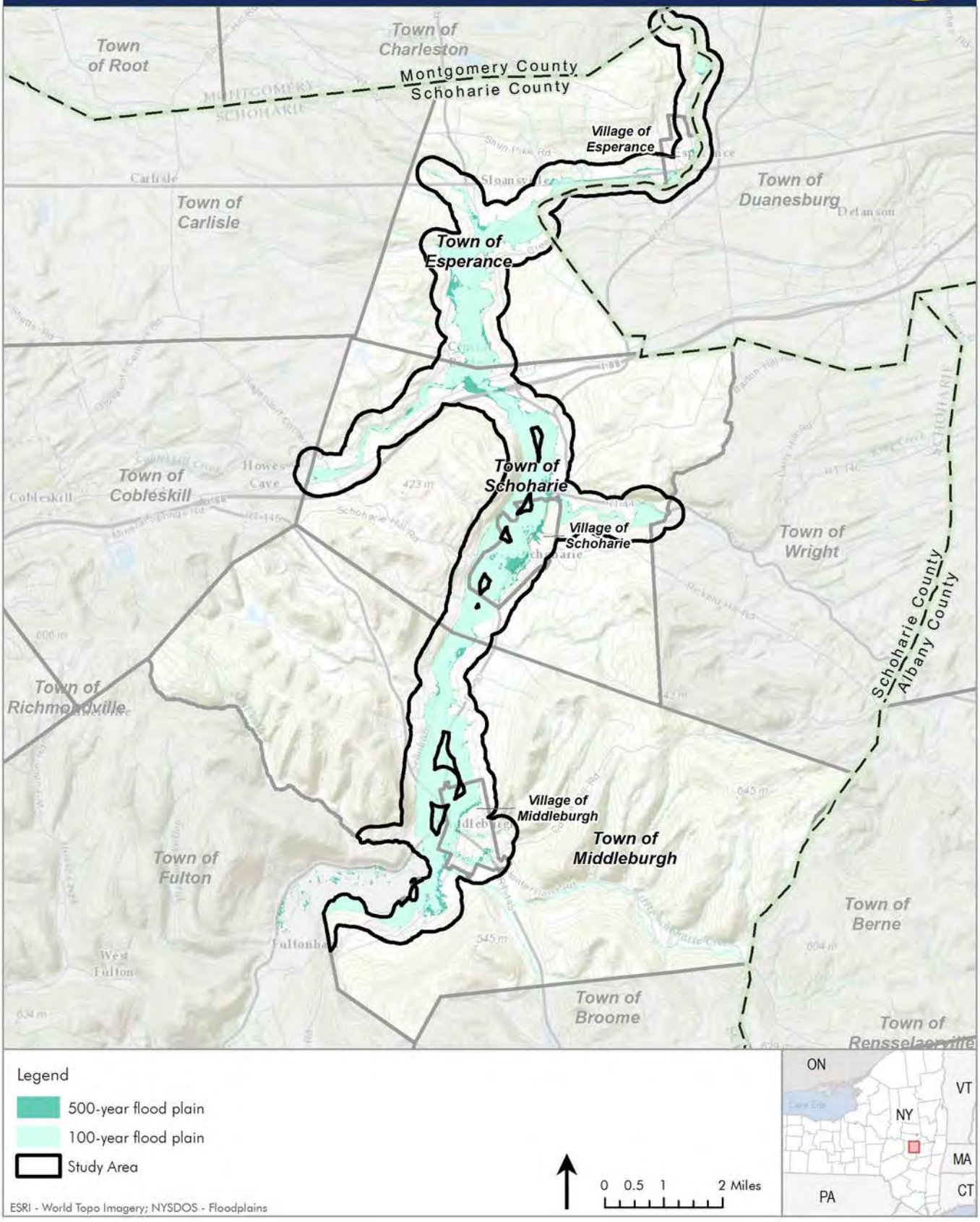
The geographic study area of this NYRCR Plan includes areas where Community assets are most at risk, where reconstruction or future construction would be primarily directed, and where key investments to improve the local economy can be made. The scope of the study area was determined by the Committee (with input from the public) based on known 100- and 500-year floodplains; regional issues; interests of neighboring communities, including watershed-wide risks and management; and the provision and sharing of services among jurisdictions. These regional elements were balanced by the need to define an area within which specific projects could be implemented to mitigate flood impacts and protect Community assets.

The Committee based the study area on a quarter-mile buffer around the 500-year floodplain of Schoharie Creek and its major tributaries to address community assets that may be within range of flood waters during catastrophic storms. Tributaries were recognized to be critical components of the study area since, during Hurricane Irene, tributary flooding was responsible for localized damage to homes, businesses, and critical community assets, including schools and infrastructure. Specifically, Fly Creek, Cripplebush Creek, Cobleskill Creek, Gorge Creek, Spring Brook, Fox Creek, and Stony Brook were identified.

The study area was then expanded to include specific locations that are recognized to be at risk during flooding. These include: the full extent of the hamlets of Gallupville and Central Bridge, both situated along tributaries of Schoharie Creek; and extension of the quarter-mile buffer around the 500-year floodplain to the Town of Blenheim, which is south of Middleburgh, since the Community regularly provides critical emergency services to this town.

Figure 2 provides a map of the final geographic study area.

Figure 2: Geographic Study Area of the Schoharie Valley Community NYRCR Plan



B. Description of storm impacts

Hurricane Irene ravaged the eastern seaboard of the United States (U.S.) from Puerto Rico to the Canadian border between August 21 and 29, 2011. Wind speeds recorded in the storm varied with each successive landfall with hurricane force gusts recorded in Puerto Rico, North Carolina, New Jersey, and New York. Irene left roughly 8 million people without power for up to a week and shut down mass transit in the northeast. Irene's most damaging impact was from rainfall which caused devastating flash flooding across eastern New York, Vermont, and Northern New Hampshire.

> *"I was there for 9/11 (retired upstate from NYPD). That was worse, of course, but this is bad. You feel so helpless. It's going to take a long time to clean it all up. That's the part that feels familiar."*[2]

Photo credit: Jess Loden Kirby

Schoharie Creek spills its banks

> *When Hurricane Irene hit, David and Denise Lloyd watched their barn on Maple Downs Farm in Middleburgh fill with 7 feet of water in 20 minutes.*[3]

Photo credit: Ken Hubert

Flooding in the Schoharie Valley

Hurricane Irene dumped more than sixteen inches of rain in the Catskill region, the headwaters of the Schoharie Creek. This excessive rainfall led to raging creeks and streams that quickly swelled and spilled their banks, flooding towns and local communities more rapidly than residents had ever seen. According to the United States Geological Survey (USGS), the flow rate of the Schoharie Creek was 6,000 ft^3/second higher after the storms than during any other period prior to the onset of creek discharge rate measurements in 1939.[4] This caused the creek to rise to a historic level of more than 17 feet in just 12 hours. On August 28, 2011, the Schoharie Creek overflowed its banks and the Towns and Villages of Esperance, Schoharie and Middleburgh found themselves facing a crisis.[5] The speeds at which flooding occurred outpaced residents' abilities to combat the rising water and as bilge pump systems quickly failed, residents were forced out of their homes to find shelter on higher ground.[6]

Photo credit: Sherri Meyer-Veen

Mud and flood waters from Hurricane Irene and Tropical Storm Lee

Both the immediate aftermath and the long-term economic impacts of the storm took a heavy toll on the communities, which was magnified when Tropical Storm Lee moved through Schoharie County just 10 days later. Residents, businesses and, farms were struggling to recover from Hurricane Irene when Tropical Storm Lee hit the area. Basements that were pumped free of water and mud were once again inundated, causing further damage. The high winds and rain of Tropical Storm Lee drenched and ruined belongings that had been salvaged after the hurricane and were outside under tarps while repairs to homes commenced. The flash flooding caused by Tropical Storm Lee primarily flooded areas not affected by Hurricane Irene flooding, spreading further havoc. In the Valley, emergency services and other resources were already stretched thin. The massive, rapid rainfall in the Catskills from Hurricane Irene created a huge volume of water that surged down the Schoharie Creek and resulted in an eight foot tidal wave of water that crashed through the valley floor washing away main street businesses and residences.

Due to flooding from Hurricane Irene and Tropical Storm Lee, much of the pumpkin harvest in the northeast was lost just before Halloween.

Photo credit : wikimedia

Not only did Hurricane Irene and Tropical Storm Lee cause devastating flooding along the Schoharie Creek, heavy rainfall also overwhelmed tributaries upstream which, caused significant flooding and damage along those waterways. The powerful flood waters inundated an area larger than the established flood plain, covering land that had not been flooded in several hundred years.[7]

Agricultural damage

Farms throughout the Valley were devastated. An estimated 43,000 acres of arable farmland lay under-water; and to add insult to injury, it was late summer and many farms were either soon to harvest, or beginning to harvest the year's crop. By the time that floodwaters would recede, it was too late in the season for most farmers to replant, and many were left without a harvest. In addition to crop losses, many dairy and cattle operations lost livestock due to flooding.

Much in the way of farm infrastructure was also destroyed. Grain silos, barns, and equipment were also lost during the floods. David Lloyd's description of the damage at his Maple Downs Farm portrays the devastation many farmers faced after Hurricane Irene. He said, "We lost a whole year's worth of stored seed, 200 acres of standing corn and 47 head of dairy cattle. All of our equipment was under water – nine tractors, our car, we lost three trucks."[8] Mr. Lloyd's extensive losses were unfortunately not unique. As flood waters receded, farmers were left with tons of debris to clear and concern about soil contamination. Although many farmers had crop insurance, many farms were faced with crop losses well beyond what their policies would cover. **Table 1** provides the crop losses as well as other agriculture damages throughout Schoharie County as a result of Hurricane Irene; losses total approximately $18.8 million.[9]

Photo credit: Ken Hubert

A Schoharie County farm during Hurricane Irene and after the floodwaters receded

Table 1 Schoharie County agriculture losses from Hurricane Irene

Crop	Acres lost	Percent total lost	Value lost
Apples	18.5	11%	$30,024.00
Cantaloupes	75	59%	$118,704.48
Sweet corn	2,000	41%	$2,015,200.00
Yellow forage corn	15,000	59%	$4,067,867.00
Yellow grain corn	10,000	60%	$2,974,000.00
Fresh cucumbers	50	79%	$178,145.20
Green bell peppers	120	91%	$1,147,929.20
Winter squash	500	79%	$3,098,424.86
Tomatoes	300	98%	$3,729,353.51
Other Damages			
Pasture	2000	N/A	$4,000.00
60 farm dwellings and service buildings damaged and 25 destroyed	N/A	N/A	$1,000,000.00
Fruit and nut trees and bushes damaged	20	N/A	N/A
Approximate Livestock Losses**			
Adult Beef	10 head lost		$40,000.00
Adult Dairy	21 head lost		$210,000.00
Non adult	20 head lost		$100,000.00
Calves	19 head lost		$57,000.00
Chicken	14 layers lost		$200.00
Sheep	2 head lost		$400.00

* US Department of Agriculture Farm Service Agency (FSA) Data
**Numbers based on voluntary participation in FSA data collection

Source NYS DOT

Massive road damage to the main evacuation route: Route 30

Impacts to roadways

Access to this area is provided by roadways that traverse the floodplain, and are at risk from flooding; primary roadways run parallel and near to the Schoharie Creek and are therefore at high risk of flooding. This in turn puts the communities at risk because it becomes very difficult to evacuate or to access supplies and medical services.

Miraculously, there were no human fatalities or injuries in Schoharie County as a result of Hurricane Irene and Tropical Storm Lee. However, the flooding caused widespread destruction of homes, businesses and public infrastructure. National Grid reported 3,370 customer power outages in Schoharie County on August 31, 2011. Numerous roads and bridges were flooded, damaged, and impassable, leaving residents in many neighborhoods stranded. Within Esperance, Middleburgh, and Schoharie, 17 roads were closed as a result of flood damage and impassable conditions (**Table 2**). [10] In addition to the listed closures, I-88 and NYS Route 7 bridges over the Schoharie Creek were temporarily closed until safety assessments could be made.

As the major transportation routes that run parallel to the Creek were impassable, evacuees headed uphill to the remote hillsides, or went to local shelters for safety. Unfortunately, a number of shelters were inaccessible due to flooding, and the Middleburgh Middle School shelter was surrounded by flood waters that trapped those who were inside.

"I've lived through 10 floods, '96, '05… This is the worst." - Anonymous Middleburgh resident [11]

Public safety facilities were also impacted. The County Health Department's facilities on Main Street in Schoharie were also underwater. Significant damage at the Schoharie County Public Safety facility caused a major disruption in essential public safety systems, including the 911 and public safety communications services as the generators that powered them were flooded. The county jail co-located in this facility had to be evacuated and all inmates transferred to the Albany County jail.

Emergency facilities were severely damaged, which, made it difficult to provide essential services. The firehouse in the Village of Schoharie was heavily damaged by floodwaters; in the Town of Esperance, the Central Bridge firehouse was surrounded by flood water; and in the Village of Middleburgh, the antiquated water pump was quickly overwhelmed leading to their station flooding as well.

Table 2 Roads closed due to Hurricane Irene*

Municipality	Closed Roads
Esperance	Egelston Dr., U.S. Route 20, Junction Rd., Main St., Priddle Rd., Ragan Rd., Saddlemire Hill Rd., Western Tpk., Stuben St.
Middleburgh	Brooky Hollow Rd., Clauverwie, Greenbush Hill Rd., State Route 145, State Route 30, Tinkley Hollow Rd., Woods Rd.
Schoharie	Howes Cave Rd., Junction Rd., Route 443

**Schoharie County Hurricane Irene and Tropical Storm Lee: Flood Response After-Action Report and Improvement Plan (AAR /IP)* (2012).

Photo credit: Ken Hubert

Damage to Route 30

Damage to public infrastructure, including stormwater systems, roads and bridges, caused by Hurricane Irene and Tropical Storm Lee totaled nearly $130 million in Schoharie County and has not yet been fully recovered. The natural north-south geographic division of the County created by the flooding of Schoharie Creek and the resulting closure of multiple roads led to a fragmentation of disaster response and recovery resources. This in turn led to challenges associated with getting emergency equipment and services to where they were needed.

These challenges, coupled with the severity of the flooding and the pace of the rising floodwaters, prompted early and rapid actions to alert and evacuate residents. Schoharie County emergency plans had identified 29 pre-designated evacuation routes for use during flooding in the Schoharie basin. However, in the flood events of Hurricane Irene and Tropical Storm Lee, four of the 29 evacuation routes were impassable due to flooding and/or flood damage and 10 routes had sectors or areas where traffic was reduced to one lane and/or required detours, leaving only 15 of the routes fully passable in both directions. Thirteen shelters were established in the County to serve evacuees and disaster victims, and provisions were made at the Schoharie Valley animal shelter in response to the need for sheltering pets and companion animals.

Building damage

Approximately 47% of homes (215 housing units) in the Town and Village of Schoharie were destroyed or sustained severe damage from Hurricane Irene and Tropical Storm Lee.[12] Approximately 18% (138 housing units) of homes in the Town and Village of Middleburgh were destroyed or sustained severe damage, and approximately 8% (72 housing units) of homes in the Town and Village of Esperance were similarly affected. In total, 57 homes were destroyed from Hurricane Irene and 367 sustained severe

damage. This represents approximately 20 % of the total housing stock within the six communities. Residential areas still face the loss of many affordable, attractive homes.

Photo credit: Ken Hubert

Mud covering the parking lot of a gas station in Middleburgh

Local businesses and many public buildings located within the communities' main street business districts suffered major damage from Hurricane Irene and Tropical Storm Lee. The County Public Safety Facility located on Depot Lane; the Department of Public Works Buildings located on NYS Route 30; and the main County Buildings located on Spring and Main Streets were all damaged. Flooding in the basement and first floor of the Main County building severely impacted the Department of Health, Real Property Tax, Treasurer, and the County Clerk and incapacitated the upper floors of the building as well as the County Court. Flooding also resulted in the loss and damage of many records, including all past grants and County Planning Commission records from 1996 and many County deed records.

Two years later, businesses are still reeling from significant losses of inventory, extensive repairs, and the loss of a customer base due to population dispersal. Loss and damage of homes, businesses, and several notable historic buildings has eroded both property values and the property tax base and has damaged prospects of securing investors for much needed housing and commercial development.

"When you have people stepping up like we've had, you're blessed. Our community is blessed," Supervisor Dennis Richards from Middleburgh said. "Our volunteers, our rescue squads, were greatly appreciated and did a great job stepping up."[13]

Although they represent the most extreme events in recent years, these two storms are not the only flood events that have wreaked havoc on this region. The flash floods of June 2013 were the most recent a reminder of how much work remains to prepare the communities for the next major event. The National Climatic Data Center reported that 29 flood events have occurred in Schoharie County between 1996 and 2013. Ten of these events were declared Federal emergencies by the U.S. President. Seven of the 11 most serious floods on record were influenced by late winter snowmelt in combination with heavy precipitation,) which causes risk of ice jams that add to the destruction during flooding.[14]

Community economic impacts

Two school districts and Schoharie County are the major employers in the Community. These are followed by small businesses, home occupations, and agriculture. Since most of these are located near the Schoharie Creek or its tributaries, they were all devastated during Hurricane Irene resulting in a significant blow to the local economy. The total damage reported to date by 78 businesses is nearly $6.7 million for structural damage, machinery and equipment that needs to be replaced, and lost inventory. This figure does not include the lost revenue from businesses closed during the storm event. Since many of the major businesses were closed during the storms, and many did not reopen, most residents were out of jobs for some duration. At the same time, many were faced with home repairs and replacement of personal items. Most business owners also live in the Community which left many reeling from damage to their homes as well as businesses. The overall impact to the community is that, since the storms, there has been an increase in the percentage of low/moderate income households in four of the six jurisdictions of the Community (**Table 3**).

Table 3 Change in low/moderate income households*

Town	2010*	2012**
Town of Middleburgh	55.7%	58.5%
Town of Schoharie	53.2%	60.7%
Town of Esperance	45.5%	43.8%
Village of Esperance	40.6%	44.9%
Village of Middleburgh	67.3%	66.9%
Village of Schoharie	52.7%	65.8%

*2008 -2012 American Community Survey data

C. Critical issues

The Schoharie Valley is exceptionally fertile, with easy access to water and to rich loamy soils provided by its network of creeks and tributaries, which regularly enrich adjacent farmland. Changing demographics and economic pressures have modified land use such that Community assets encroach on the natural behavior of its creeks. Hurricane Irene brought this relationship to a tipping point, and Tropical Storm Lee pushed the balance over as the Schoharie Creek and its tributaries did more damage than anyone could remember seeing before.

The Recovery Support Functions (RSFs) comprise the National Disaster Recovery Framework's (NDRF's) coordinating structure for key functional areas of assistance. Their purpose is to support local governments by facilitating problem solving, improving access to resources and by fostering coordination among State and Federal agencies, nongovernmental partners and stakeholders.[15]

Through the NYRCR program, the Community sought to find a new, sustainable and resilient balance with the water network that feeds it. In taking a hard look at vulnerabilities related to the Hurricane and Tropical Storm, a few critical points emerged that can help the Community plan for future flood events, large and small. These points have been grouped according to the National Response Framework's (NRF's) six (6) Recovery Support Functions (RSFs), presented below.[16]

i. Community planning and capacity building

The Committee identified that the unprecedented devastation caused by Hurricane Irene and Tropical Storm Lee requires them to rethink building codes, zoning laws, and land use regulations. Existing comprehensive plans in the six communities recognize the importance of the floodplain, past flood events, and the need to address ongoing impacts. However, the plans need to be updated to include evaluations of hydrological features and flooding patterns and identify specific techniques or infrastructure that can address flooding or its underlying causes. Flood management policies and programs such as zoning subdivision, and floodplain laws could also be updated to align with hazard mitigation goals.

It was recognized that emergency response plans and communication systems could be strengthened. During the two storm events, there was a need for redundant communication technologies and for updated emergency plans. Limited cellular and high-speed broadband compounded the difficulties of the response.

Access to information was also limited as there was no single entity or location for residents to turn to for information. The residents responded as best they could, but there was room to improve process and information flow.

In the aftermath of Hurricane Irene and Tropical Storm Lee, organizations were created and activities coordinated in an unprecedented manner. This collaboration should be encouraged and fostered by fully engaging these new organizations and partnerships in the long term recovery of these communities.

ii. Economic development

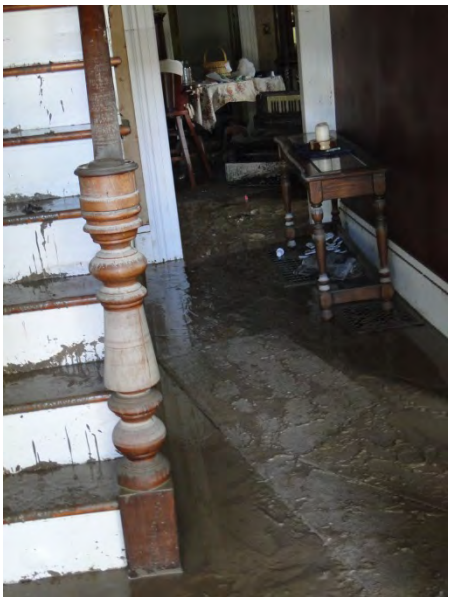
Economic development is of utmost importance to the Schoharie County Communities. The business districts in the three Villages are located in the floodplain and most were flooded extensively during Hurricane Irene and Tropical Storm Lee. The economic condition prior to the storms was not strong and the disaster exacerbated the situation, leaving many businesses struggling or even worse, unable to reopen. In the Village of Schoharie, for example, landmarks such as the Parrott House and Taylor Block remain vacant, contributing to blight and preventing re-investment. Restoration of the local business economy and projects and programs to address storm-related business resiliency is critical to the long-term recovery and resilience of these communities.

Photo credit: Ken Hubert

Flood damaged debris and trash in front of businesses, Village of Schoharie

iii. Health and social services

Disruption of emergency medical services (EMS) and County Health services during Hurricane Irene highlighted the fragility of the existing health and social services system, in particular for this largely low / moderate income community with an increasing aging and growing vulnerable population. Since the storms, medical and social service care has been restored to levels that existed prior to the flood events; however there is a critical need to prepare these services for future resiliency. There is also an effort under way to bring medical facilities to underserved populations via a new clinic in the Village of Middleburgh.



Source Sherri Meyer-Veen

Mud coating the inside of a home after the floodwaters receded

iv. Housing

Some homes in the Towns and Villages of Esperance, Schoharie, and Middleburgh have been repaired since Hurricane Irene and Tropical Storm Lee; however, providing suitable housing options for the Community remains a critical issue. Housing types that remain a critical issue include: interim and permanent housing; owner occupied and rental; single family and multifamily; housing for the elderly, special needs populations and supportive housing; and affordable housing.

The Community also recognizes that the repair of homes without flood proofing and retrofitting leaves them vulnerable to damage during future flood events.

Photo credit: Ken Hubert

Pooled water in the streets of Middleburgh following Hurricane Irene

v. Infrastructure

The storm severely taxes public infrastructure. Aging and undersized stormwater systems were overwhelmed by the volume and speed with which floodwater inundated the Towns and Villages. Consequently, streets were unpassable or completely washed out, private and public buildings were overwhelmed, public facilities including parks sustained extensive damage, drinking water sources became contaminated and sewage was washed out of systems. Establishing ro-

bust infrastructure was therefore identified by the Committee as a critical issue. Specific issues relate to the location or design of stormwater systems, their ability to withstand a volume not previously required, and areas where stormwater pools or backs up into systems.

vi. Natural and cultural resources

The Schoharie Creek and its tributaries are a natural resource to the Community but also were the primary source of devastation during Hurricane Irene and Tropical Storm Lee. Schoharie Creek and its major tributaries, including Fly Creek, Cripplebush Creek, Cobleskill Creek, Gorge Creek, Spring Brook, Fox Creek, and Stony Brook, all overflowed their banks and impacted Community assets from homes, schools and businesses, to infrastructure and green space. In some cases flooding caused localized damage. This was the case where Fox Creek flooding destroyed adjacent baseball fields and other features of Fox Creek Park. In other cases, floodwaters released from the banks of creeks caused damage at a greater distance. This was the case with Gorge Creek and the Schoharie Creek which, although they also caused localized damage, surged into the Main Street Business and residential districts in the Village of Middleburgh, and were responsible for the extensive damage incurred there. Inundation with heavy rain and subsequent flooding caused damage to these streams themselves. Stream banks were heavily eroded resulting in bank failures and sedimentation in channels, stream beds were scoured by debris, including vegetation that was stripped from the floodplain. The aquatic habitat of these creeks was destroyed as evidenced by vegetation, mud, and aquatic wildlife that were deposited on roadways and in buildings and found after the flood waters receded.

Cultural resources sustained intense damage due to Hurricane Irene, followed in many cases by an immediate insult from Tropical Storm Lee. Historic features that were damaged include: the cemetery in the Village of Esperance; George Westinghouse, Jr. Birthplace and Boyhood Home in the Town of Schoharie; the Fox Creek covered bridge, Daughters of the American Revolution (DAR) Lasell Hall, Schoharie Colonial Heritage Association, Schoharie County Courthouse Complex, Schoharie Valley Railroad Museum, and the Schoharie Valley Railroad Complex historic district in the Village of Schoharie; and the Bellinger-Dutton House and Best House Medical Exhibit in the Village of Middleburgh. Of the churches that are in the Community, many are located in flood-prone areas. The following all sustained damage during Hurricane Irene: the Schoharie Valley Gospel Church/Shelter in the Town of Esperance; Reformed Church of Schoharie in the Village of Schoharie; and Our Lady of the Valley Church, St. Mark's Evangelical Lutheran Church, and Middleburgh Reformed Church in the Village of Middleburgh. Many experienced over ten feet of rushing muddy flood waters, and the Valley Bible Baptist Church in the Town of Middleburgh was so severely damaged that it has since undergone a Federal Emergency Management Agency (FEMA) property buyout. Other damaged cultural features include Fox Creek Park in the Village of Schoharie and the libraries in the Villages of Schoharie and Middleburgh.

D. Community vision

To launch the planning process, the Planning Committee developed an initial Community Vision, which was reviewed and revised by Committee Members based on public input obtained during a public engagement event. The final Community Vision statement for the Community is:

We commit to the flood resiliency and sustainable revitalization of our towns and villages.

With this plan, we strive to:

1. ***Support local residents, businesses and farms with storm recovery, technology improvements, and future planning assistance.***
2. ***Increase the vitality of main streets and downtown centers and their resilience to future storms.***
3. ***Preserve open spaces and their natural ability to provide resiliency. Wetlands, floodplains, and riparian zones are an important part of long term planning.***
4. ***Maintain and upgrade the facilities and assets of first responders to enable continuous services during an emergency. Provide safe evacuation routes for residents and timely communication.***
5. ***Expand the range of housing options by rehabilitating and reinforcing existing housing stock, promoting "green" development, and focusing new construction in strategic areas.***
6. ***Promote historic and cultural assets as a draw for tourism.***
7. ***Adapt housing and service improvements to serve vulnerable populations.***
8. ***Treat Schoharie Creek as an asset. Improve public access for tourism, kayaking, and enjoyment of the Creek.***
9. ***Support ongoing economic development efforts for local businesses and farms, and to grow and sustain the Community's population.***
10. ***Develop and maintain long range strategic plans to prepare for the future needs of the Community.***

E. Relationship to regional plans

The Towns and Villages of Esperance, Schoharie, and Middleburgh are part of a multi-jurisdictional planning area in the Schoharie Valley. These municipalities have a long history of collaboration, and the Villages and their respective Towns regularly undertake regional assessments, plan together, and share services. These partnerships are longstanding and have resulted in development of fundamental documents such as multi-municipal comprehensive plans and all-hazard mitigation plans. The comprehensive plans reviewed in development of this NYRCR Plan include:

- Town and Village of Schoharie Comprehensive Plan (January/February 1997);[17]
- Town and Village of Middleburgh Comprehensive Plan (March 1999);[18]
- Village of Esperance Comprehensive Plan (2004);[19] and
- Town of Esperance Comprehensive Plan (2009).[20]

These comprehensive plans provided key information about the NYRCR Community, which in turn helped to inform sections of the NYRCR Plan. The sections of the NYRCR Plan informed by these planning efforts include the Community overview and the Community vision. These plans also provided detailed community, demographic, and economic data as well as the goals and recommendations for all areas of the communities such as land use, housing, resource protection, recreation, safety and traffic, and economic development.

On the regional level, Schoharie County participates in a number of planning efforts. One such effort is the Mohawk Valley Regional Economic Development Council (MVREDC). The MVREDC is one of ten regional councils in New York State that were created to develop long-term strategic plans for economic growth in their respective regions. In 2011, the Council developed an initial Strategic Plan and followed up with a Progress Report in 2012. This NYRCR Plan furthers the 2012 MVREDC Progress Report strategies of revival, including increasing spatial efficiencies focused on strengthening the region's sustainability, and forging the long-term planning of communities within the region.[21]

Schoharie County also participated in the development of the 2012 *Mohawk Valley Regional Sustainability Plan* (MVRSP).[22] The 2012 MVRSP was developed to meet the needs of residents both today and in the future to find innovative ways to operate and grow while reducing their impact on the environment. The Towns and Villages of Esperance, Schoharie, and Middleburgh NYRCR Plan addresses a number of MVRSP's core initiatives, including the following:

- Enhance regional concentrations to retain and create business in key growth sectors;
- Restore infrastructure and increase spatial efficiencies that will revitalize existing urban and town centers;
- Strengthen government and civic effectiveness to produce a more vibrant economy;
- Redevelop Main Streets, Waterfronts, and Brownfields;
- Invest in existing infrastructure and housing stock;
- Improve existing water management infrastructure; and
- Establish regional watershed planning.

This NYRCR Plan also fulfills recommendations made in the 2012 *Schoharie County Multi-Jurisdictional Hazard Mitigation Plan* (Hazard Mitigation Plan)[23] update prepared by Schoharie County in response to the Disaster Mitigation Act of 2000.[24] The greatest hazard identified by the Hazard Mitigation Plan is

that of flooding. This NYRCR Plan recognizes that flooding still poses grave threats to the region and addresses a number of the Hazard Mitigation Plan update's core strategies, including: hazard reduction through taking advantage of development funding opportunities; pursuit of cost-effective hazard mitigation projects; emphasis on mitigation measures that prevent or reduce losses in designated high hazard flood zones and those that enhance and compliment local goals; and encouragement of mitigation measures that manage development and protect natural features.

Schoharie County also conducted an After Action Report (AAR), the *After Action Report and Improvement Plan, Hurricane Irene and Tropical Storm Lee Flood Response of August – September 2011*, after Hurricane Irene and Tropical Storm Lee, which identified several major strengths of the County's response. In addition to the identified strengths, the AAR identified opportunities and areas for improvement to prepare for another major event.[25] The following primary areas were identified for improvement in the AAR and were also identified as critical issues and Community needs in the NYRCR Plan:

- Expand flood monitoring capabilities;
- Improve awareness of flood warning, alerting, and evacuation policies;
- Improve communication and coordination among the County, Towns, and Villages;
- Enhance planning and incident management organization in the Towns and Villages;
- Establish essential public safety facilities outside flood risk areas;
- Improve back-up and alternate public safety facilities and support;
- Improve public safety communications, ensuring redundant/back-up capabilities; and
- Expand cellular phone coverage, particularly in the southern portion of the County.

Floodwaters Rising above Bridge
Source: Colleen Fullford

Floodwaters of the Schoharie Creek inundate area homes and roads
Source: Tim Hogan

II. Assessment of risk and needs

Section II includes the following:

- **A comprehensive overview of Community assets, risks, and broader Community needs. This includes a description of the process undertaken to identify and inventory Community assets and the risk of damage or disruption to each due to flooding. A series of maps is also included which shows the location of each community asset, and its asset class all color coded by flood risk; and**
- **An analysis and discussion of Community needs and opportunities.**

The results of the asset inventory, risk assessment, and needs and opportunities assessment informed the development of strategies and the identification of projects to implement this NY Rising Community Reconstruction (NYRCR) Plan.

A. Description of community assets and assessment of risk

i. Description of community assets

Community assets in the NYRCR Towns and Villages of Esperance, Schoharie, and Middleburgh (Community) were identified and inventoried. Those assets were then ranked according to their relative vulnerability to flooding and importance to the Community in order to develop projects to protect the Community's more vulnerable assets.

a. Asset inventory methodology

Assets in the Community were initially identified through an extensive public engagement process that included multiple NYRCR Planning Committee meetings and public engagement events. Additional assets were identified through a review of existing datasets received from New York State Department of State (NYS DOS) and field surveys.[26]

Asset Inventory provides a complete description of the assets located within or outside of an NYRCR Community whose loss or impairment due to flooding and storm events would compromise any essential social, economic or environmental functions or critical facilities.

The purpose of the asset inventory was to compile and review assets within or close to the geographic scope that have been affected or could be affected by storm events. The Esperance, Middleburgh, and Schoharie Asset Inventory included assets that are in the 100- and 500-year floodplain as well as to assets that lie outside the 100- and 500-year floodplain that have an impact on Community resiliency. Assets were considered if their loss or impairment would compromise any critical facilities or any essential cultural, social, economic, or environmental functions of the Community.

The classes of assets included in the inventory are presented in **Table 4**.

Table 4 Classes of assets

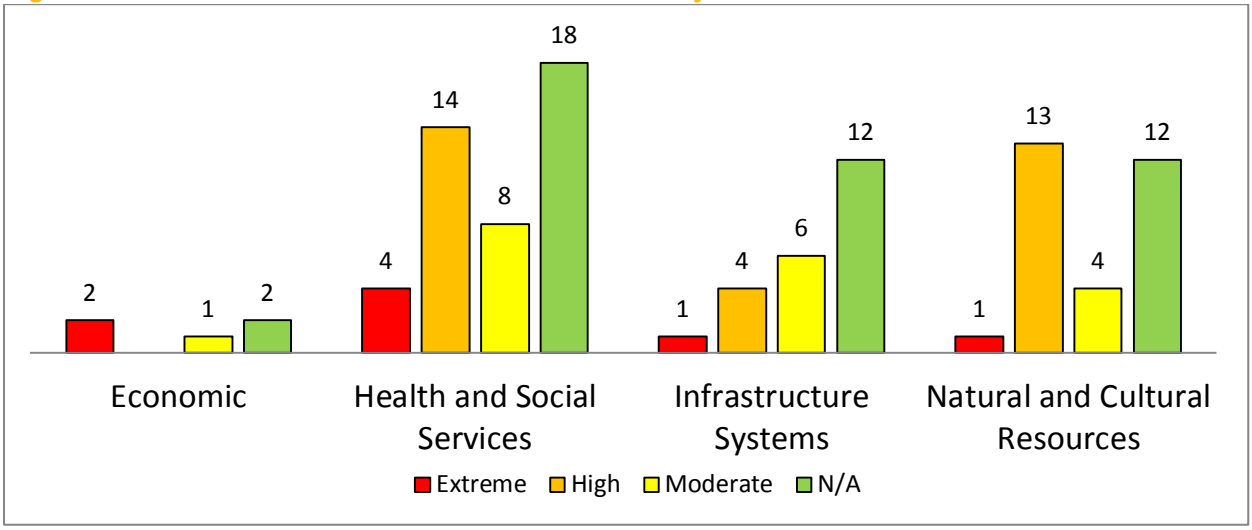
Asset Class	Asset Examples
Economic	Office buildings, business and industrial parks, manufacturing, warehouses, storage facilities, grocery stores, restaurants, banks, lodging, storefronts, downtown center, seasonal/tourism destinations
Health and Social Services	Schools, health care, day care, elder care, emergency operations, government and administrative services, media and communications, police, fire and rescue
Housing	Single-family and multi-family dwellings, supportive housing/group homes, senior housing and affordable housing
Infrastructure Systems	State Canal System facilities, pedestrian, bicycle and vehicular ways, transit, bridges, airports, rail, ports, ferries, gas stations, water supply, storm water, wastewater, solid waste and recycling
Natural and Cultural Resources	Natural habitats, wetlands and marshes, recreation facilities, parks, public access, open spaces, agricultural areas, religious establishments, libraries, museums, historic landmarks, performing arts venues

The risk area in which the asset is located was determined according to existing Federal Emergency Management Agency (FEMA) floodplain maps and Community observation. Assets were categorized into four different risk areas: Extreme, High, Moderate, and Not applicable (N/A):

- **Extreme Risk Areas** are those of frequent flooding as identified by the Planning Committee and public;
- **High Risk Areas** are inside the 100-year floodplain or are located 100 feet or less from the water;
- **Moderate Risk Areas** are inside the August 2011 high waterline mark map or are between 100 and 200 feet from the water;
- **Unlikely Risk Areas** are inside the 500-year floodplain or are between 200 and 300 feet from the water;
- **N/A Risk areas** are areas that are not known to flood and are located outside the 100-/500-year floodplain and are more than 300 feet from the water.

Figure 3 illustrates the number of assets identified in each risk area by asset class.

Figure 3 Number of assets in each asset class by risk area



As **Figure 3** shows, the greatest number of assets located in either the extreme and high risk zones are health and social services.

Community value

A Community value of **High, Medium,** or **Low** was assigned to each asset by the Planning Committee, based on their best judgment and knowledge of the region. The Community value, which represents the outcome or magnitude of damage to the Community if an asset flooded, is one of the factors that were considered in the development of recommendations related to protecting the asset. Other factors include risk, cost, benefits and regional ties. If an asset valued as **High** flooded, then the outcome would be critical or catastrophic to the Community. For example, if the Middleburgh Emergency Volunteer Ambulance Corps, Inc. or the Scho-Wright Ambulance Service, Inc. in the Village of Schoharie floods, emergency response services would be directly impacted.

If an asset valued as **Medium** flooded then the Community outcome would be marginal. For example, if the drinking water treatment plant in the Village of Schoharie flooded, then the Community would be temporarily without water until the facility repaired the damage caused by flood waters.

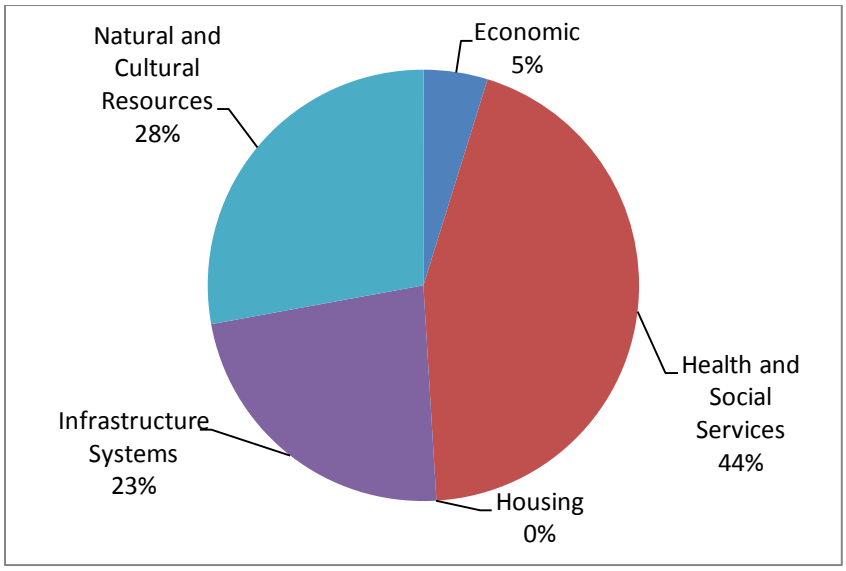
Finally, if an asset valued as **Low** flooded, then the Community outcome would be negligible. Examples of such low-value assets include the post offices in the communities, the Upper Middleburgh Cemetery, and various historical landmark and facilities such as the Schoharie Valley Railroad Complex.

Community assets

A total of 102 assets were identified in the six municipalities. Of those assets 23% were identified as Infrastructure, 44% were identified as Health and Social Services, 5% as Economic, and 28% as Natural and Cultural Resources (**Figure 4**). The full asset inventory list is provided in **Table 16** located in Section V of this NYRCR Plan.

These identified assets range in purpose and Community value and include local business districts, municipal offices, emergency response facilities, schools and shelters, churches, drinking water treatment facilities, wells, bridges and dams, telecommunication facilities, historical landmarks, libraries, and museums.

Figure 4 Esperance/Schoharie/Middleburgh asset inventory by asset class



Infrastructure assets

Twenty-three infrastructure assets were identified. Water supply assets account for almost one-third of the infrastructure assets located in these communities. These assets include treatment plants, wells, and water intake facilities. Bridges, the Valley View Airport, and six dams account for another third. An oil well, a transfer site, a radio station, and two telephone and cable facilities make up the remaining infrastructure assets located in these communities.

Health and social services assets

Forty-four health and social service assets were identified within these communities. These assets include various emergency response facilities including fire stations, ambulatory care services, the Schoharie County Department of Health, the Schoharie County Department of Social Services, the Emergency Management Office, and the Office for the Aging for Schoharie County, as well as six health care facilities. Fourteen governmental service and administration facilities such as municipal offices and post offices are included in this list of assets. Seven schools and the Schoharie Valley Children's Center (a head start child development program) are included as Community assets, four of which double as shelters and five of which are considered critical facilities.

Photo credit: Ecology and Environment, Inc.

The Middleburgh Telephone Company

Economic assets

Five economic assets were identified and include the Main Street business districts for Schoharie and Middleburgh, as well as Harva, Dr. Reddy's Laboratories, and the Schoharie Park Water Company. While no economic asset was identified in the Town or Village of Esperance, the identified assets have a broadly felt affect. These assets make up the economic backbone of the Community.

Natural and cultural resources assets

Thirty natural and cultural resources were identified as Community assets including historical landmarks, cultural and religious establishments, community centers, libraries, and museums. Of these assets two churches and the Esperance Elks Lodge, which double as shelters, are included as critical facilities. Another five assets including two libraries, the Fox Creek covered bridge, the Schoharie County courthouse, and St Mark's Evangelical Lutheran Church are considered locally significant.

Photo credit: Ecology and Environment, Inc.

Harva, Village of Schoharie

ii. Assessment of risk to assets and systems

a. Objective of the risk assessment

Risk is the probability that an asset will be damaged or destroyed during a major storm event. The Committee assessed the risk to assets to: understand those assets and geographic areas within the Community that are most at risk from storm damage; and inform the selection of projects that would benefit the Community the most.

Photo credit: Ecology and Environment, Inc.

Daughters of the American Revolution Lasell Hall: a historic landmark in the Village of Schoharie

b. Approach to the risk assessment

The NYRCR Risk Assessment Tool was used to evaluate the relative risk to all Community assets identified during the asset inventory process. For each asset, relative risk was assessed based on three factors: hazard, exposure, and vulnerability. Hazard is the likelihood and magnitude of future storm events. Exposure is a function of the local environmental attributes that contribute to flood risk, such as an asset's elevation with regard to Base Flood Elevation, its location with regard to points of confluence (where multiple streams intersect) and stormwater outfalls, and whether or not it is protected by vegetative buffers. Vulnerability

is a function of the type of asset and the length and severity of disruption to the asset's function that is likely to arise from flood damage.

A final risk score was computed for each asset using the NYRCR risk assessment tool. By employing the risk assessment tool, the Planning Committee was able to more objectively evaluate projects that would best protect the assets deemed most valuable within the Community as well as those projects that would contribute to long-term Community and economic growth.

c. Risk assessment results

Risk scores were characterized as severe, high, moderate, and residual risk. **Table 5** summarizes the distribution of risk scores for all of the identified Community assets. The final risk score helps to identify the assets within the Community that may be at an increased potential for storm damage and to establish how risks need to be addressed.

Table 5 Distribution of risk scores for the Towns and Villages of Esperance, Schoharie and Middleburgh assets

Risk Score	Total Assets	Critical Assets	Locally Significant	Assets Serve Vulnerable Populations
Severe	3	0	1	0
High	26	9	9	3
Moderate	19	9	3	3
Residual Risk	10	3	3	1

Severe risk assets

Among the six communities, a total of three assets were found to be at severe risk. Those assets include the Main Street business districts in the Village of Schoharie and the Village of Middleburgh and Our Lady of the Valley Church located in the Village of Middleburg. While the Our Lady of the Valley Church is not located in the 100- or 500-year floodplain, it flooded extensively during Hurricane Irene and subsequently was flooded in June of 2013 when Gorge Creek, a tributary of Schoharie Creek, flooded. In addition to extensive flood impacts during Hurricane Irene and Tropical Storm Lee, this area was defined as one that frequently floods by Community members. The Main Street Business Districts also suffered significant flood damage during Hurricane Irene and Tropical Storm Lee.

High risk assets

Photo credit: Ecology and Environment, Inc.

Village of Middleburgh Main Street Business District

Many of the 26 assets found to be at high risk are located in the 100-year floodplain, in close proximity to a water body, or within the frequent flooding water mark delineated by the Committee. Assets with the highest risk were Middleburgh Central School in the Village of Middleburgh; Niagara Engine Company 6 and Schoharie Village Offices in the Village of Schoharie; and Saint Mark's Evangelical Lutheran Church and Middleburgh Water Treatment Plant in the Village and Town of Middleburgh, respectively. Some assets that received high risk scores border the floodplain yet remain at risk because they are near tributaries that are unable to adequately drain or because flooding occurs as river morphology shifts. The flood patterns of the Schoharie Creek change with some regularity and, as a result, the 100- and 500-year floodplain maps do not always predict where flooding will occur.

High risk assets include multiple critical and locally significant assets as well as assets that protect vulnerable populations. Of these assets, 14 are categorized as health and social service assets and include health care facilities, emergency response facilities, municipal offices, local schools that double as shelters, and post offices. Another nine assets are considered natural and cultural resources and include libraries, churches, and historic landmarks such as the Schoharie Colonial Heritage Hall, the Daughters of the American Revolution (DAR) Lasell Hall, and the Schoharie Valley railroad complex. The previously mentioned Middleburgh water treatment plant in the Village and Town of Middleburgh and the drinking water well in the Town of Middleburgh are two high risk infrastructure assets that are listed as critical facilities. Lastly, the Main Street Business District in Middleburgh, a locally significant asset for the Town and Village economy, is located in an extreme flood risk area, is at a high risk, and suffered massive damage during Hurricane Irene. Many of these assets have been impacted by flooding from Hurricane Irene, Tropical Storm Lee, and other flooding events.

Moderate risk assets

Nineteen assets received a moderate risk score. These assets include health care facilities and emergency response facilities as well as a high school that also serves as a shelter during emergencies. Infrastructure facilities including drinking water intake and treatment plants (also considered critical facilities), a waters transfer site, and a bridge are also designated as moderate risk assets. Natural and cultural resources with moderate risk scores include Fox Creek Park, the Esperance cemetery, and historic landmarks such as the Fox Creek covered bridge, the Schoharie County Courthouse complex, and the Bellinger-Dutton house. Like some assets that received high risk scores, not all assets in this risk category are necessarily found within a floodplain or high water mark boundary. Moderate risk assets were characterized based on historical flooding impacts and proximity to water bodies. Assets not included in a

floodplain but that remain at a moderate risk include the Middleburgh Telephone Company in the Village of Middleburgh, the Schoharie Central High School in the Village of Schoharie, the Central Bridge fire station, and the Schoharie County Office for the Aging in the Town of Schoharie, which also doubles as a shelter. In these cases, assets are a risk because of infrastructure that currently cannot withstand the results of heavy rainfall or unpredictable flooding.

Residual risk assets

Ten assets were scored as residual risks. Two are located in a FEMA-delineated floodplain: a New York State Department of Transportation (NYS DOT) facility in the 100-year floodplain and Harva, a business, in the 500-year floodplain. The remaining assets are within 300 feet of a water body. These assets include the Village of Esperance and Huntersland fire stations and the Middleburgh Elementary School and shelter, all of which are considered critical facilities. Two museums, municipal offices, and the Middleburgh Telephone Satellite Cable Installation also received residual risk scores.

Photo credit: Ecology and Environment, Inc.

Fox Creek Park, Village of Schoharie

No risk assets

The remaining 29 identified Community assets received a risk score of zero, are not located in a flood risk area, and are thus considered not at risk.

Map Series

Figure 5 *is a map series that presents the Towns and Villages of Esperance, Schoharie and Middleburgh Community's assets according to their risk score as determined through the risk assessment process. Each asset is associated with an icon which corresponds to its asset class and is color coded according to its flood risk score.*

A vulnerability that is not captured in the risk assessment is that of individual homes and businesses to flood impacts. Many homes and businesses within each of these communities can be found both in the 100-year and 500-year floodplains and are vulnerable to flooding, with some experiencing repetitive flood impacts. A detailed housing assessment was completed in order to address this additional set of risks. A further discussion of the Community's housing needs can be found in the following section on Needs and Opportunities.

Figure 5: Towns and Villages of Esperance, Schoharie and Middleburgh
Community Assets Risk Maps
Frame 1 of 4

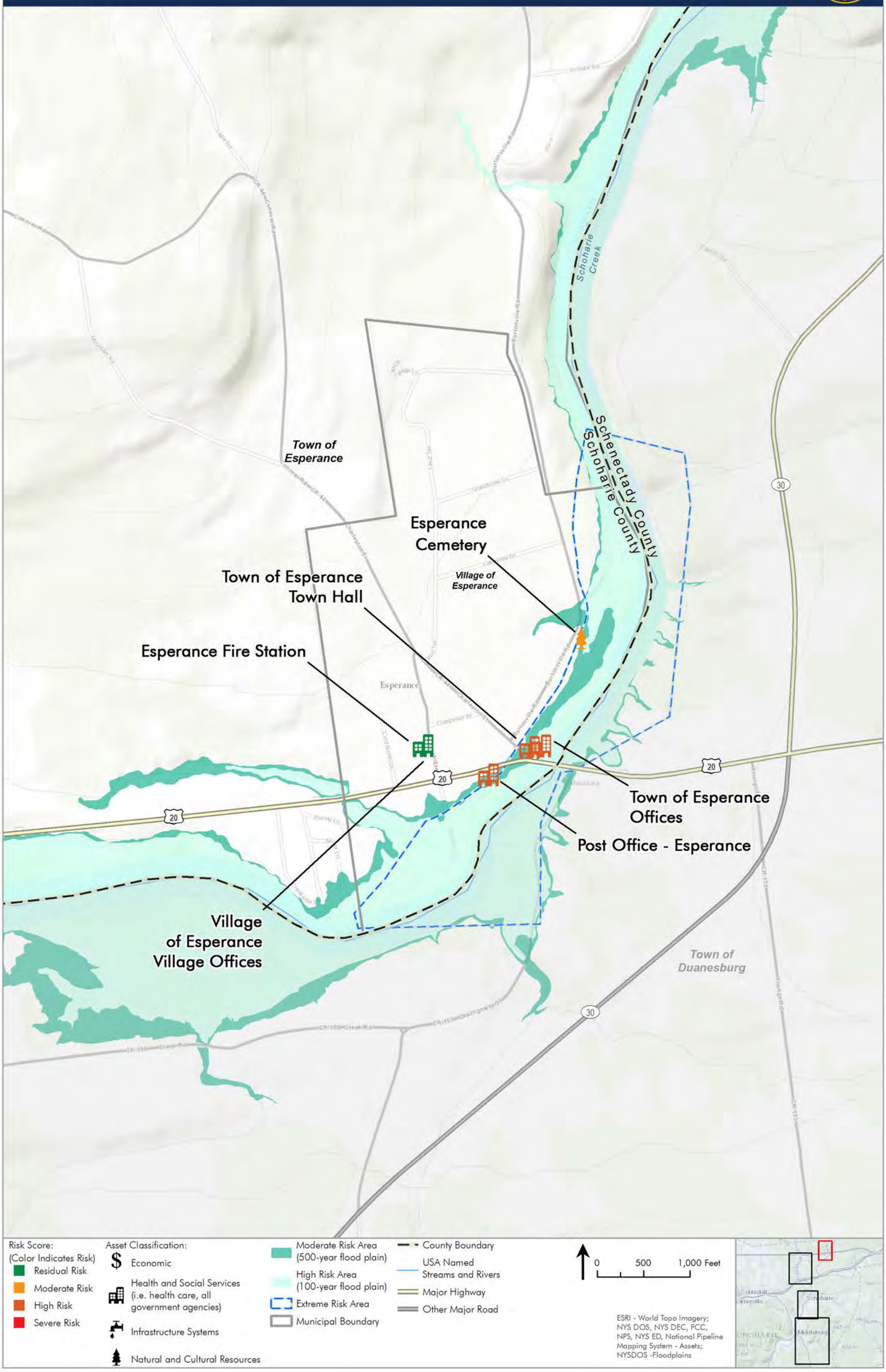


Figure 5: Towns and Villages of Esperance, Schoharie and Middleburgh
Community Assets Risk Maps
Frame 2 of 4

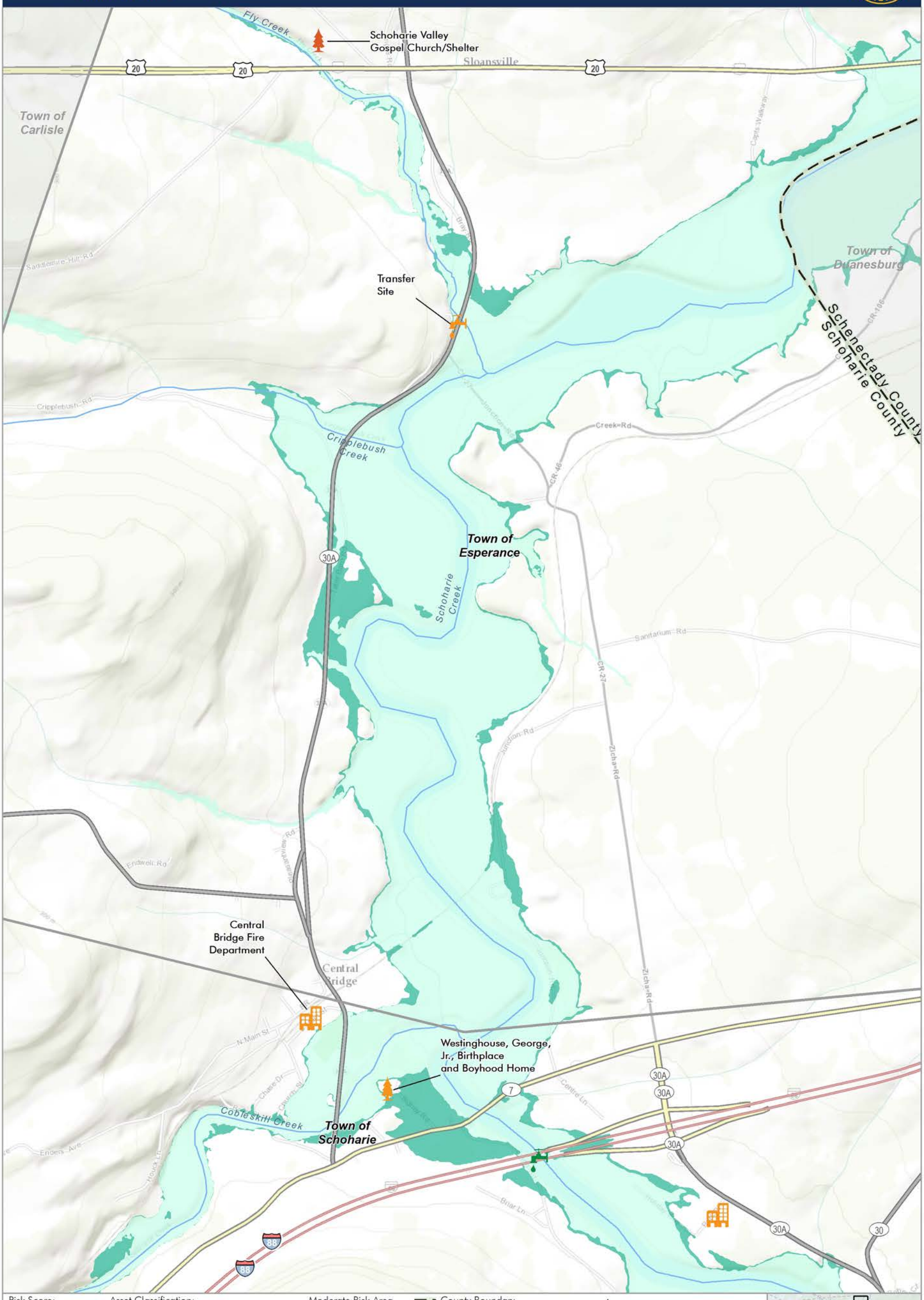
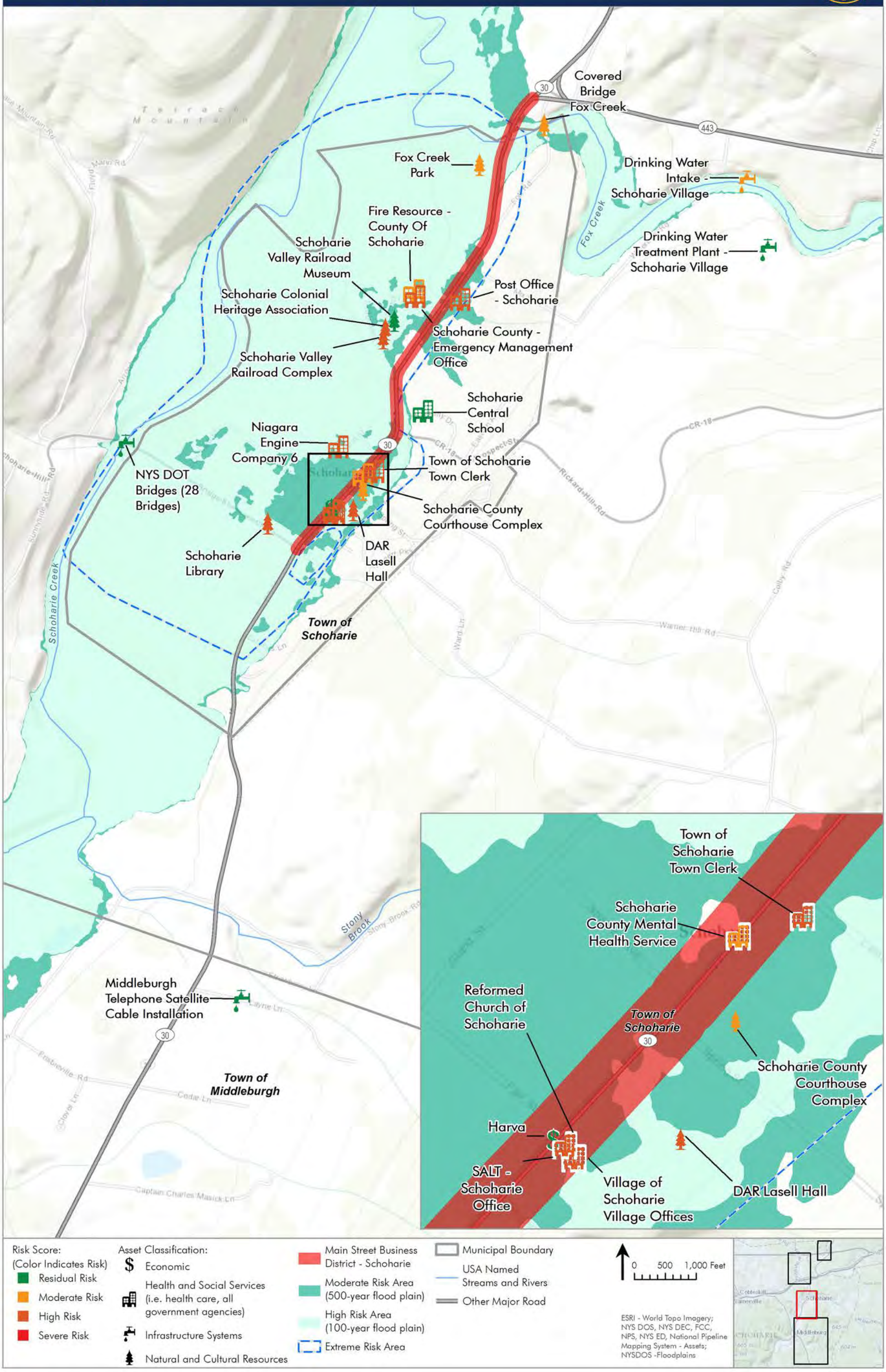


Figure 5: Towns and Villages of Esperance, Schoharie and Middleburgh
Community Assets Risk Maps
Frame 3 of 4



Risk Score:
(Color Indicates Risk)
- Residual Risk
- Moderate Risk
- High Risk
- Severe Risk

Asset Classification:
- $ Economic
- Health and Social Services (i.e. health care, all government agencies)
- Infrastructure Systems
- Natural and Cultural Resources

- Main Street Business District - Schoharie
- Moderate Risk Area (500-year flood plain)
- High Risk Area (100-year flood plain)
- Extreme Risk Area

- Municipal Boundary
- USA Named Streams and Rivers
- Other Major Road

0 500 1,000 Feet

ESRI - World Topo Imagery; NYS DOS, NYS DEC, FCC, NPS, NYS ED, National Pipeline Mapping System - Assets; NYSDOS -Floodplains

Figure 5: Towns and Villages of Esperance, Schoharie and Middleburgh
Community Assets Risk Maps
Frame 4 of 4

Middleburgh Reformed Church
Bellinger--Dutton House
Middleburgh Fire Department 96
Middleburgh Telephone Company
Village of Middleburgh
Middleburgh Elementary School/Shelter
Middleburgh DPW Building
Middleburgh Central School/Shelter
Middleburgh Diversion Dam
Town of Schoharie
Town of Wright
Town of Middleburgh
Huntersland Fire Department

St. Mark's Evangelical Lutheran Church
Middleburgh Fire Station
Middleburgh Fire Department 96
Drinking Water Treatment Plant - Middleburgh Village
Middleburgh Library
Post Office - Middleburgh
Middleburgh Telephone Company
St Catherine's Church
Drinking Water Well - Middleburgh Village
Bassett Healthcare Middleburgh
Middleburgh Central School/Shelter
Village of Middleburgh Village Clerk
Best House Medical Exhibit

Risk Score: (Color Indicates Risk)
- Residual Risk
- Moderate Risk
- High Risk
- Severe Risk

Asset Classification:
- $ Economic
- Health and Social Services (i.e. health care, all government agencies)
- Infrastructure Systems
- Natural and Cultural Resources

- Main Street Business District - Middleburgh
- Moderate Risk Area (500-year flood plain)
- High Risk Area (100-year flood plain)
- Extreme Risk Area

- Municipal Boundary
- USA Named Streams and Rivers
- Major Highway
- Other Major Road

0 1,000 2,000 Feet

ESRI - World Topo Imagery; NYS DOS, NYS DEC, FCC, NPS, NYS ED, National Pipeline Mapping System - Assets; NYSDOS -Floodplains

B. Assessment of needs and opportunities

i. Community needs and opportunities

Recovery of the Schoharie Valley Community must integrate both repair and stabilization strategies along with longer-range revitalization and economic-oriented actions. The Towns and Villages of Esperance, Schoharie, and Middleburgh still need to repair or replace lost and damaged assets, local infrastructure, and economic resources. Some assets may need to be demolished or moved out of harm's way. The Community aims to make existing and future assets more resilient.

In planning for recovery, the Community has recognized and built upon the regional nature of many local issues. At the same time, they have acknowledged each municipality's unique needs and opportunities. The identified needs and opportunities are presented below, by recovery support function.

NYRCR Plans: *In line with the National Disaster Recovery Framework, the plans will consider the needs and opportunities related to the following six recovery support functions:*

- *Community Planning and Capacity Building;*
- *Economic Development;*
- *Health and Social Services;*
- *Housing;*
- *Infrastructure; and*
- *Natural and Cultural Resources.*

a. Community planning and capacity building

Many people became isolated during flooding events in the Community because of challenges to emergency preparedness and a loss of communication. Hurricane Irene unleashed unprecedented impact to individuals, local and county governments, and local emergency responders. Enhanced communication among emergency providers and residents and businesses is a key component for storm preparation and emergency preparedness. There is a recognized need and opportunity to improve flood warning, emergency alerts, and awareness of evacuation policies. This opportunity may be realized through public education campaigns, using municipal websites to enhance communication and information on emergency plans and protocols, supporting more widespread cellular and broadband coverage, and implementing robust emergency communication systems, including text and email messages to residents.

There is a real opportunity to improve planning and incident management in the towns and villages, and identify management measures for preparation, notification, response, and cleanup phases in an emergency. The County has already developed a model Emergency Operations Plan (EOP) that each community could adopt and use to update its respective emergency preparedness and response programs. Adopting this EOP model across the communities will help each one with their own planning and capacity building by identifying the hazards, communication needs, responsibility structure, and logistics needed to adequately manage a disaster. This would also enable emergency services to respond effi-

ciently during an emergency event and follow their individual Emergency Operations Procedures (EOPs) at the local level, while seamlessly merging with the County's EOP and resources.

Another integral component of planning is focused on capacity-building at all levels. There is both a need and an opportunity for local governments to build the organizational capacity to administer projects. The administrative capacity of local governments can be supported by sharing governmental resources at a regional level, including continued support from County agencies (i.e., Schoharie County Planning and Development Agency and Schoharie County Soil and Water Conservation District).

Coordination, collaboration, and partnerships among the Community, local and regional agencies and organizations need to be fostered to enhance recovery and resiliency. Some partnering programs have already been initiated, such as the County Soil and Water Conservation District's implementation of the Mohawk River Watershed Management Plan. Other regional groups, such as Schoharie Area Long Term, Inc. (SALT), continue to help the Community recover from Hurricane Irene and Tropical Storm Lee flooding. The Village of Schoharie has under taken development of a Long Term Recovery Program which is identifying actions that the Village can accomplish in the short and long-term to revitalize.

Identification of appropriate flood mitigation techniques designed to address the unique hydrology and circumstances of each community

Existing comprehensive plans do not currently include evaluations of hydrological features or flooding patterns, nor do they identify specify techniques or preventative infrastructure that can address flooding and its underlying causes. To better accomplish this, all six towns and villages within the Community would need to update their comprehensive plans to include flood-related planning. The Town of Middleburgh received funding to update their comprehensive plan to reevaluate current floodplain areas and encourage better land use management practices to limit future loss of property and keep residents safe.

Local planning documents and hazard mitigation plans need to be updated with flood resiliency requirements and mitigation tools and actions. The update process needs to include the preparation of flood mitigation plans, studies of the Schoharie Creek and its tributaries, a determination of appropriate locations for development outside the floodplain, and a requirement that new structures within the floodplain be appropriately flood proofed. The development of five-year capital improvement plans that incorporate capital spending to implement flood resiliency projects would provide a pathway toward longer-term recovery.

Updating laws and building codes that incorporate flood-proofing and flood management for new development

Current laws and regulations need to be updated to consider vulnerable populations in the Community, methods to flood-proof structures, and implement hazard mitigation techniques. Specifically, updated building codes, land use regulations, and design guidelines would establish development and construction standards related to flood-proofing, protecting riparian zones, and floodplain management and mitigation and contribute to community resiliency. The enforcement of state building codes and establishment of

new property maintenance rules to verify building repairs are performed in accordance with applicable codes will help ensure that up to date methods to address flooding are used. Evaluating and updating existing floodplain laws would also help with property and resident protection.

b. Economic development

Nearly all business districts in the Villages are located in the floodplain, and most of these were flooded during Hurricane Irene and Tropical Storm Lee. Small businesses that were struggling prior to flooding were unable to re-open due to financial constraints associated with rebuilding and it is unlikely that businesses that have re-opened would be able to recover from another future storm.

Photo credit: Ecology and Environment

Closed businesses, Village of Middleburgh

Several buildings that were severely damaged during Hurricane Irene and Tropical Storm Lee, such as the Turtle Rock Café, have undergone FEMA buy-outs. Locations such as these are ideal to repurpose as open space Community use. Before the other spaces that are currently vacant can be used for commercial activity, they will require physical rehabilitation that brings them up to current building codes and incorporates flood resiliency techniques to minimize future flood damage. The ongoing vacancy and disrepair of key buildings in the Community contributes to blight and reduces reinvestment in the Community.

The Community has an opportunity to create a new climate of stability to attract and keep investment. This opportunity can be capitalized on by incorporating resiliency measures to assure business owners that the cycle of damage is being broken and their business will thrive through and after the next storm. Through the NYRCR planning process, the Community has an opportunity to develop tangible programs directed at rebuilding the economies of the towns and villages, strengthening Main Street districts, and attracting new, long-term investment. One such opportunity could involve taking ownership of commercially viable and vacant spaces, performing any requisite renovations and then leasing or selling the rehabilitated spaces to interested occupants. Another opportunity includes providing financial incentives or assistance to commercial property owners to rehabilitate and improve the resiliency of their businesses. Financial assistance can also be offered to existing and/or prospective Main Street business owners to purchase commercial property and thus further the Community's economic development goals. Enhanced economic and business activities such as those previously mentioned will create a thriving local economy, re-populate the villages, increase the fiscal health of the communities, and recover the quality of life that existed pre-flood.

All of these options will require guidance from a community development practitioner experienced in working with municipal governments and local development corporations. A regional business development coordinator could be engaged to facilitate the implementation of many of the other economic development recommendations included in this NYRCR Plan and other planning efforts.

Entrepreneurial and business development skills are needed to help the Community's small, local businesses succeed. Direct outreach to individual businesses is needed to connect people to sources of available technical and financial assistance. Additionally, there is a need for businesses to develop and, if possible, share business continuity-of-operations plans which will help them recover more quickly from storm damage, and leverage appropriate community support resources.

Photo credit: Sherri Meyer-Veen

Village Hardware, Village of Schoharie

The Community would benefit from the creation of business development incentives, comprehensive marketing, and grant writing efforts. The need to market the area to a variety of audiences has been recognized by the Community, NYRCR Planning Committee, and other planning efforts, such as the Village of Schoharie Long Term Community Recovery Program. A comprehensive marketing program with branding and outreach to a broad audience in the region, state, and country and targeted at potential residents, new entrepreneurs, and new clients/customers has been identified as a critical economic development need.

Outside the villages, assistance is still needed to help farms prepare for and mitigate against future storm damage. There is a need to ensure that electrical equipment and essential facilities such as milking parlors and milk tanks are placed or housed in structures with increased flood resiliency. Of particular importance to farmers are stream bank management and protection measures that could be implemented to reduce erosion of farmlands during flooding.

Residents and community leaders recognize that the area's scenic beauty, agriculture, and historic and natural resources are fundamental opportunities for economic enhancement through tourism. The Community is in an excellent location with easy access to the Capital Region of Albany/Schenectady/Troy as well as the Catskill Mountain area. These are opportunities that could be better taken advantage of to grow the economy.

Outdoor recreation tied to public access to Schoharie Creek and other natural and cultural assets are viewed as important economic development activities. The communities would benefit economically from developing flood-resilient recreational assets in the floodplain that would support tourism but at the same time, preserves the floodplain.

The largest land use in the Schoharie Valley is agriculture and as Schoharie County is within a half hour drive of the Capital District the area is in the perfect location to market and promote agritourism. Agritourism opportunities include farmers markets, u-pick operations, bed and breakfasts and inns located on farms, on-farm stays, farm tours, and scenic tours. Agritourism can be linked to existing retail operations on Main Street through the promotion of locally grown products. By supporting active agriculture in the Community, agritourism allows land to remain undeveloped and ultimately more flood resilient.

There is also a need and opportunity to assess the potential benefits associated with adding public infrastructure such as sewer and municipal water in the region which could result in additional economic development opportunities.

c. Health and social services

As can be seen in **Table 6**, the Community has a substantial proportion of their population that is considered vulnerable or underserved. These are the populations for which health and social services are most critical, particularly during emergencies. As a result there is a need to develop plans at the town or village level that specifically address health and social service needs in the communities.

Table 6 Vulnerable populations*

Municipality	2010 Population	14 years of age and under	65 years of age and over	Families below poverty level	Persons 5 years and older with a disability
Town of Esperance	1,731	326 19%	244 14%	4.8	590 34%
Village of Esperance	345	56 15%	44 13%	3.7	107 31%
Town of Schoharie	2,283	356 16%	339 15%	3.8	624 27%
Village of Schoharie	922	111 12%	195 21%	5.9	341 37%
Town of Middleburgh	2,246	376 17%	351 16%	11.5	615 27%
Village of Middleburgh	1,500	233 15%	263 17%	12.2	547 36%

**Schoharie County Multi-Jurisdiction Hazard Mitigation Plan* (2013).

There is also the need to coordinate the Community and Schoharie County with health care providers including Bassett Healthcare, which manages the nearest hospital located in Cobleskill, to help them improve their capacity to maintain operations during and after emergencies. Contingency planning needs to be developed for the County Department of Health which was inoperable during Hurricane Irene due to flooding and led to a lack of services from this department.

These needs may be addressed by improving the resiliency of health and social service infrastructure so that services may continue uninterrupted during future flood events. By improving communication services and providing backup electricity during and after flood events, recovery efforts would also be improved. The absence of additional capacity could be addressed by reinstating a former County initiative to train community members to support medical services in emergencies.

Medical and social service care has been restored to levels that existed prior to the flood events. In addition, there is an effort under way to bring medical facilities to underserved populations through a new clinic in the Village of Middleburgh. The current level of care is sufficient to address the social service needs for the Community at the present time.

d. Housing

More than 700 residential units, including single-family, multi-family, and renter-occupied housing have suffered repeated damage from flooding events since 1958 throughout Schoharie County. As a result of Hurricane Irene and Tropical Storm Lee alone, 520 housing units were destroyed or damaged, a figure that represents roughly 20% of the total housing stock within the community.[27] [28]

Based on SALT Coalition door-to-door surveys the estimated cost of full-home repairs was approximately $75,000 per structure, which represented 147 flood-damaged homes in the County. SALT has recently estimated that repair costs can reach $150,000 for larger, older homes that were damaged. Currently approximately 70 households in the County are in need of replacement housing; 26 of these households include someone with special needs.

Immediately after the flood, some home and business owners in the Community began a reconstruction response to begin recovery. In the Village of Schoharie, four homes were elevated. Some landowners relocated utilities and other essential equipment from basements to upper floors. According to the survey completed for the Village of Schoharie Long Term Community Recovery (LTCR) Plan, a plan funded by the New York State Department of State (NYS DOS) to help develop strategies for long-term recovery, the percentage of completed retrofitting is not high. The missed opportunity to retrofit structures may have been due to financial constraints and the immediate need to recover quickly. As a result, there is a need and opportunity to work with landowners to flood-proof and retrofit in a more comprehen-

Photo credit: Colleen Fullford

Significant damage to a home caused by Hurricane Irene

sive manner to mitigate future flooding events. This need could be addressed if homeowners were provided with flood resiliency audits, educational materials, and resources related to flood mitigation measures such as elevation, moving utilities, and filling in basements.

A huge constraint on development and continued housing ownership is high flood insurance rates. To address this need, projects that exceed the minimum requirements of the National Flood Insurance Program Community Rating System could be implemented to improve resiliency and reduce flood insurance rates.

There is a true shortage of undeveloped land within the incorporated areas of the three villages and outside the floodplain, so there is a need to rehabilitate or retrofit existing housing stock and expand non-floodplain areas where feasible. By creating and enforcing floodplain building standards, the towns and villages could minimize flood damage.

Local building code requirements should address the protection in investments in new and rebuilt homes or buildings. There is a need to strengthen building codes for new and rebuilt structures to ensure that flood resiliency is maximized. Given the location of these communities in the floodplain, updating the building code is a critical and significant task to enhance flood mitigation needs in the future.

Other housing-related issues include housing quality and future housing needs. While affordable housing is available, there are few upscale or quality apartments that would be attractive to young professionals in the area. It is anticipated that housing needs will change in the future due to the current trend that the population is aging. The senior population may require alternative housing types.

e. Infrastructure

Hurricane Irene and Tropical Storm Lee left nearly $130 million in damages to public infrastructure, including water and sewer, roads, bridges, public buildings, emergency service facilities (fire and ambulance facilities), storm water and drainage systems, and water resources throughout the Community. Schoharie County has estimated that $32.6 million is needed for more than 900 public utility and infrastructure projects.[29] This cost estimate includes repairs and upgrades to public facilities and privately owned utilities, as well as match requirements for federal funded programs, such as the FEMA Hazard Mitigation Grant Program and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Emergency Watershed Protection Program.

Photo credit: Ken Hubert

Route 30 was reduced to one lane due to damage caused by Hurricane Irene

It has been difficult for Schoharie County to undertake some projects without identifying a required source for matching funds. The cost in disaster damages for each municipality has often exceeded their annual operating budgets. There is an immediate need for financial assistance to aid the recovery of the six municipalities. Critical infrastructure needs in the Community as a result of Hurricane Irene and Tropical Storm Lee are vast and include the following:

- Flood proofing and improvements of water treatment facilities, drinking water intakes, and drinking water sources;
- Sewer system installation and resiliency enhancements;
- Construction, rehabilitation and flood proofing of various public service buildings including emergency response facilities such as fire houses and Emergency Medical Services (EMS), town hall, and town highway facilities;
- Repair and redesign of drainage and stormwater systems to better handle floodwaters;
- Installation of culverts that are adequately designed to convey stormwater;
- Repair and cleaning of catch basins;
- Debris removal, cleaning, and restoration of streams;
- Road improvements to help ensure road networks are more resilient;
- Upgrade sidewalks to improve pedestrian linkages and safe routes; and
- Improvement of curb cuts on Main Streets.

While making these necessary infrastructure improvements, the Community has the opportunity to address some of their infrastructure needs through natural infrastructure and Low Impact Development (LID) design techniques. These techniques have been increasingly recognized and promoted among hazard and climate planners and managers as opportunities to increase flood resiliency, supplement existing infrastructure, and increase livability. Wetlands help cleanse urban storm water of contaminants before it enters waterways, improving overall water quality. Green space provides habitat for wildlife, opportunities for fishing and recreation, and improved quality of life for residents.

Photo credit: Wikipedia

A low impact development technique: rain gardens, reduce stormwater runoff and flooding

Low Impact Development (LID) provides an innovative opportunity and approach to stormwater management with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. By managing runoff close to its source though intelligent site design, LID techniques can enhance the Community's local environment, protect public health, and improve Community livability. From an economic standpoint, some LID techniques require lower maintenance and management costs when compared with traditionally built infrastructure. Given the landscape of the six communities, ample opportunities exist to take advantage of green infrastructure to address a subset of the identified physical infrastructure needs.

f. Natural and cultural resources

Given the ongoing issues related to flooding and storm water management, the importance of natural resources and open spaces is widely recognized in the Community. The various comprehensive plans do not currently acknowledge the importance of natural resources and open space, address resource protection, and establish broad objectives to minimize flood damage. However, there is a need to incorporate specific details on flood damage mitigation in natural resource management plans. At this time, the communities do not have open space or comprehensive stormwater plans.

Stream and stormwater management

One weakness that is common to all six municipalities' planning documents is that they do not include sufficient data, analyses, policies, or actions to address and mitigate flooding, or utilize green infrastructure. The Community has an opportunity to begin to see Schoharie Creek as having positive roles instead of solely negative ones. Schoharie Creek is an ecological, agricultural, and recreational asset for each municipality, if managed correctly.

Photo credit: Ken Hubert

Schoharie Creek as seen from above after Hurricane Irene

The Community wants to use water resources effectively and, to this end Schoharie County has conducted a preliminary evaluation of major streams and tributaries to identify needed improvements for efficient storm water management. A Community-wide storm water evaluation study to determine retrofit opportunities using green infrastructure and LID techniques is an important next step.

Throughout the Schoharie Valley, there is a need to understand the condition and hydrology of streams and undertake stream and stream bank projects that stabilize banks, reduce erosion, and protect floodplains. Streams and stream conditions have been evaluated by the Schoharie County Soil and Water Conservation District (SCSWCD) and Schoharie County was awarded funding to implement stormwater management practices in the Mohawk River watershed. While stream restoration projects on four major

tributaries in the area are underway, long-term threats to public safety from future flooding still exist because stream and floodplain projects have not yet been undertaken in most other places in the Community. Future mitigation projects can build upon the program efforts already underway.

More emphasis is needed on how natural systems can be restored or expanded to best withstand inundation from future storms and provide greater protection of assets. This can be accomplished through studying the hydrology and behavior of Schoharie Creek, and its tributaries, and preparing a flood management plan; restoring stream channels and banks; developing and protecting wetlands; updating stream gage monitoring of the Schoharie Creek; and enhancing the riparian zone/vegetation.

Current land use or storm water regulations can also be evaluated and modified in order to protect and enhance wetlands or other natural infrastructure. Finally, implementation of stream protection ordinances at the municipal or county level could become an important tool for the Community, especially as they may control dumping of trees and debris in the creek and its tributaries.

Cultural and recreational resources

A majority of homes in the Village of Schoharie are historic and likely eligible for listing on the National Register of Historic Places (NHRP). Most listed and unlisted historic buildings including the County Court House and Daughters of the American Revolution's (DAR) LaSalle Hall were heavily impacted by Hurricane Irene and Tropical Storm Lee. Although no buildings or sites in the Village of Esperance are on the NRHP, the Village has a great deal of historic character and architecture. As such there is a need for the local comprehensive plans to establish and outline a process for protecting these historic resources from flooding or other natural disasters.

Residents of the area have clearly identified the need for additional recreational opportunities and enhanced access to cultural resources. For example, the Village of Esperance Comprehensive Plan mentions a desire to expand the amount of parkland in the Village and increase access to Schoharie Creek. Opportunities to provide access to recreational and cultural resources include:

- The creation of better linkages to historic sites and cultural facilities in the Valley;
- The creation of a cohesive waterfront recreational plan to help spur physical and economic revitalization;
- The enhancement of recreational and tourism opportunities throughout the Community; and
- The creation of a historic and cultural resources group to coordinate efforts to protect and promote these resources.

There is a desire and opportunity to use green areas throughout the Community as part of an overall green infrastructure system and explore the use of Netherlands-style recreational areas as detention ponds during flooding.

Another resource needing attention is agriculture. Many farms throughout the Community had major losses of land, crops, equipment, animals, and structures. Despite the key role of agriculture as a pre-dominant local land use and major economic driver in the County, there is no plan that addresses how to protect valuable farms and farmland from future flooding and storm-induced erosion. Schoharie County does have a county-wide agriculture and farmland protection plan, but flooding impacts to farms were not evaluated or included in future farmland protection recommendations.

Flooding in the Streets
Source: Sherri Meyer-Veen

The Cleanup Effort in the Village of Middleburgh after Hurricane Irene
Source: Ken Hubert

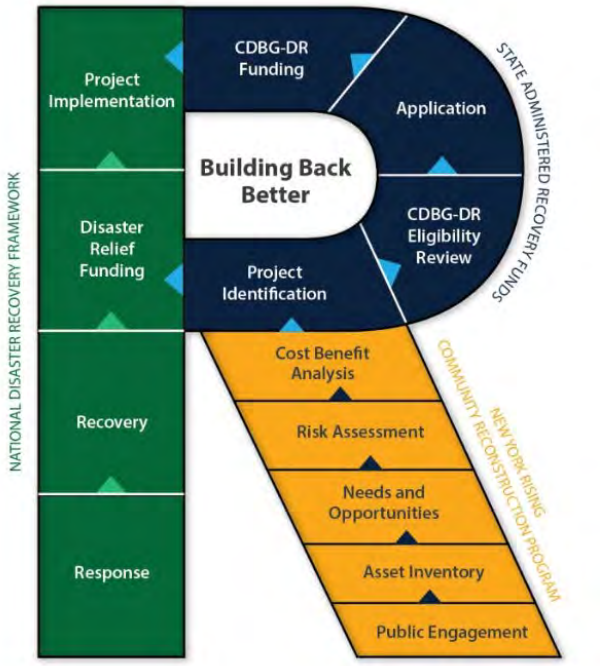
III. Reconstruction and resiliency strategies

Section III builds on the asset inventory, risk assessment, and needs and opportunities presented in the previous section. Included are a description of the reconstruction and resiliency strategies proposed by the NY Rising Community Reconstruction (NYRCR) Towns and Villages of Esperance, Schoharie, and Middleburgh Committee. Strategies are intended to help mitigate risk and address community needs. The proposed strategies are:

- **Regional Strategy One: Enhance storm preparation and emergency preparedness planning;**
- **Regional Strategy Two: Build a vibrant economic base;**
- **Regional Strategy Three: Address the lack of detailed data and analysis to quantify flood risks;**
- **Municipal Strategy One: Strengthen each jurisdiction's storm preparation and emergency preparedness planning;**
- **Municipal Strategy Two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee;**
- **Municipal Strategy Three: Address interim and permanent housing needs; and**
- **Municipal Strategy Four: Address the lack of comprehensive open space and stormwater plans.**

A. Reconstruction and resiliency strategies

The NYRCR Planning Committee (Committee) for the Towns and Villages of Esperance, Schoharie, and Middleburgh (Community), in collaboration with numerous other partners, has identified strategies and projects that will support reconstruction, resilience, and economic development and assist these Towns and Villages in recovering from the impacts of Hurricane Irene and Tropical Storm Lee. The strategies and projects identified here are built from the Community Needs and Opportunities Assessment and are designed to lessen impacts from future storm events and strengthen the Community's ability to recover from inevitable storms in the future.



The development process of reconstruction and resiliency strategies and projects

The strategies listed in this NYRCR Plan were developed through desktop research and analysis, field work, interviews, and collaborative brainstorming with the Committee and other local and regional stakeholders. For each strategy, the Community needs, from which it was derived, and Proposed and Featured projects are presented in a table. Detailed profiles for Proposed and Featured projects are found in Section IV of this NYRCR Plan.

As discussed in Section II.B., the Towns and Villages of Esperance, Schoharie, Middleburgh share many similar needs and opportunities by virtue of their history and location within the Schoharie Valley. They also share similar risks with respect to future severe weather and flooding events. These unifying similarities argue strongly for a collaborative, regional approach to achieving many of the recovery and resilience challenges. Nonetheless, there are specific needs in each municipality that are best addressed at the local level.

The strategies and actions identified in the planning process recognize both the need for a regional approach to address common needs as well as creating municipal-specific strategies. In some cases (e.g., emergency management) more than one municipality identified the same strategy yet different projects

to address their specific needs. Some projects that were identified also address several strategies. A summary of the regional and municipal-specific projects is provided in **Tables 7-13** by each strategy.

Regional strategies

Regional strategies address needs on a broad scale and require resources that may be beyond the capacity of the individual Towns and Villages. In addition, the Community recognizes that jurisdictions are interdependent on services such as emergency response, can synergize to affect resilience (e.g., tourism and economic development), and impact each other in terms of watershed management practices. Based on this understanding, the Committee created three regional strategies.

Regional strategy one: ***Enhance storm preparation and emergency preparedness planning across the Community, including improving communication capacities and processes and educating the public to prepare for, respond to, and recover from flooding.***

This strategy was developed by the Committee based on experiences during Hurricane Irene and Tropical Strom Lee where the capacity of emergency services was exceeded, communications were strained and the need for advanced public education was realized. The Village of Schoharie firehouse was destroyed by flood waters and the Central Bridge firehouse was inaccessible because of flooded roads. The remaining fire service organizations struggled to respond with old, limited and inefficient equipment. Emergency medical services access and transport routes were disrupted. The all-volunteer fire and emergency medical services historically struggle to maintain a cadre of trained personnel which was further strained during the flood emergencies when they were torn between helping neighbors and helping their own families. Despite these challenges, not a single life was lost due to flooding. The existing Community communication systems including person-to-person, telephone, cellular service, internet, and television temporarily failed as a result of flood damage, the cause of which was typically the loss of electricity. Due to the flooding of roads, Community members became isolated which contributed to loss of person-to-person communication. This breakdown in communication systems contributed to instances of miscommunication and misinformation. The lack of public education on personal preparedness further strained response organizations. As such, the Community identified the need to improve the capacity of emergency response systems and enhance public education. **Table 7** below presents the Proposed and Featured regional projects identified by the Community to address this strategy. Proposed projects are defined as projects that are proposed for funding through the collective Community's allocation of Community Development Block Grant – Disaster Recovery (CDBG-DR) funding. Featured projects are projects and actions that the Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.

Table 7 **Regional strategy one: Enhance storm preparation and emergency preparedness planning across the region, including improving communication capacities and processes and educating the public to prepare for, respond to, and recover from flooding.**

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Flood Warning and Response System	Develop a flood warning and response plan to improve emergency communications and regional emergency and contingency vehicle routes.	$500,000	Proposed	Y	Regional
Flood Resilience Public Education Campaign	Develop and distribute educational materials to help residents understand key steps to prevent or reduce flood damage.	$85,000	Proposed	Y	Regional
Recruit Volunteer First Responders	Implement focused recruitment program with appropriate training and marketing efforts to increase the number of trained emergency response volunteers.	$60,000	Proposed	Y	Regional
Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)	Build hydrologic model of Schoharie Creek and tributaries to identify and evaluate the feasibility of long term solutions to flooding, drainage, and stormwater management. Develop conceptual mitigation projects that could be funded via future grants.	$48,000	Proposed	Y	Regional
Generators for Healthcare Facilities and Emergency Services	Fund purchase and installation of emergency generators in five to ten selected critical healthcare facilities or emergency shelters that currently do not have, or have inadequate generators.	$500,000 (can be phased)	Proposed	Y	Regional
Provide Resources for Homeowners	Provide financial support for a variety of mitigation efforts such as resiliency audits, home elevations, relocation of utilities, and filling-in cellars.	$2,060,000	Proposed	Y	Regional

Table 7 (continued) Regional strategy one: Enhance storm preparation and emergency preparedness planning across the region, including improving communication capacities and processes and educating the public to prepare for, respond to, and recover from flooding.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Local Disaster Recovery Manager	Employ a disaster recovery manager to secure funding for future restoration and development projects. Future projects could include completing Village water and sewer system, restoring the theater, and adding new Schoharie Creek access points.	$300,000 (phased over 2 years)	Proposed	Y	Regional
Build a Multi-use Trail from Central Bridge through Schoharie to Middleburgh	Build a multi-use trail, including bike paths along Routes 30, 30A, and 145, from Central Bridge through the Village of Schoharie to the Village of Middleburgh. Green infrastructure and flood mitigation features would be an integral part of the trail and would help to reduce flood impacts in surrounding areas.	$2,200,000	Featured	Y	Regional

Regional strategy two: ***Build a vibrant economic base by supporting and improving businesses, services and attractions in region.***

Prior to the devastating damage caused by Hurricane Irene and Tropical Storm Lee, the communities of Esperance, Schoharie, and Middleburgh were already struggling economically. Four of the six jurisdictions in this Community are designated low/moderate income. Damages caused by flooding were crippling. Businesses sustained flood damage, which resulted in economic losses due to closure and the need to contribute financial resources towards repairing and rebuilding their structures. Many businesses were unable to recoup the losses they suffered and closed permanently which cascaded into increasing unemployment rates. The Community has identified the need for a strategy that would strengthen the economic viability and resiliency of these communities through support to businesses, bolstering the local tourism industry, and community planning activities. **Table 8** below links Proposed and Featured projects with this strategy.

Photo credit: Ecology and Environment, Inc.

The Turtle Rock Café remains closed and has undergone a FEMA buyout

Table 8 Regional strategy two: Build a vibrant economic base by supporting and improving businesses, services and attractions in the region.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Generators for Healthcare Facilities and Emergency Services	Fund purchase and installation of emergency generators in five to ten selected critical healthcare facilities or emergency shelters that currently do not have or have inadequate generators.	$500,000 (can be phased)	Proposed	Y	Regional
Central Bridge Main Street Repairs	Stormwater repairs, including installation of storm sewer pipe and catch basins, creation of a stone lined ditch, sidewalk replacements, and asphalt repairs would be completed on portions of North and South Main streets that were damaged during Irene.	$1,150,000	Proposed	N	Town of Schoharie

Table 8 (continued) Regional strategy two: Build a vibrant economic base by supporting and improving businesses, services and attractions in the region.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Parrott House	This project includes the acquisition and repair of the Parrott House. This project will purchase the building, making resiliency and flood mitigation repairs by raising the utilities to the first floor, and bringing the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Parrott House was impacted by Hurricane Irene and Tropical Storm Lee. The building is currently vacant and at risk of blight.	$980,000	Proposed	N	Village of Schoharie
Taylor Block	This project includes the acquisition and repair of the Taylor Block building. This project will purchase the building, make resiliency and flood mitigation repairs by raising the utilities to the first floor, and bring the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Village believes that this is keystone project that addresses an urgent need related to the flood, impacts low/moderate income families, and addresses economic development.	$655,000	Proposed	N	Village of Schoharie

Table 8 (continued) Regional strategy two: Build a vibrant economic base by supporting and improving businesses, services and attractions in the region.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Commercial Node Development and Public Utility Extension Feasibility Study	This project includes two feasibility studies. The first will consider property siting and acquisition, permitting, infrastructure improvements, and business incentives as part of the development of a commercial node outside the floodplain. The second will evaluate the feasibility and conduct a cost/benefit analysis of extending public utilities to the potential commercial node areas.	$140,000	Proposed	N	Town of Middleburgh
Local Disaster Recovery Manager	Employ a disaster recovery manager to secure funding for future restoration and development projects. Future projects could include completing Village water and sewer system, restoring the theater, and adding new Schoharie Creek access points.	$300,000 (phased over 2 years)	Proposed	N	Village of Middleburgh
Build a Multi-use Trail from Central Bridge through Schoharie to Middleburgh	Build a multi-use trail, including bike paths along Routes 30, 30A, and 145, from Central Bridge through the Village of Schoharie to the Village of Middleburgh. Green infrastructure and flood mitigation features would be an integral part of the trail and would help to reduce flood impacts in surrounding areas.	$2,200,000	Featured	Y	Regional
Re-purpose Destroyed Mobile Home Park	Although homes in the mobile park home on Junction Road were completely destroyed by flooding, the site is now stable and functional utilities still remain. The proposed project is to covert the site for use by RVs; creating an opportunity for tourism for the area.	$100,000	Featured	N	Town of Esperance

Table 8 (continued) Regional strategy two: Build a vibrant economic base by supporting and improving businesses, services and attractions in the region.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Business Restoration and Incentives Program	This funding will assist in rebuilding Main Street's economy and to increase downtown business opportunities and includes financial incentives. A zero- or low-interest loan or matching grant program will be established to assist existing or potential Main Street property owners with rehabilitation of commercial or commercial/mixed use buildings in the Village. The program would work in concert with Rebuild, Restore, and Repopulate Main Street.	$400,000	Featured	N	Village of Middleburgh
Add the Village to the Town of Middleburgh's Comprehensive Plan Update	Add the Village to the comprehensive plan updates currently being planned for the Town. The plan will address development in the floodplain and flood mitigation strategies. The plan update will incorporate new mapping and studies and identified flood mitigation, risk reduction measures, and resiliency policies. An updated comprehensive plan will be necessary to be successful in future applications for grant funding. By adding the Village to this effort, resources may be maximized a coordinated planning effort would be achieved.	$40,000	Featured	N	Village of Middleburgh

Regional strategy three: ***Address the lack of detailed data and analysis to quantify flood risks and to plan measures, including green infrastructure projects, to reduce flooding risks and increase resiliency of stream systems in the event of future storms.***

As a result of the lack of detailed existing data related to flood risks, the Towns and Villages of Esperance, Schoharie, and Middleburgh face challenges to implement adequate flood mitigation measures. As described in the Description of Storm Impacts and Critical Issues, Sections IB and C of this NYRCR Plan, impaired creeks and tributaries overwhelmed infrastructure, resulted in excessive damage to public and private structures and property, and resulted in delays in response and recovery. The Community identified the critical need for a strategy to address these data gaps in order to plan and implement projects that would be rooted in resilience. **Table 9** below presents the Community's Proposed and Featured projects to address this strategy.

Table 9 **Regional strategy three: Address the lack of detailed data and analysis to quantify flood risks and to plan measures including green infrastructure projects, to reduce flooding risks and increase resiliency of stream systems in the event of future storms.**

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)	Build hydrologic model of Schoharie Creek and tributaries to identify and evaluate the feasibility of long term solutions to flooding, drainage, and stormwater management. Develop conceptual mitigation projects that could be funded via future grants.	$48,000	Proposed	Y	Regional
Flood Warning and Response System	Develop a flood warning and response plan to improve emergency communications and regional emergency and contingency vehicle routes.	$500,000	Proposed	Y	Regional
Flood Resilience Public Education Campaign	Develop and distribute educational materials to help residents understand key steps to prevent or reduce flood damage.	$85,000	Proposed	Y	Regional
Provide Resources for Homeowners	Provide financial support for a variety of mitigation efforts such as resiliency audits, home elevations, relocation of utilities, and filling-in cellars.	$2,060,000	Proposed	Y	Regional

Table 9 (continued) Regional strategy three: Address the lack of detailed data and analysis to quantify flood risks and to plan measures including green infrastructure projects, to reduce flooding risks and increase resiliency of stream systems in the event of future storms.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Gorge Creek Hydrologic Study	Conduct hydrologic study of approximately one mile of Gorge Creek to determine measures to stabilize the creek banks and increase the capacity of the creek in order to mitigate downstream flooding. Study would include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling.	$40,000	Proposed	N	Town of Middleburgh
Stream Bank Erosion Control—Schoharie Creek off of Baker Avenue	Install rip rap and stone revetments to slow creek flow, reduce erosion, and mitigate flooding along approximately 1,000 feet of the Schoharie Creek parallel to Baker Avenue.	$400,000	Proposed	N	Village of Middleburgh
Fox Creek Study	Evaluate flooding along Fox Creek near SR30 bridge.	$40,000	Featured	N	Town of Schoharie
Become a Federal Emergency Management Agency (FEMA) CRS Community	Obtain a Class 9 or better rating under the FEMA Community Rating System to reduce the cost of flood insurance premiums for businesses and homeowners.	$50,000	Featured	N	Village of Middleburgh

Municipal specific strategies

Municipal strategy one: *Strengthen each community's storm preparation and emergency preparedness planning, including improving communication capacities and processes.*

The Community developed a regional strategy to enhance storm preparation and response capabilities (Regional strategy one). Municipal strategy one was included based on the need to address municipal-specific damage to infrastructure, build local economic bases, update local plans, bolster the emergency services capabilities of each jurisdiction and address localized flood concerns. **Table 10** below describes municipal-specific projects identified to address this strategy.

Table 10 Municipal strategy one: Strengthen each Community's storm preparation and emergency preparedness planning, including improving communication capacities and processes.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Central Bridge Firehouse Relocation	Relocate the Central Bridge firehouse to a new location on higher ground because the roads surrounding the firehouse were flooding during Irene, preventing effective response.	$2,900,000	Proposed	N	Town of Esperance
Town of Esperance Town Hall Restoration and Flood Proofing	This project includes two components: (1) Renovate the Esperance Town Hall building and add flood proofing by raising the utilities, and (2) Construct an additional building next to the existing transfer station to serve as a secondary location for services, and storage of archives and records.	$606,000	Proposed	N	Town of Esperance
Equip Landis Arboretum as an Emergency Shelter	Upgrade the Landis Arboretum Meeting House to serve as an emergency shelter install back-up generator and a water purification and filtration system.	$40,000	Proposed	N	Town of Esperance
Village of Esperance Firehouse Rescue Facility	Construct a new rescue facility for the Village of Esperance. The current firehouse is too old to accommodate modern fire trucks which are larger than the size of the truck bays. This lengthens response time due to difficultly getting trucks in and out of the firehouse.	$750,000	Proposed	N	Village of Esperance

Table 10 (continued) Municipal strategy one: Strengthen each Community's storm preparation and emergency preparedness planning, including improving communication capacities and processes.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Town of Schoharie Highway Garage Replacement	Construct a new Town garage in a location away from the creek. The Town garage used by the Department of Public Works for maintenance and repair of Town equipment was severely damaged during Irene and is vulnerable to future storms in its current location.	$1,970,000	Proposed	N	Town of Schoharie
Contribution to Firehouse Replacement	FEMA is providing partial funding for construction of a new firehouse to replace the Village firehouse that was destroyed during Irene. The Town and Village of Schoharie will contribute funds towards the cost of the new facility and equipment.	$850,000	Proposed	N	Town and Village of Schoharie
Land Use Study for Floodplain Management	Conduct a Land Use Study to identify lands to support strategic relation of buildings and promote development outside flood-prone areas.	$100,000	Proposed	N	Village of Schoharie
Rebuilding Police Emergency Services	Construct a new shared service facility outside of the floodplain on the Schoharie Central School District Property. The building will house emergency services, police vehicles and equipment, and the police department's safety office. This project is needed because the building that housed the Village Police Department was destroyed during Irene.	$200,000	Proposed	N	Village of Schoharie
New Ambulance Building and Shelter	Construct a new EMS building and new emergency shelter on the Department of Public Works property on Cotton Hill Road to address a lack of sufficient EMS operating space. The new emergency shelter would be located outside of the floodplain.	$2,300,000	Proposed	N	Town of Middleburgh
Emergency Response Equipment	Middleburgh Fire Department will purchase needed equipment including a new fire engine pumper/tanker, SEFU storm emergency unit, 25 sets of turnout gear, Jaws of Life, 100 KW generator, and Bullard thermal imagers.	$975,000	Proposed	N	Town and Village of Middleburgh

Table 10 (continued) Municipal strategy one: Strengthen each Community's storm preparation and emergency preparedness planning, including improving communication capacities and processes.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Stream Bank Erosion Control—Schoharie Creek off of Baker Avenue	Install rip rap and stone revetments to slow creek flow, reduce erosion, and mitigate flooding along approximately 1,000 feet of the Schoharie Creek parallel to Baker Avenue.	$400,000	Proposed	N	Village of Middleburgh
Town of Schoharie Comprehensive Plan Update	Update the Town and Village's Comprehensive Plan based on the impacts of Hurricane Irene and Tropical Storm Lee.	$40,000	Featured	N	Town of Schoharie
Alternate Emergency Route	Construct a road to provide an alternate emergency evacuation route to Route 145 and River Street, which flood frequently during storms. Road would be constructed perpendicular to a series of dead end residential streets east of Schoharie Creek.	$900,000	Featured	N	Town of Middleburgh
Become a FEMA CRS Community	Obtain a Class 9 or better rating under the FEMA Community Rating System to reduce the cost of flood insurance premiums for businesses and homeowners.	$50,000	Featured	N	Village of Middleburgh

Municipal Strategy 2: ***Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood proofing and flood preparedness measures.***

Photo credit: Sherri Meyer-Veen

Damaged and blocked road as a result of flooding

During Hurricane Irene infrastructure systems in the Towns and Villages of Esperance, Schoharie, and Middleburgh experienced significant damage. Many of these systems have yet to fully recover and remain threatened by future flooding impacts. Roads were washed out, bridges failed, debris clogged waterways and culverts which exacerbated flooding, drinking water facilities were damaged, and stormwater drainage systems overflowed. The Community identified the need to strategically repair infrastructure and continue to grow in a manner that is consistent with the character of each municipality while continuing to build resilience to future flood events. This strategy also includes the provision of emergency services during and after flood events and provides the dual benefit of supporting economic development. **Table 11** below lists projects to address municipal-specific infrastructure needs.

Table 11 **Municipal strategy two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood-proofing and flood preparedness measures.**

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Drinking Water Intake Improvements	Implement water supply and transmission line improvements for Central Bridge to prevent the intake of floodwaters at the water treatment plant during storm events and impacts to water quality.	Phase I: $1,280,000 Phase II: $1,200,000	Proposed	N	Town of Esperance
Tributary Mitigation Program	Implement mitigation activities identified in a previous study on Fly Creek and perform like studies on Cripplebush and Cobleskill Creeks to identify appropriate mitigation efforts.	$680,000	Proposed	N	Town of Esperance

Table 11 (continued) Municipal strategy two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood-proofing and flood preparedness measures.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Cemetery Road Repair	Pave the cemetery dirt roads which were heavily damaged by Irene. Take-off quantities for asphalt have already been estimated.	$125,000	Proposed	N	Village of Esperance
Install Sewer to prevent future health risks in the Village of Esperance, Phase I	Conduct engineering study, prepare an engineering design and install a sewer trunk line and wastewater treatment plant in the Village of Esperance. Septic leach fields adjacent to groundwater wells were flooded during Irene, putting the groundwater supply and community health at risk. The leach fields are aging, not maintained and no program exists for testing.	$2,400,000	Proposed	N	Village of Esperance
Town of Schoharie Highway Garage Replacement	Construct a new Town garage in a location away from the creek. The Town garage used by the Department of Public Works for maintenance and repair of Town equipment was severely damaged during Irene and is vulnerable to future storms in its current location.	$1,970,000	Proposed	N	Town of Schoharie
Central Bridge Main Street Repairs	Stormwater repairs, including installation of storm sewer pipe and catch basins, creation of a stone lined ditch, sidewalk replacements, and asphalt repairs would be completed on portions of North and South Main street s that were damaged during Irene.	$1,150,000	Proposed	N	Town of Schoharie
Stony Brook Mitigation	Address sections of the Stony Brook which need repair to mitigate extensive flooding. Repairs could include bed raising, floodplain reconnection, grade control, and culvert modifications/upgrades.	$2,100,000	Proposed	N	Town of Schoharie
Hilgert Parkway Stormwater Pumping Station	Constructing a pumping station will relieve flooding problems that exist. This area is prone to flooding because land on Hilgert Parkway is lower than the Spring Brook streambed and other water outlets preventing water from draining by gravity.	$242,000	Proposed	N	Village of Schoharie

Table 11 (continued) Municipal strategy two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood-proofing and flood preparedness measures.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Young's Spring Intake Line Replacements	Stabilize and protect the main source of drinking water for the Village of Schoharie. During Irene geologic shifting threatened the water supply. This project would harden siphon pipes for water intake.	$70,000	Proposed	N	Village of Schoharie
South End Drainage Improvements	Construction of swales, retention ponds, culverts, storm drains, and the stabilization of stream banks in the Village's South End to relieve chronic problems with ponding stormwater.	$1,015,000	Proposed	N	Village of Schoharie
Master Drainage Plan	The flood damage sustained by the Village of Schoharie during Hurricane Irene and Tropical Storm Lee revealed a critical need for a master drainage plan. The plan will help the Village be proactive in its engineering and planning both for future storm events and additional mixed used development in the Community.	$288,000	Proposed	N	Village of Schoharie
Northern Drainage/Stream Improvement	This project will address flooding of Fox Creek. It includes the improvement of drainage along the Fox Creek tributaries that runs from the center of the Village to Fox Creek.	$290,000	Proposed	N	Village of Schoharie
Land Use Study for Floodplain Management	Conduct a Land Use Study to identify lands to support strategic relation of buildings and promote development outside flood-prone areas.	$100,000	Proposed	N	Village of Schoharie
Gorge Creek Hydrologic Study	Conduct hydrologic study of approximately one mile of Gorge Creek to determine measures to stabilize the creek banks and increase the capacity of the creek in order to mitigate downstream flooding. Study would include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling.	$40,000	Proposed	N	Town of Middleburgh

Table 11 (continued) Municipal strategy two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood-proofing and flood preparedness measures.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Town of Middleburgh Watershed Restoration Project	Design and engineering for the restoration of Little Schoharie and Line Creeks to re-establish natural channels, restore trout habitat, stabilize areas where landslides occurred during Hurricane Irene and Tropical Storm Lee, and protect homes, farms and roads.	$1,000,000	Proposed	N	Town of Middleburgh
Gorge Creek Culvert Repair and Stormwater and Drainage Infrastructure Improvements	Construct new box culvert to replace culverts beneath Middleburgh High School. The new culvert will connect existing Main Street stormwater drainage and new stormwater systems constructed under this project along Main Street, Railroad Avenue, Railroad Court, Sheldon Street and Danforth Avenue to Gorge Creek.	$2,600,000	Proposed	N	Village of Middleburgh
Install Sewer to prevent future health risks in the Village of Esperance, Phase II	Conduct engineering study, prepare an engineering design, and install a collection system to connect the remaining residences in the proposed sewer district in the Village of Esperance to the trunk line on Main Street that was installed as part of the proposed first phase of this project. Septic leach fields adjacent to groundwater wells were flooded during Irene, putting the groundwater supply and community health at risk.	$1,700,000	Featured	N	Village of Esperance
Fox Creek Study	Evaluate flooding along Fox Creek near SR30 bridge.	$40,000	Featured	N	Town of Schoharie
Central Bridge Water Reservoir Restoration	Debris and sediment that washed into the reservoir during Irene have impacted water quality and needs to be removed.	$640,000	Featured	N	Town of Schoharie

Table 11 (continued) Municipal strategy two: Make repairs to infrastructure damaged by Hurricane Irene and Tropical Storm Lee and implement flood-proofing and flood preparedness measures.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Evaluate and Install Photovoltaic Systems	Renewable energy infrastructure may create significant annual savings in municipal operating expenses. This project is to examine the cost-benefit and feasibility of solar energy upgrades for the Villages' municipal buildings. Based on the study's results, a program will be established to support solar installations for municipal buildings used by the Village.	$150,000	Featured	N	Village of Schoharie
Spring Brook Drainage Improvements	Spring Brook flooded severely during Hurricane Irene and Tropical Storm Lee. Improvements will be made to enhance flow capacity into the stream channel and subsequently, Schoharie Creek.	$3,800,000	Featured	N	Village of Schoharie
Evaluate and Install Photovoltaic Systems	Renewable energy infrastructure may create significant annual savings in municipal operating expenses. This project is to examine the cost-benefit and feasibility of solar energy upgrades for the Villages' municipal buildings. Based on the study's results, a program will be established to support solar installations for municipal buildings used by the Village.	$150,000	Featured	N	Village of Schoharie
Spring Brook Drainage Improvements	Spring Brook flooded severely during Hurricane Irene and Tropical Storm Lee. Improvements will be made to enhance flow capacity into the stream channel and subsequently, Schoharie Creek.	$3,800,000	Featured	N	Village of Schoharie
Implementation of the Commercial Node Town of Middleburgh Utility Extension	Extend public utilities out of the Village of Middleburgh into the Town to attract new businesses and encourage these to build outside the floodplain.	$3,000,000	Featured	N	Town of Middleburgh

Municipal strategy three: ***Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.***

Impacts of Hurricane Irene and Tropical Storm Lee highlighted the need for short- and long-term resilient houses within the Community. The need for additional resiliency tools and measures that would protect housing within the Community was also noted. These needs related to increased housing resiliency include enhanced emergency services capabilities for fire suppression and water pumping; stream and stormwater management for the protection of nearby properties; and long-term planning for the protection of existing homes and deliberate management of floodplain development. **Table 12** below lists Proposed and Featured projects identified to address housing needs.

Table 12 **Municipal strategy three: Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.**

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Tributary Mitigation Program	Implement mitigation activities identified in a previous study on Fly Creek and perform like studies on Cripplebush and Cobleskill Creeks to identify appropriate mitigation efforts.	$680,000	Proposed	N	Town of Esperance
Central Bridge Main Street Repairs	Stormwater repairs, including installation of storm sewer pipe and catch basins, creation of a stone lined ditch, sidewalk replacements, and asphalt repairs would be completed on portions of North and South Main street s that were damaged during Irene.	$1,150,000	Proposed	N	Town of Schoharie

Table 12 (continued) Municipal strategy three: Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Parrott House	This project includes the acquisition and repair of the Parrott House. This project will purchase the building, making resiliency and flood mitigation repairs by raising the utilities to the first floor, and bringing the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Parrott House was impacted by Hurricane Irene and Tropical Storm Lee. The building is currently vacant and at risk of blight.	$978,400	Proposed	N	Village of Schoharie

Table 12 (continued) Municipal strategy three: Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Taylor Block	This project includes the acquisition and repair of the Taylor Block building. This project will purchase the building, make resiliency and flood mitigation repairs by raising the utilities to the first floor, and bring the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Village believes that this is keystone project that addresses an urgent need related to the flood, impacts low/moderate income families, and addresses economic development.	$653,800	Proposed	N	Village of Schoharie
Land Use Study for Floodplain Management	Conduct a Land Use Study to identify lands to support strategic relation of buildings and promote development outside flood-prone areas.	$100,000	Proposed	N	Village of Schoharie
Huntersland Volunteer Fire Department Berm Enhancement	The berm behind the Huntersland Volunteer Fire Department will be increased in height, stabilized, and extended in length to direct stormwater overflow away from the nearby church and residences.	$144,000	Proposed	N	Town of Middleburgh

Table 12 (continued) Municipal strategy three: Address interim and permanent housing needs across all housing types, including special needs and affordable housing, and reduce flood insurance costs to current homeowners.

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Stream Bank Erosion Control - Schoharie Creek off of Baker Avenue	Install rip rap and stone revetments to slow creek flow, reduce erosion, and mitigate flooding along approximately 1,000 feet of the Schoharie Creek parallel to Baker Avenue.	$400,000	Proposed	N	Village of Middleburgh

Municipal strategy four: ***Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure.***

The Communities have the opportunity to increase resiliency through green infrastructure projects such as the construction of swales, retention ponds and stabilization of stream banks as well as reuse of FEMA buy-out properties as open space. The projects listed in **Table 13** include gathering appropriate data and conducting analyses to address stormwater management; restoring streams; adopting policies that enable implementation and maintenance of open space and stormwater measures; and leveraging opportunities for reusing previously developed land for open spaces including recreation.

Table 13 Municipal strategy four: Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Tributary Mitigation Program	Implement mitigation activities identified in a previous study on Fly Creek and perform like studies on Cripplebush and Cobleskill Creeks to identify appropriate mitigation efforts.	$680,000	Proposed	N	Town of Esperance
Re-purpose Destroyed Mobile Home Park	Although homes in the mobile park home on Junction Road were completely destroyed by flooding, the site is now stable and functional utilities still remain. The proposed project is to covert the site for use by RVs; creating an opportunity for tourism for the area.	$100,000	Proposed	N	Town of Esperance
Cemetery Road Repair	Pave the cemetery dirt roads which were heavily damaged by Irene. Takeoff quantities for asphalt have already been estimated.	$125,000	Proposed	N	Village of Esperance

Table 13 (continued) Municipal strategy four: Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Stony Brook Mitigation	Address sections of the Stony Brook which need repair to mitigate extensive flooding. Repairs could include bed raising, floodplain reconnection, grade control, and culvert modifications/upgrades.	$2,100,000	Proposed	N	Town of Schoharie
Master Drainage Plan	The flood damage sustained by the Village of Schoharie during Hurricane Irene and Tropical Storm Lee revealed a critical need for a master drainage plan. The plan will help the Village be proactive in its engineering and planning both for future storm events and additional mixed used development in the Community.	$288,000	Proposed	N	Village of Schoharie
Northern Drainage/Stream Improvement	This project will address flooding of Fox Creek. It includes the improvement of drainage along the Fox Creek tributaries that runs from the center of the Village to Fox Creek.	$290,000	Proposed	N	Village of Schoharie
Land Use Study for Floodplain Management	Conduct a Land Use Study to identify lands to support strategic relation of buildings and promote development outside flood-prone areas.	$100,000	Proposed	N	Village of Schoharie

Table 13 (continued) Municipal strategy four: Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Gorge Creek Hydrologic Study	Conduct hydrologic study of approximately one mile of Gorge Creek to determine measures to stabilize the creek banks and increase the capacity of the creek in order to mitigate downstream flooding. Study would include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling.	$40,000	Proposed	N	Town of Middleburgh
Huntersland Volunteer Fire Department Berm Enhancement	The berm behind the Huntersland Volunteer Fire Department will be increased in height, stabilized, and extended in length to direct stormwater overflow away from the nearby church and residences.	$144,000	Proposed	N	Town of Middleburgh
Town of Middleburgh Watershed Restoration Project	Design and engineering for the restoration of Little Schoharie and Line Creeks to re-establish natural channels, restore trout habitat, stabilize areas where landslides occurred during Hurricane Irene and Tropical Storm Lee, and protect homes, farms and roads.	$1,000,000	Proposed	N	Town of Middleburgh

Table 13 (continued) Municipal strategy four: Address the lack of comprehensive open space and stormwater plans in the Community, including development and restoration of green infrastructure

Project Name	Short Project Description	Estimated Cost	Proposed or Featured Project	Regional (Y/N)	Municipality
Local Disaster Recovery Manager	Employ a disaster recovery manager to secure funding for future restoration and development projects. Future projects could include completing Village water and sewer system, restoring the theater, and adding new Schoharie Creek access points.	$300,000 (phased over 2 years)	Proposed	N	Village of Middleburgh
Karkerdorf Boat Launch	Build a public boat and kayak launch on Schoharie Creek and adjacent open land resulting from buy-outs of residential properties located off Smith Road that sustained extensive damage during Hurricane Irene.	$600,000	Featured	N	Town of Schoharie
Add the Village to the Town of Middleburgh's Comprehensive Plan Update	Add the Village to the comprehensive plan update currently being planned for the Town. The plan will address development in the floodplain and flood mitigation strategies. The plan update will incorporate new mapping and studies and identified flood mitigation, risk reduction measures, and resiliency policies. An updated comprehensive plan will be necessary to be successful in future applications for grant funding. By adding the Village to this effort, resources may be maximized a coordinated planning effort would be achieved.	$40,000	Featured	N	Village of Middleburgh

Volunteers Help Rehab the Bland Family Home
Source: Schoharie Area Long Term, Inc.

IV. Implementation – project profiles

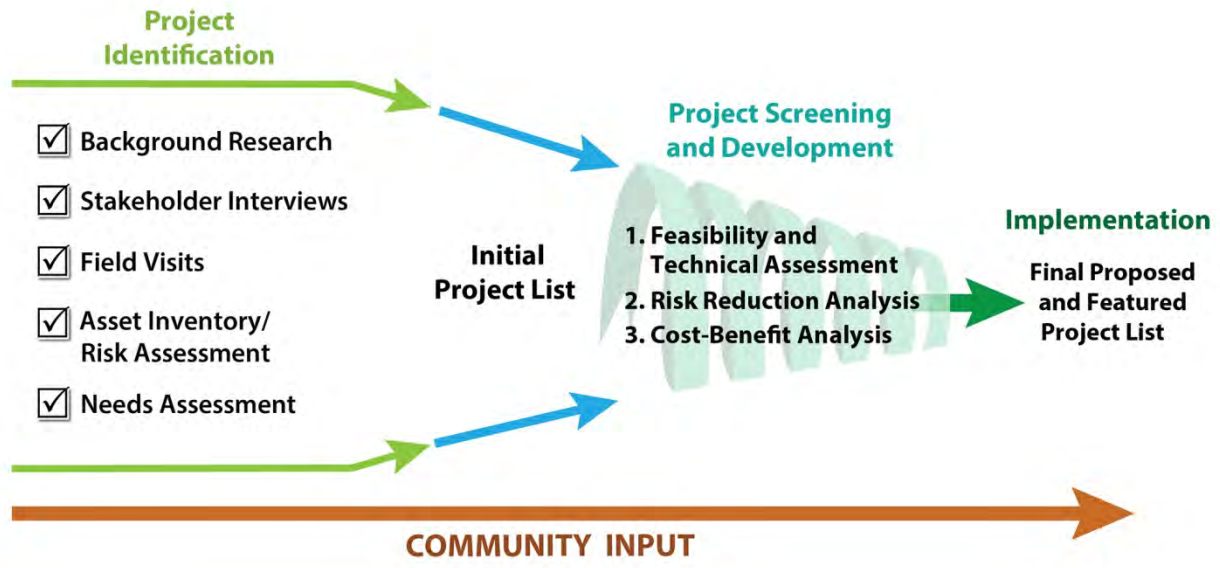
Section IV includes a description of the projects that were identified to address the Community's needs based on the strategies presented in the previous section. A detailed project profile is presented for each Proposed and Featured project identified by the NY Rising Community Reconstruction (NYRCR) Towns and Villages of Esperance, Schoharie, and Middleburgh Planning Committee. Project profiles include:

- **Project name, location, and jurisdiction;**
- **Type of project – Proposed or Featured;**
- **Associated strategies and recovery functions;**
- **Description of the project purpose, scope, and expected outcomes;**
- **Project cost;**
- **Project benefits;**
- **Project implementation strategy;**
- **Potential regulatory requirements (review, permits, etc.); and**
- **Potential alternate funding sources for Featured projects.**

Following the project profiles is a series of maps which displays the location where each Proposed or Featured project would occur.

The NYRCR Planning Committee (Committee) compiled a list of loosely defined projects that would contribute to the Schoharie Valley Community's long-term resiliency, categorized by the six Recovery Support Functions and informed by the needs and opportunities assessment and public input received during public engagement events. Each project was evaluated with regard to its technical feasibility and possible regulatory requirements. Projects were presented at the third Public Engagement Event. Public comments on projects were addressed and updated descriptions were presented to the Planning Committee. The Committee then voted on whether or not to include each Proposed and Featured project in this NYRCR Plan. **Figure 6** below depicts the process of project screening and selection.

Figure 6 NYRCR Plan Project identification and screening process.



The project development, evaluation, and screening process resulted in the selection of Proposed and Featured projects. Project profiles for all Proposed and Featured projects are provided in this plan section. Proposed projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding. Featured projects are projects and actions that the Planning Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program. The Featured project profiles include additional funding sources that may be sought for their completion.

Projects have been grouped by geographic scope. Regional projects, which would provide benefit to all of the jurisdictions in this NYRCR Community, are presented first. Projects that are jurisdiction-specific are then presented traveling geographically from north to south in the Community from Esperance to

Middleburgh. Each project contains details about the project including the associated NYRCR Plan strategy and recovery functions, the project location and jurisdiction, in which it would be implemented, a description of the project, benefits, costs, and an implementation strategy including timeframe and regulatory requirements. For Featured projects, alternative funding sources are also identified. It should be noted that each project which receives State funding will require review for applicability of the State Environmental Quality Review Act (SEQRA) under Part 617 of the NYS Environmental Conservation Law.[30]

Following the project profiles, a map series (**Figure 7**) illustrates the location of Proposed and Featured projects.

A bridge flooded by the Schoharie Creek
Source: Sherri Meyer-Veen

Flood Warning and Response System – Enhancing Community Response

Project type: Proposed

Associated Strategies
- Understanding Regional Flood Risks
- Regional Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Economic Development
- Health and Social Services

Location
- Regional

Jurisdictions
- Schoharie County

Emergency communications and coordination in the region were challenged during Hurricane Irene. The following improvements have been identified as critical communication needs for future storm and emergency events:

- Improved forewarning to residents on the anticipated time and height of the crest of the Schoharie Creek and its tributaries;
- Redundancy in all forms of communications to avoid communication system disruptions as a result of flooding (prevalent power outages led to disruptions of the already unreliable cellular service in the Schoharie Valley); and
- The dispersion of information on primary and alternative evacuation and emergency response routes. During Hurricane Irene, many of routes were blocked by flooding, debris, and traffic during. This will allow for more efficient access to residents who were isolated and could not be evacuated or provided with emergency services.

Photo credit: Ecology and Environment

Scho-Wright Ambulance Service, Schoharie, NY

Additionally, the all-volunteer fire and emergency medical services in the Schoharie Valley have struggled to maintain adequate membership and training in their response forces. This need for more robust emergency services includes pre-established plans for coordination since facilities were damaged or destroyed during Hurricane Irene and volunteer responders were strained to address their personal impacts while also supporting neighbors.

This project is to develop a flood warning and response plan which includes the following elements.

- An area-wide notification system with auto-dial and texting capabilities to provide telephone alerts to residents;
- Revision of the Warning/Communications Annex to the County's Emergency Operations Plan including establishing emergency communication points outside the floodplain for continuity of communications;
- Collaboration among response organizations to document coordinated regional emergency response approaches for increasing efficiencies;
- Establishment of contingency transportation routes for emergency services;
- Identification and mapping of areas which cannot be reached during a storm to develop plans to address residents and Community assets that may become isolated during flooding; and contingency routes for evacuation; and
- Prioritized list of areas for improved drainage along pre-established contingency routes to maintain continuity of use during floods.

Building upon the County's After Action Report, this project calls for a comprehensive evaluation of the existing emergency response and evacuation services against the challenges that were experienced as a result of flooding from Hurricane Irene and Tropical Storm Lee. An area-wide notification system with communication nodes outside the floodplain will be selected to work in conjunction with an enhanced response network, organized to meet the specific challenges faced during the flood events. It will include a number of elements such as establishing memoranda of understanding and coordination plans among emergency response providers, including fire and ambulance services; evaluating alternate evacuation routes and access routes for first responders; identifying vulnerable populations and their predominant needs, as well as areas typically isolated during flood events; and establishing gaps in response services, including the need for supporting service volunteers during emergencies.

Estimated Project Costs

The estimated costs for the project are **$500,000** including the identification of gaps and needs, establishment of an improvement plan, and the implementation of a notification system.

Project Benefits

Community Planning and Capacity Building

The proposed planning and evaluation element of the project will result in better emergency communications and agency coordination for the Community by identifying opportunities for improved emergency response through better access, pre-planned inter-mural communications, and pre-identified vulnerable populations. In selecting an area-wide notification system with auto-dial and texting capabilities,

the Community will be better able to make more timely response and evacuation decisions thereby reducing risks to life and to public safety, especially to populations that may become isolated during flooding. This is expected to reduce the demand on emergency responders.

Economic Development

Overall the project will support Community recovery activities by increasing the efficiency of response and better targeting resources used to respond. With the area-wide notification system, residents will generally be able to plan to evacuate or shelter-in-place using real-time information and allow emergency services to focus on vulnerable populations and critically impacted assets. Increased response capacity generated through contingency and coordination planning and a bolstered cadre of response volunteers is expected to result in enhanced response efficiency. Each of these elements will generate economic benefits for the community by streamlining the provision of services, reducing material loss to residents through more informed self-response, and focused protection of Community-critical assets.

Health and Social Services

A goal of this project is to increase life-safety protection of persons, including vulnerable and isolated populations, and for the emergency responders who assist them. It is intended to better match the resources available during an emergency event to the needs of the Community and provide advanced warning for residents' protection. It is also designed to improve emergency response which is expected to reduce psychological and emotional stresses to response personnel who will be able to provide more and focused assistance in less time.

Risk Reduction and Cost-Benefit Analysis

This project is to address protection of the health and safety of residents, visitors, and emergency response personnel within the Schoharie Valley who may be impacted by impending flooding. Risk to physical assets may also be reduced as it is anticipated that emergency responders will be more able to address this secondary concern if, as a result of this project, fewer residents are at risk. Early warning to residents in the floodplain allows them to safely evacuate or find shelter on higher ground. Identifying areas that may be isolated by flooding, or vulnerable populations who cannot self-evacuate in advance of flooding will help responders make good decisions early on in the response on the deployment and/or sharing of resources. This will not only help protect these residents, but will also reduce the demands placed on emergency response services during and immediately after an event. This project also includes planning to increase the efficiency with which response organizations can collaborate to better use resources across the region. Investment in this project is expected to reduce the cost of future response activities in terms of tangible response costs (e.g. gasoline, equipment wear), as well as costs to individuals as they undertake proactive measures to protect themselves and their properties.

Implementation Strategy

It will take approximately two to three months to prepare a scope of work and select a consultant. Once the contract is in place, it will take an additional four to six months to perform data collection, followed by three to four months of planning meetings. After this, a further four to six months will be needed to draft the system plan, and select and install the area-wide notification system.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

Flood Resilience Public Education Campaign

Project type: Proposed

Associated Strategies
- Understanding Regional Flood Risks
- Regional Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Housing
- Health and Social Services

Location
- Regional

Jurisdiction
- N/A

After Hurricane Irene and Tropical Storm Lee, many residents indicated that they would have benefited from knowing more about how to prepare for, respond to, and recover from flooding. Some of the challenges they encountered during the floods include: unexpected amounts and locations of water on their properties; knowing how to get emergency information during the flooding; the need for unplanned evacuation including deciding what to take with them and where they will go; and providing support to family members with special needs. After the flood water receded and residents returned to their properties, they were faced with the daunting task of clean up. Challenges with this phase of recovery included: disposal of household goods (including appliances and hazardous waste) and saturated mold-prone building materials; and the financial costs of home repair. Recovery was insurmountable for the owners of business that did not reopen, and many residents who subsequently moved from the Community.

Photo credit: FEMA/Adam Dubrowa

Flood warning siren, street sign, and hand made signs

The Community needs the Flood Resilience Public Education Campaign to help them better understand flooding, the roles they can play to protect themselves and their property, and how to recover quickly with the resources that are available. The intent of this project is to disseminate key information on: key steps to prevent or reduce flood damage; personal preparedness and response; and how to help ensure a faster, less costly recovery. The project is expected to enhance overall community flood resiliency.

The campaign will:

- Run for a period of two years and provide flood preparedness information to be distributed though seminars and workshops, reinforced through written materials to be distributed across the Community through churches, non-profit organizations and schools.
- Include: strategic planning meetings and research; development of print materials and public service announcements; acquiring radio and television air time; public presentations/workshops; and the implementation of a post-campaign survey/analysis.

Estimated Project Costs

The Flood Resilience Public Education Campaign is expected to use information developed on regional flood risks from the after action reports of flood events to develop material targeted to the public on actual localized flood risks, and what can be undertaken individually to better flood proof homes and businesses. Through ensuring that residents, homeowners, and businesses have a good understanding of the impacts of flooding, the risks of it happening, and how to better prepare to minimize its impacts, it is possible to increase regional storm preparedness. The project is also geared toward enhancing personal preparedness for life safety protection and to minimize the burden on emergency services. The project is expected to cost **$85,000**, which will cover developing a scope of work, hiring a consultant, conducting research and developing material for various media, and then conducting a sustained public outreach and information campaign with a final post-campaign survey.

Project Benefits

Community Planning and Capacity Building

The campaign is expected to support increased awareness of the risks associated with flooding, to both residents and the responders on whom they depend. This will allow residents of the Community to prepare for storms, make informed decisions on how to better prepare their households for a flood event, and understand when and how to evacuate safely. Informing the citizens is expected to reduce the burden on local response organizations and allow them to focus their limited resources on the most vulnerable within the Community.

Housing

In providing specific information on how flooding occurs within the Community, the campaign will help residents better protect their homes and their possessions. No two storm events are likely to cause exactly the same type of flooding, but there are many actions that homeowners can undertake to mitigate their risk of flooding or reduce the impact on their properties. If residents can be better informed on appropriate actions that will reduce damage to their homes, residents will become more resilient to future flooding.

Health and Social Services

The goal is to better protect residents within the Community by providing appropriate, focused, useful information as to what they can do to protect themselves and their homes, notably within the context of other activities on-going Community-wide and at the individual Village and Town level. Enhanced preparedness is expected to contribute to life-safety and reduce the mental strains of anxiety associated with storm events. Better empowered residents are also expected to reduce the need for support by emergency responders such that they will not be as overwhelmed, overworked, and stressed themselves.

Risk Reduction and Cost-Benefit Analysis

This project is expected to increase community planning and capacity building and better prepare residents and their communities for future storm events. This project will not directly reduce the flood risk to specific Community assets although mitigation of damage to homes and businesses is an anticipated outcome through better individual preparation for flood events. By providing information pertinent to local flood risks it is expected that individual homeowners and residents will be able to make informed decisions regarding flood mitigation actions and activities resulting in less damage, improved personal safety, and faster recovery. A critical benefit that is expected is protection of local responders' life safety and mental health. The potential project benefits to homeowners, businesses, residents, and responders are expected to outweigh the cost of the investment.

Implementation

It is expected to require approximately two months to prepare a scope of work and select a consultant. Once the contract is in place, it will take approximately two months to conduct the research into flood damage, storm risk, and ongoing regional and local flood mitigation projects. Another two to six months will be needed to develop multi-media information, including print material and presentations, and radio and television advertisements. An estimated 10 to 14 months are then proposed to conduct outreach across the Community and perform the post-campaign survey.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

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Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)

Project type: Proposed

Associated Strategies

- Regional Storm Preparedness
- Understanding Regional Flood Risks

Associated Recovery Functions

- Housing
- Infrastructure
- Natural and Cultural Resources

Location

- Regional

Jurisdiction

- N/A

Schoharie Creek is highly prone to flooding, and past floods have resulted in significant damages to private and public property. Recurrent flood damage has strained local resources and disrupted the local economy of the rural communities in the Schoharie Creek Valley, most of which are low/moderate income. Due to the extent and nature of flooding along the creek, a regional flood study is needed to determine comprehensive regional flood management opportunities for protection of the Community. Appropriate strategies and projects will be developed for independent or collective implementation to incrementally reduce flood risk.

The study will combine detailed hydrologic and hydraulic analyses with an engineering study that uses modeling to evaluate both existing and future watershed conditions and identify causes of, and potential mitigation measures for, flood hazards. Most of the effort will include desktop modeling analysis using existing federal, state, and local databases on historic watershed information. Desktop analyses will be accompanied by stream surveys and physical verification to refine the models and verify the current conditions of the Schoharie Creek and its existing infrastructure, especially in locations with historic flooding.

Photo credit: FEMA/Hans Pennink
Schoharie Creek

Input from local officials and the community will be used to determine and prioritize high-risk areas and areas where assets are at risk, which are to be the focus of the study. The objective of the Regional Flood Study is to identify and evaluate long term solutions to flooding, drainage, and stormwater management problems across the watershed.

Conceptual mitigation projects will be developed as part of the flood study. These may range from implementing watershed management regulatory tools to constructing structural flood mitigation features. Similar studies and stream management plans have been completed or are under development for other watersheds within the region, and successful measures identified through them will be considered. Future grant funding from various sources will be sought to implement projects recommended through the flood study.

Estimated Project Costs

It is estimated that **$48,000** will be required for this project.

Project Benefits

Housing

A watershed-wide hydrologic modeling of the Schoharie Creek tributaries will help planners develop recommendations for Community-wide implementation of engineered physical protection, and stormwater management solutions, for flood protection of homes in the towns and villages. It will also inform zoning decisions to prevent future housing development in flood-prone locations.

Infrastructure

The project is expected to inform improvements to stormwater management systems to mitigate damage to public water and transportation systems. Study outcomes are expected to reveal priority locations for these efforts and to lead to the design and implementation of systems which are more effective.

Natural and Cultural Resources

The study will provide a better understanding of the watershed to identify specific efforts which will improve health of the ecosystem through targeted management and restoration activities, which will maintain this critical natural resource while minimizing its potential for causing damage.

Risk Reduction and Cost-Benefit Analysis

This initiative will allow the region to develop a collection of conceptual projects that can incrementally reduce flood stage, divert flow, or manage stream flood conditions in order to reduce risk to community assets located within the 100-year and 500-year floodplains. This initiative is seen as the integral step to generate information useful to implement projects that could reduce risks to any of the assets located in the floodplain of the Schoharie Creek. Although this project does not directly reduce risk to assets in the floodplain, the projects it will inform are expected to do so. Results are expected to produce comprehensive and long term flood mitigation benefits that outweigh the costs of this project.

Implementation

It will take approximately two to three months to develop a scope of work and hire a consultant. Four to six months will then be required for data collection, followed by four months of data analysis and modeling. Four months of fieldwork are expected and will be influenced by seasons and weather. The final six to eight months will be used to produce the study.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

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Generators for Healthcare Facilities and Emergency Services

Project type: Proposed

Associated Strategies

- Regional Storm Preparedness
- Resilient Economy

Associated Recovery Functions

- Community Planning and Capacity Building
- Health and Social Services

Location

- Regional

Jurisdiction

- Schoharie County

Photo credit: FEMA

An example of a power generator

The wind, debris, and flooding caused by Hurricane Irene resulted in wide-spread power outages in the Schoharie Valley. Power outages disrupted healthcare and emergency services which are critical to the Community for the protection of persons and property. Electrical outages due to flooding from Hurricane Irene and Tropical Storm Lee underscored the vulnerability of emergency shelters, healthcare facilities, and firehouses to storm events. This project will ensure that priority healthcare facilities and emergency shelters are equipped with appropriately sized generators located in flood-proof areas. This will help ensure continuity of essential services to the Community, especially vulnerable populations (i.e., seniors, patients, evacuees) during storm events and power outages. The project will fund the purchase and installation of emergency generators in selected critical healthcare facilities, emergency shelters, and fire houses. Various facilities will require various sized generators and require different levels of effort to install them based on existing electrical systems.

Schoharie Area Long Term, Inc. (SALT) has surveyed Schoharie County's hospitals and healthcare facilities, county offices, fire and emergency services departments, senior living facilities, and designated emergency shelters/warming centers to determine their equipment needs. Based on this survey, SALT has identified 11 designated emergency shelters and two fire departments and two healthcare facilities which do not have generators, and two fire departments which have generators that are inadequate to meet their needs.

The project will include a needs assessment including: an evaluation of the list of shelters within the Community to determine which are best suited to address Community needs; communication with healthcare facilities to identify critical services provided by each; a survey of fire services to determine if their facilities have adequate back-up power sources. Generators will be installed in a prioritized list of 5 to 10 facilities based on the assessment, the size of power systems required, and allocated project budget.

Estimated Project Costs

The project calls for investing **$500,000** into identifying and purchasing appropriate emergency generators for facilities that have a critical function for the Community, including serving vulnerable populations during an emergency. Cost will not be evenly split by facility as various facilities may require different sized generators and levels of effort to install them based on an individual facility's existing electrical system.

Project Benefits

Community Planning and Capacity Building

Investment in emergency generators will enable response operations to continue for the protection of physical assets such as homes and public buildings as well as the health and safety of visitors and residents during flood, storm, and other emergency events that disrupt the electric supply.

Health and Social Services

Providing emergency generators to healthcare facilities will allow them to provide critical services during power outages caused by emergencies including floods. This supports continuous access to healthcare and public health services for all Community residents, and notably vulnerable populations, during an emergency. Back-up electrical power helps ensure safe sheltering operations with functional building systems (e.g., lighting, heat, water) and equipment (e.g. kitchens) during power outages.

Risk Reduction and Cost-Benefit Analysis

This project is expected to increase community planning and capacity building, and help to better prepare emergency responders and municipal leaders to serve residents during future storm events which cause power outages. This project is intended to reduce risks to human health by ensuring power for critical facilities and services are available during future storm events. The project will help emergency services to continue protection of properties and the Community, including residents, visitors, and vulnerable populations. It will also support safe sheltering of those who must leave their residences. These benefits of enhanced protection to the Community are expected to outweigh the project's cost.

Implementation

It is estimated that it will require approximately four months to perform the needs assessment, prioritize facilities for generator installation, and to determine the sizes needed and installation requirements. It will then take an estimated two months to obtain permits and a further 12 to 20 months to install the generators.

Regulatory Requirements

It is anticipated that building permits will be required for generator installation and that New York State Department of Health (NYS DOH) inspections may be required for shelters.

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Recruit Volunteer First Responders

Project type: Proposed

Associated Strategies
- Regional Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Health and Social Services
- Housing

Location
- Regional

Jurisdictions
- N/A

The Community identified the need to increase the number of trained emergency response volunteers as the Towns and Villages within it remain highly vulnerable to future storm events during which response capabilities can be overwhelmed. This project implements a focused recruitment program to attract emergency response volunteers for training. Recruitment of volunteers will include targeted marketing through print materials, recruitment events, and radio and television advertisements.

During project development, program planners will assess training requirements and needs of the Community's fire and emergency medical services and create the training curriculum. The project includes funding to provide the training to volunteer recruits at no cost as an incentive for joining the services.

Photo credit: Village of Middleburgh Fire Department

First responders in the Village of Middleburgh

Training of all volunteer recruits is expected to include courses in Incident Command System (ICS) and the National Incident Management System (NIMS). Training of emergency services personnel will be coordinated with the Schoharie County Ambulance and Rescue Squad Association. Course offerings are expected to include cardiopulmonary resuscitation (CPR), and those leading to Emergency Medical Technician and Advanced Emergency Medical Technician certifications. Training of firefighter recruits will be coordinated with the Schoharie County Fire Coordinator's Office and will include a schedule of local classes using curriculum developed by the New York State Office of Fire Prevention and Control (OFPC) to train recruits as Exterior Firefighters, Interior Structural Firefighters, and/or Apparatus Operator Fire Officers. The goal of the project will be that, at a minimum, the new volunteers will be ready to be folded into a formalized multi-jurisdictional response managed by a designated on-scene commander.

Estimated Project Costs

It is estimated that **$60,000** will be required to create and implement a recruitment plan to attract emergency response volunteers, and establish a suitable training curriculum. It will also allow for an initial roll-out of the recruitment campaign and to train a first round of interested volunteers.

Project Benefits

Community Planning and Capacity Building

During Hurricane Irene and Tropical Storm Lee, it became evident that the Community needs to actively undertake recruitment and training of volunteer emergency responders to increase the overall safety of the residents and visitors in the Community. The proposed training curriculum will include drills developed to prepare volunteer responders to act appropriately and safely when dealing with hazards and risks identified in local emergency planning efforts. In creating a larger pool of trained volunteer emergency responders, the Community benefits from additional resources that can effectively intervene during emergencies by providing shift relief and additional capacity.

Health and Social Services

Attraction and retention of trained emergency responders will: help improve response efficiencies of life safety operations for the protection of visitors, residents, and responders; and will allow for shift relief of current volunteers.

Housing

A trained force of emergency responders will be better prepared to respond and protect residences within the Community. Critical efforts during flood events include pumping water from homes, assisting with household hazardous waste, and fire suppression.

Risk Reduction and Cost-Benefit Analysis

An increased number of trained emergency response volunteers reduces risk of impacts to human health and the environment and contributes to the capacity of services to protect physical assets. The training program will focus on the hazards and risks identified through hazard mitigation plans and emergency management planning. A trained force of emergency responders will have the knowledge, education, and experience - through drills and exercises - to respond cohesively, safely and most efficiently. More rapid response capacity will help further reduce storm damage and flood loss, making this a very cost-effective initiative.

Implementation

The project will require approximately four to six months to develop and implement the training and recruitment program, an additional two months to implement the recruitment program, and an additional one to two years to conduct the first full round of training.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

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Provide Resources to Homeowners

Project type: Proposed

Associated Strategies

- Regional Storm Preparedness
- Understanding Regional Flood Risks

Associated Recovery Functions

- Housing
- Economic Development

Location

- Regional

Jurisdictions

- N/A

During Hurricane Irene many homes throughout Esperance, Schoharie, and Middleburgh suffered devastating damage. Roughly 2,129 units of housing were damaged as a result of Hurricane Irene, the impacts of which were exacerbated by Tropical Storm Lee just 10 days later. While some homes have been rebuilt, many remain in disrepair. Additionally, most homes were rebuilt without flood-proofing and are vulnerable to future flood events. For these reasons, there is a significant need for a program to address homes that are vulnerable to damage from flooding as well as homes that were previously damaged. This project will provide financial support to homes not covered, or funded, under the NY Rising Housing Program and will include a variety of mitigation efforts such as resiliency audits, home elevations, relocation of utilities, and filling-in cellars.

Photo credit: Schoharie Area Long Term, Inc.

Rebuilding of a flood damaged home in Schoharie, NY

Estimated Project Costs

The costs associated with the damage from Hurricane Irene and Tropical Storm Lee was considerable given the number of units impacted in the Community. This project calls for an investment of **$2,060,000** to conduct home resiliency audits in the flood prone areas, and will support a low or no interest revolving loan fund for home elevations, filling in of cellars, and relocation of utilities as appropriate. The initial fund is expected to support the flood proofing and/or elevation of approximately 20 homes.

Project Benefits

Housing

The intent of the project is to protect flood-prone housing from damage. This is expected to minimize housing damage, and reduce required repairs. Many residents were displaced during Hurricane Irene and Tropical Storm Lee because their homes were damaged by flooding. Mitigating home damage through flood proofing is also expected to reduce the number of residents that are displaced.

Economic Development

The Community seeks to be able to safeguard its infrastructure and residents, and this project will help increase the resilience of homeowners by helping them better adapt to future flood conditions and reduce their vulnerability to damage. As a result of the project's protective measures, homes will be protected from future damage and the costs associated with their repairs. As the project's goal of protecting housing stock is expected to result in more residences surviving flood events it result in maintained occupancy and stabilize the local tax base.

Risk Reduction and Cost-Benefit Analysis

This project will reduce risks of future flooding by protecting homes that were damaged by Hurricane Irene and Tropical Storm Lee, and others which may be at risk but did not sustain damage during these storms. This will help homeowners who have been, or may be, impacted by flooding to remain in their homes, thereby safeguarding the Community population and tax base. This is critical to ensuring recovery, longevity, and vitality of the Community. Since the majority of the proposed project funds will be used to seed a no or low interest loan fund, it is expected that the initial investment will remain available for unlimited rounds of projects. The ongoing and long term benefits of the project to the Community are expected to outweigh the costs of its implementation.

Implementation

It will take approximately four to six months to identify homes that qualify to be enrolled in the program and homeowners who wish to participate. Once these have been identified, it will take two months to obtain the necessary permits and a further two months to complete the required design/engineering efforts. Finally, an estimated 12 months will be needed for construction.

Regulatory Requirements

Each construction activity under this project may have regulatory requirements including approvals from New York State Department of Environmental Conservation (NYS DEC), United States Army Corps of Engineers (USACE) and local planning agencies. Funding for project elements may also be available through New York State Housing and Community Renewal (HCR) programs which have specific requirements.

Drinking Water Improvements

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Infrastructure
- Health and Social Services
- Economic

Location
- Town of Esperance

Jurisdiction
- Town of Esperance

The Central Bridge water treatment plant is a critical asset in the Town of Esperance. During Hurricane Irene, floodwaters overwhelmed elements of the Town's drinking water system and have necessitated upgrades to the treatment system and transmission line. These upgrades may be completed in two phases; the first will include water treatment system upgrades, while the second phase includes replacement of the transmission line.

Phase I – Water Treatment Filter Plant Improvements

The Central Bridge Water treatment plant receives potable water from two surface water reservoirs. From the reservoirs, water is conveyed by gravity through piping to the water filtration plant where it is then filtered through a gravity fed slow sand process. Chlorine is added prior to the clearwell, where finished water is stored for use in the distribution system. Cleaning of the filter beds is done by manual scraping and removal of the contaminants captured in the top sand layer.

While this slow sand filter process is excellent for treating water with low turbidities and organics, during Hurricane Irene the water treatment plant was overwhelmed by high runoff and flood waters containing excessive amounts of organics and sediment. As a result the filters clogged so rapidly that the operator could not clean them fast enough to meet the demand of inputs which resulted in the deterioration of water quality to below the regulatory thresholds for potable water. Additionally, when the organic-laden runoff came in contact with the chlorine from the treatment process, high disinfection byproducts (DBPs) were formed. Since these byproducts can be harmful to human health, upgrading the treatment system will help ensure a continued supply of safe drinking water to the Town of Esperance residents during flooding.

Pretreatment of the water prior to filtration and post treatment after filtration are both needed. The pretreatment will involve the addition of a sedimentation/clarification stage with a tank constructed upstream of the slow sand filters. The water entering the slow sand filters will then be of a quality that the filters could process efficiently. Following the slow sand filters, additional polishing filters are needed to remove the remaining organics. This post treatment will consist of carbon filtration or a similar equivalent, and ultraviolet light treatment that will bring the finished water into compliance with DBP regulations.

Phase II – Transmission Line Upgrade

The second phase of this project includes the Central Bridge water transmission system, which is also a critical asset for the Town of Esperance. The aging water lines have numerous breaks and deficiencies, enabling flood waters to infiltrate the water system contaminating the water supply jeopardizing public health of residents. This project will replace the aging water lines thereby removing all gaps in the system.

Estimated Project Costs

The proposed first phase filter plant improvements including the sedimentation/clarification tank and the installation of a carbon filtration and ultraviolet light treatment system are estimated to cost approximately **$1,280,000**. This estimate includes $1,130,000 of construction costs and $150,000 for engineering and design. The second phase, transmission line upgrade, is estimated at **$1,200,000** with $1,160,000 in construction costs and an additional $140,000 for engineering and design.

Project Benefits

Infrastructure

At present, the Central Bridge water treatment plant is compromised during flood events. Additional supply and transmission line improvements will increase the treatment plant's ability to withstand flooding.

Health and Social Benefits

A contaminated water supply will have direct impacts on the health and social welfare of the residents within the Town of Esperance. Improving the water treatment infrastructure to better withstand floodwaters will reduce the potential for a contamination of the water supply.

Economic

This project will save residents money by precluding them from the need to buy bottled water during instances of flooding that result in water quality that does not meet the standard for potable water.

Risk Reduction and Cost-Benefit Analysis

This project will directly protect the Central Bridge water treatment system and will help ensure Town residents have a safe drinking water supply during storm events. These benefits to public health and the reduced risks to this critical facility are expected to outweigh the costs associated with this project.

Implementation Strategy

The expected timeframe for this project is between 18 to 20 months. For phase I, two months is estimated to select a contractor, an additional two months is expected for permitting and two to four months for project design and engineering. Construction of the filtration plant and transmission lines during Phase II, as well as any required demolition is expected to take roughly 12 months to complete.

Regulatory Requirements

For completion of the project several regulatory requirements will need to be met. These may include New York State Department of Health (NYS DOH) approval for a new water treatment facility; updates to the water supply permit; New York State Department of Environmental Conservation (NYS DEC) approvals if the scope is limited to a new well or increased water taking; and an NYS DEC Article 15 permit will be required for any stream crossings.

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Central Bridge Firehouse Relocation

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Health and Social Services

Location
- Town of Esperance

Jurisdiction
- Town of Esperance

Ingress and egress from the Central Bridge fire house was restricted during Hurricane Irene as the roads surrounding the building were flooded and impassable. Lack of access to the facility hampered not only response within the jurisdiction but also the Town's ability to respond to requests for mutual aid to assist the Town and Village of Schoharie whose firehouse was destroyed during the hurricane. This project proposes to relocate the Central Bridge firehouse to a new, elevated location outside of the floodplain. The proposed location is on the Town-owned Central Bridge wastewater treatment plant property which is to the west of South Main street when traveling North on Route 30A.

Photo credit: Gail Browning

The Central Bridge firehouse

Estimated Project Costs

The estimated budget to build a new firehouse, in the proposed location outside the floodplain, is **$2,900,000**.

Project Benefits

Community Planning and Capacity Building

The Town's firehouse is essential for an effective fire service response. This project is expected to protect emergency response assets during future storm events to help ensure emergency responders' abil-

ity to maintain services to the Town of Esperance and Hamlet of Central Bridge as well as neighboring jurisdictions through mutual aid requests.

Health and Social Benefits

An accessible firehouse that stores equipment for life safety protection is essential to the health and safety of residents during flooding. A new firehouse located outside of the floodplain, supports the general preservation of physical health of persons in community, particularly vulnerable populations.

Risk Reduction and Cost-Benefit Analysis

Functional emergency services reduce the risk to human life and safety and offer protection of physical assets against damage. The estimated cost for locating a new firehouse outside the floodplain is $2,900,000. This immediate investment is anticipated to be exceeded by the long-term health and safety benefits to residents through ensuring emergency services are available during flood events.

Implementation Strategy

It is expected that the project will require 12 months. Two to three months are expected to be required to select a contractor followed by three months for building design and project permitting. An additional six months is expected for construction.

Regulatory Requirements

For this project, Town building permits and inspection will be required as will adherence to codes and guidelines for firehouse construction.

Esperance Town Hall Restoration and Flood Proofing

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building

Location
- Town of Esperance

Jurisdiction
- Town of Esperance

The Esperance Town Hall is located on Charleston Street in the Village of Schoharie. It is adjacent to the Schoharie Creek and was flooded during Hurricane Irene resulting in a loss of services to the entire Town. Examples of critical services provided through Town Hall include demolition and building permits, and general information and services related to flood response efforts. Access to these important Town resources and services would have expedited community recovery in the aftermath of Hurricane Irene.

Photo credit:Ecology and Environment, Inc.

Town of Esperance Town Hall near the Schoharie Creek

This project will include two components.

1. Renovation of the Town hall and add flood proofing measures including raising the utilities out of the basement.
2. Construction of an additional building next to the existing waste transfer and recycling facility on Route 30A, approximately one mile south of the Village of Sloansville to serve as a secondary location for storage of archives and records and continuity of Town government operations during floods.

Estimated Project Costs

The estimated project cost to raise the utilities in the Town Hall and to construct an additional building on the Town transfer facility property for storage of archives and records, and an alternate location for government operations during flooding is **$606,000**. This cost includes renovations and flood proofing of the existing Town Hall and construction of the new building.

Project Benefits

Community Planning and Capacity Building

This project will protect the Town of Esperance Town Hall which remains vulnerable to flooding. This project is expected to increase community planning and capacity building capabilities, better preparing municipal leaders and local governments for future storm events. Additionally, this project will help to ensure that the critical services provided by and housed within the Town Hall are able to continuously operate or recover more efficiently after storm events. This is critical since a fast and effective community recovery is dependent on municipal services such as accessing records and archives and obtaining demolition and building permits.

Risk Reduction and Cost-Benefit Analysis

A critical function of government services is protection of persons and property from damage through community planning, implementation of zoning and building standards, and providing resources for emergency response and recovery. This function becomes essential during emergencies such as flooding when the community need for resources is greatest. Continued government services after a disaster remain essential to the safety, well-being and ability of residents and local businesses to recover. This project's primary goal is to assure continued government operations so that businesses and residents can quickly access the resources available to them to them during storms and to quickly begin the rebuilding process once the storm has passed. The continuity of government operations is essential and justifies the costs associated with implementing this project.

Implementation Strategy

It is expected to take a total of approximately two years to complete the project. Two to three months are expected to be required to develop a scope of services and select a contractor. Two to four months are expected to be required for project design and obtaining building permits, with construction taking approximately 14 to 17 months.

Regulatory Requirements

Local building permits will be required for completion of this project.

Tributary Mitigation Program

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Housing Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Housing
- Infrastructure
- Natural and Cultural Resources

Location

- Town of Esperance

Jurisdiction

- Town of Esperance
- Schoharie County

Three tributaries along Schoharie Creek, Fly, Cripplebush and Cobleskill Creeks, overflowed their banks during Hurricane Irene and Tropical Storm Lee and continue to do so regularly during major storm events. Along Fly Creek, 15 - 20 homeowners are impacted with their yards and basements being flooded each time the creek spills its banks. A 1,000 foot stretch along Cripplebush Creek is unstable and experiences bank failures and high levels of sediment deposition. Route 30A and an adjacent parking lot were under water after Hurricane Irene. Along Cobleskill Creek there is critical infrastructure such as the Central Bridge sewage plant and Route 30A which is threatened by flooding. This project proposes to design and implement stream restoration techniques identified in a study performed on Fly Creek and to perform a similar study to prepare restoration designs for Cripplebush and Cobleskill Creeks.

Fly Creek: In its current condition, one section of Fly Creek poses an ongoing threat to nearby residents. Even during minor floods the basements and yards along the stream experience flooding. During Hurricane Irene, waters from Fly Creek inundated basements and severely damaged the yards of adjacent homeowners. These impacts are related to the fact that this problematic stretch of stream is close to the confluence with Schoharie Creek which also floods and provides backwater pressure to Fly Creek outflow. Additionally, the stream is con-

Photo credit: Schoharie County Soil and Water Conservation Disctrict

Fly Creek looking upstream toward eroding hillslope

stantly migrating, and suffers from excessive sediment loading. In terms of tributaries, this section of Fly Creek is the biggest ongoing issue for the Town of Esperance. In 2003, the Schoharie County Soil and Water Conservation District contracted with a company to perform a geomorphology study. The study resulted in an assessment and survey data on the problematic reach of the stream which is roughly 3,052 feet long. Some additional work may be required including: new survey data based on recent changes to the stream morphology; design and engineering; and updated restoration and mitigation techniques. However, this existing study provides an excellent starting point from which mitigation activities may be implemented. At least 15 to20 landowners will benefit from mitigation measures that will resolve the existing issues at Fly Creek.

Photo credit: Schoharie County Soil and Water Conservation Disctrict

An eroding bank along a lower reach of Fly Creek.

Proposed project reach length along Fly Creek

Cripplebush Creek: The last 1,000 feet of this stream are unstable and agricultural land uses abut the stream banks before the stream joins the Schoharie Creek. This section of the stream suffers from bank failures, lack of stream buffer zones, high levels of sediment deposition, and backwater impacts. Due to the confluence of the two streams in this area, the Schoharie Creek backed up and inundated a large New York State Department of Environmental Conservation (NYS DEC) fishing access site and parking lot during Hurricane Irene. The parking lot which is located at a low spot adjacent to Route 30A, and is slightly elevated, was covered by approximately 15 feet of water.

The location where Cripplebush Creek empties into the Schoharie Creek

The location where Cobleskill Creek empties into the Schoharie Creek

Cobleskill Creek: The issues associated with Cobleskill Creek are slightly more complex as this creek is fed by a 90+ square mile watershed, in which sub-watersheds from multiple tributaries are nested. Among the chief concerns along the Cobleskill Creek is the adjacent infrastructure located near the confluence of this stream and the Schoharie Creek which is threatened by poor stream conditions in this area. Critical infrastructure, including the outflow for the Central Bridge Sewage Plant and the Route 30A Bridge, are located near areas that were heavily inundated with water during Hurricane Irene. Additionally, agricultural lands in this area are threatened by the stream. The Schoharie County Soil and Water Conservation District has received at least six complaints related to this section of stream over the last several years indicating a persistent need for these issues to be addressed.

Estimated Project Costs

The estimated project cost to complete the project is **$680,000**: approximately $600,000 to complete remaining studies and reconstruction of Fly Creek; and $40,000 each for studies on Cripplebush and Cobleskill Creeks.

Project Benefits

Housing

This project includes elements to protect 15-20 homes located along Fly Creek. Homes will be protected from future major storm events and, since remaining stream damage currently causes frequent flooding, they will be protected from ongoing flooding which now occurs during typical storm events.

Infrastructure

Infrastructure that is expected to be protected through implementation of this project includes the Central Bridge sewage plant and Route 30A. Route 30A is a primary north-south transportation route through the Town and is currently threatened due to flooding of Fly Creek.

Natural and Cultural Resources

The design and implementation of stream restoration techniques will reestablish stream health by minimizing stream bank damage and sedimentation. The project is also designed to protect a NYS DEC fishing access site from future storm damage and maintain this resource to the Community.

Risk Reduction and Cost-Benefit Analysis

Restoration of Fly Creek is expected to reduce the risk of flooding to 15-20 homes in the Town. Studies on Cripplebush and Cobleskill Creeks are an initial step to implementing protective measures for community assets including agricultural land, a NYS DEC fishing access site, and others within the Creeks' floodplains. Risk reduction through implementation of construction activities informed by the Cobleskill Creek study are expected to impact the Central Bridge Sewage Plant, Route 30A bridge, and other Community assets within the Creek's floodplain. The cost of the project is marginal in comparison to the avoided cost from further flood damage to residential and critical assets. Twenty homes, several cultural assets, and key critical infrastructure will be better protected from flooding upon completion of the stream restoration study and implementation projects.

Implementation Strategy

The Fly creek mitigation project is expected to take two to three months for selection of a contractor, two months to collect remaining data during a field season, two months to obtain permits and 12 to 18 months for construction for a total of 18 to 25 months. Total project timeline will be dependent on alignment of seasonal field activities with overall project schedule.

The Cripplebush and Cobleskill Creek studies will require two to three months for selection of a contractor, two to four months for data collection during a field season, two to four months for data analysis and six months to prepare reports and develop conceptual mitigation plans. The total project timeline will be dependent on alignment of seasonal field activities with the overall project schedule.

Regulatory Requirements

Regulatory requirements are anticipated to include: New York State Department of Environmental Conservation (NYS DEC) Article 15 permit and water quality certification; New York State Department of Transportation Highway Work permits for activities in the right-of-way of state roads; and local permits.

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Equip Landis Arboretum as an Emergency Shelter

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building

Location
- Town of Esperance

Jurisdiction
- Town of Esperance

There was insufficient shelter space for residents who had to evacuate their homes during Hurricane Irene and Tropical Storm Lee. This highlighted the need to identify potential shelter spaces that may be used in the event of a future emergency and thereby build the community's resilience. This project is to upgrade the Landis Arboretum Meeting House to serve as an emergency shelter. For the space to serve as a suitable shelter a generator needs to be installed. Additionally, the scope of this project will include the installation of a water purification and filtration system to provide essential basic treatment for the water supply to the building.

Photo credit:Ecology and Environment, Inc.

Landis Arboretum Meeting House up on a hill in the Town of Esperance

Estimated Project Costs

The estimated project cost to install a back-up generator and perform any associated electrical modifications and to upgrade the facility with a water purification and filtration system is estimated at **$40,000**.

Project Benefits

Community Planning and Capacity Building

This project is expected to increase community planning and capacity building capabilities, better preparing emergency responders, municipal leaders, and residents for future storm events. This project will help protect individuals that are displaced during future disaster events by ensuring they have shelter and access to resources required for human health and safety including potable water, heat, and electricity.

Risk Reduction and Cost-Benefit Analysis

An additional shelter site in the Town of Esperance will provide much needed response capacity during flood events. Residents, including vulnerable populations, will have a shelter available to them thereby improving the Town's ability to provide for its residents reducing risk to their well-being. As permanent and temporary housing was in short supply during Hurricane Irene, the benefits of creating a shelter in this location of the Town justifies the expenditure required to complete this project.

Implementation Strategy

Upgrading the Landis Arboretum will require approximately 9 to 12 months. Two to three months are expected to be required for the selection of a contractor, two months for design and acquisition of a local building permit, and six to nine months for construction.

Regulatory Requirements

Local building permits will be required for the completion of this project.

Repurpose Destroyed Mobile Home Park

Project type: Proposed

Associated Strategies

- Resilient Green Spaces
- Resilient Economy

Associated Recovery Functions

- Economic Development

Location

- Town of Esperance

Jurisdiction

- Town of Esperance

Homes in the mobile home park on Junction Rd were completely destroyed during the flooding caused by Hurricane Irene. However, the site is stable and functional utilities still remain. The proposed project is to convert the site to Recreational Vehicle use in order to reuse the property and create an opportunity for enhanced economic development through tourism. In the threat of flooding, the vehicles could simply evacuate. This will increase the resiliency of this asset while still allowing the community to benefit from tourism generated income.

The mobile home park is located along the private road, Beechnut Lane, off of Junction Road, Central Bridge, NY

Estimated Project Costs

The estimated project cost to convert the mobile home park is approximately **$100,000** and includes the costs associated with paving, the construction of pavilions, a volleyball court, barbeque pits, and access points to the Schoharie Creek.

An additional source of funding for completion of this project may be the Empire State Development (ESD) Economic Development Fund Small Business Revolving Loan Fund.

Project Benefits

Economic Development

This project is expected to provide support to local businesses which suffered losses during and after Hurricane Irene and Tropical Storm Lee, and have not yet been able to return to pre-storm revenues.

This project will support economic growth by providing a site for recreational vehicles while minimizing risk to assets.

Risk Reduction and Cost-Benefit Analysis

This project is designed to reduce risk to structures in the floodplain by repurposing this developed site to an open space use.

Implementation Strategy

It will require approximately seventeen months to adapt the former mobile home park. Two to three months are expected to be required to establish scope and select a contractor, one month will be required to obtain local building permits, two months are required to develop design and engineering elements and 12 months are required for construction.

Regulatory Requirements

Local building permits and permits from the New York State Department of Environmental Conservation (NYS DEC) are likely required for the completion of this project.

Install municipal sewer to prevent future health risks in the Village of Esperance, Phase I

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Infrastructure
- Health and Social Services

Location
- Village of Esperance

Jurisdiction
- Town of Esperance
- Village of Esperance

The Village of Esperance residents currently rely on septic tanks that drain into aging leach fields on their properties for their sewage treatment and wells on the same property for drinking water. During Hurricane Irene and Tropical Storm Lee, the aged septic leach fields were flooded, putting the adjacent groundwater drinking wells at risk of contamination. Storm drains tested after Hurricane Irene showed the presence of *E. coli* bacteria that can be harmful to human health.

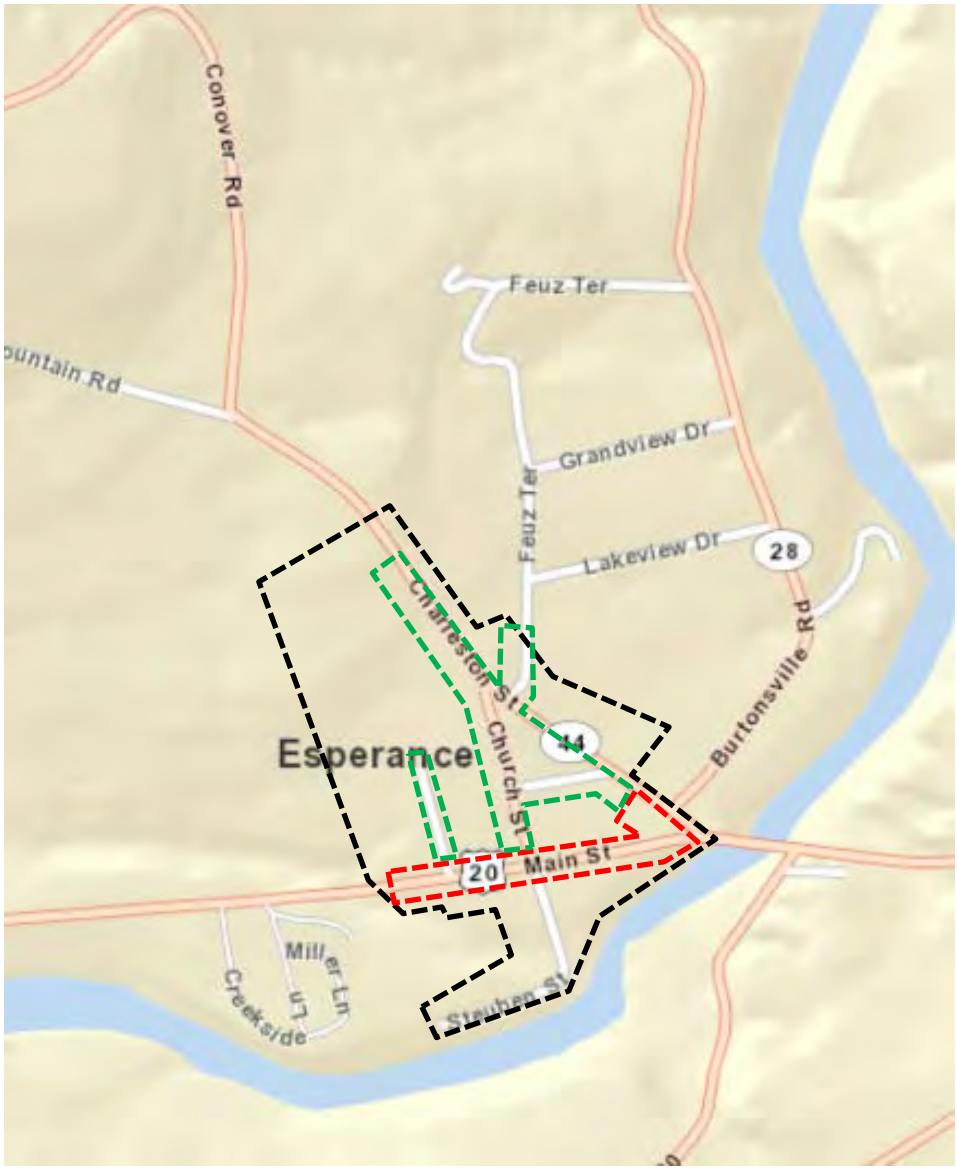
The confirmation of *E. coli* bacteria in Village storm drains indicated the need to address potential for groundwater contamination as well. If left in their current condition, the aging leach fields could potentially contaminate surface and ground water and thereby impact the Village's drinking water wells and the adjacent Schoharie Creek. Contamination of the Creek would pose further water quality concerns throughout the watershed and degrade the Creek's habitat.

The Village of Esperance proposes to design and install a public sewer system enabling their 345 residents to convert from individual septic tanks with leach fields to a Village-wide sewer system which will contain and treat wastewater. The project is proposed to be completed in two phases, the first of which is being proposed for funding under the municipality's Community Development Block Grant- Disaster Recovery (CDBG-DR) Funding. This phase of the project will include the completion of an engineering design and permitting, and the installation of a packaged wastewater treatment plant (WWTP), and sewer trunk line with laterals to service approximately 55 businesses and residences on Main Street.

The map below shows the proposed sewer district in black dotted lines with the elements of Phase I shown in red and Phase II shown in green.

Estimated Project Costs

Phase I of the project includes engineering design and permitting, installation of a WWTP, and sewer trunk line with laterals to service approximately 55 businesses and residences on Main Street and is expected to cost approximately **$2,400,000**.



Map showing proposed phases of sewer system installation in the Village of Esperance

Final completion of the public sewer system solution requires that residences and businesses connect to the public sewer system by laterals from their private properties to the public system, and that their septic systems be closed. Lateral connections from the public system are estimated to cost $2,000 per structure, and closure of each septic system is estimated at $500-$1,000. Closure of septic systems is a necessary final step in each phase to prevent future safety hazards due to unsecured tank openings or from tank collapse, and to prevent an adverse impact to drinking water wells by contamination of groundwater. The steps in septic system closure include pumping the septic tanks, breaking or perforat-

ing the tank bottoms so that they can no longer hold water, and filling the tanks with sand or gravel to secure the tank void to protect against a future collapse hazard. Lastly, piping between the building foundation and septic tank, and septic tank and leach field will be disconnected.

Project Benefits

Infrastructure

Aging leach fields across the Village pose a contamination risk to drinking water wells that are relied upon by Village residents during flood events. A public sewer system would protect local drinking water supplies, and waterways from contamination by untreated sewage.

Health and Social Services

With access to a sewer system, Village home and business owners will be able to close their septic leach fields to protect the Village's drinking water supplies. This is expected to protect public health from risks such as *E. coli* bacterial infections related to the flooding of septic leach fields.

Risk Reduction and Cost-Benefit Analysis

The design and construction of a sewer system in the Village of Esperance will reduce risks to human and environmental health. This project is also expected to enhance the reliability of infrastructure in the community and allow the Village to close aging infrastructure that currently poses a health risk during flood events. In combination, the benefits associated with project implementation and the expected useful life of the project elements is expected to substantiate its costs.

Implementation Strategy

This phase of the project is expected to take two to three months to select an engineering firm, four to six months to develop engineering designs and obtain permits, and 20 months for construction.

Regulatory Requirements

This project is expected to require a series of regulatory approvals and permits including: New York State Department of Health (NYS DOH) permits; New York State Department of Environmental Conservation (NYS DEC) permits; New York State Department of Transportation (NYS DOT) highway work permits; and local building permits.

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Village of Esperance Firehouse Rescue Facility

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building

Location
- Village of Esperance

Jurisdiction
- Town of Esperance
- Village of Esperance

Photo credit: Ecology and Environment, Inc.

The Village of Esperance Firehouse and Village Hall

The experiences of the Village of Esperance residents and response personnel during Hurricane Irene and Tropical Storm Lee made it abundantly clear that a new firehouse is essential for modern operation of this life saving service. The Village fire department needs a new firehouse large enough to accommodate contemporary fire trucks and equipment to facilitate efficiency of response. A larger firehouse would reduce the time required to maneuver fire trucks in and out of the firehouse bays, and reduce response time. Additionally, larger work spaces would help to minimize the risk of injury to department volunteers working with equipment in cramped spaces. The project is to construct a new rescue facility for the Village of Esperance to increase the resiliency of the Village and Town, and thereby enable a more effective response effort to future emergency events. This new facility will be a pole barn facility built on the same property as the existing firehouse. The new facility will be roughly 5,400 square feet and will include: an area for staging equipment and assembling flood pumps; a sufficiently sized area for the firefighters to change; a storage area; a radio room; and an office space.

Estimated Project Costs

The estimated cost for this project is **$750,000**. Of this total, approximately $120,000 is expected to be required for engineering, design, and permitting with the remaining $650,000 for construction.

Project Benefits

Community Planning and Capacity Building

This project is expected to result in community planning and capacity building benefits by better preparing emergency responders for future storm events. Through this project, emergency responders working out of the Village of Esperance Firehouse would improve response time to Community members in need of emergency assistance; response time is a critical factor in the outcome of life and property protection.

Risk Reduction and Cost-Benefit Analysis

This project will directly enable the Village of Esperance first responders to better protect Village residents and visitors, and minimize risk to their personal safety while undertaking equipment operations. The immediate and long term benefits associated with reductions in life and safety risks justify the implementation of this project.

Implementation Strategy

The implementation timeframe for this proposed project is expected to be approximately 16 - 19 months. Two to three months will be required to develop the project scope and select a contractor; two to four months will be required for building design, engineering, and permitting; and approximately 12 months are anticipated for construction depending on season and weather.

Regulatory Requirements

It is anticipated that a local building permit will be required, as may a Highway Work Permit from New York State Department of Transportation (NYS DOT) for work in the state right-of-way.

Cemetery Road Repair

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Natural and Cultural Resources

Location

- Burtonsville Road

Jurisdiction

- Village of Esperance

During Hurricane Irene there was significant damage to the cemetery on Burtonsville Road in the Village of Esperance, which is located on the west bank of the Schoharie Creek. In particular, unpaved road ways were destroyed, leaving the site inaccessible to visitors. The cemetery is a key local cultural and historical asset; fortifying the accessibility to the cemetery therefore remains important to the community. This project proposes to pave the cemetery dirt roads in order to allow access by visitors while minimizing potential damage from future storm events.

Photo credit: Ecology and Environment, Inc

The cemetery in the Village of Esperance

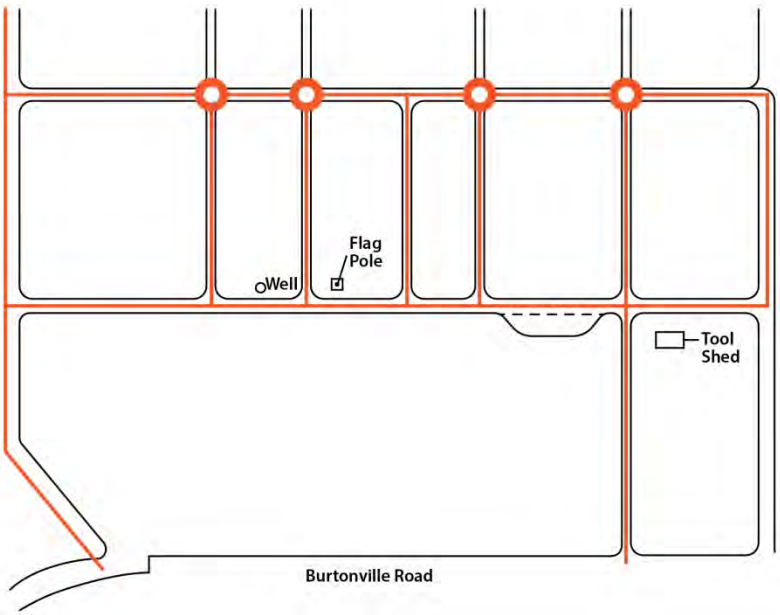
Estimated Project Costs

The estimated project costs for repairing the cemetery roads is **$125,000**. This project includes the purchase of asphalt and the paving of approximately 37,000 square feet) within the cemetery. The roads that require paving are indicated by the orange lines in the rendering provided on the following page.

Project Benefits

Natural and Cultural Resources

This project is expected to reduce risks to a locally-significant cultural and historic asset and ensure that this asset is protected from damage and is accessible during and after future flood events.



Rendering of the road requiring paving in the Village of Esperance cemetery

Risk Reduction and Cost-Benefit Analysis

The repair and upgrade of roads within the cemetery will make them more resilient to damage from future storms and will help maintain its accessibility to visitors. The cost associated with this project is modest and justified based on the reduction of future damage which is anticipated, and the community value of this cultural asset.

Implementation Strategy

Paving the cemetery roads is expected to require four months. Two months for obtaining necessary permits, and two months for construction are anticipated. The project construction schedule will be dependent on appropriate season and weather conditions.

Regulatory Requirements

Consultation with New York State Office of Parks Recreation and Historic Preservation (OPRHP) State Historic Preservation Office (SHPO) is recommended to discuss any historical designation of the cemetery. Local permits may also be required for completion of this project.

Stony Brook Mitigation

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Housing
- Infrastructure
- Natural and Cultural Resources

Location

- Town of Schoharie

Jurisdiction

- Town of Schoharie

Stony Brook Creek is a tributary of the Schoharie Creek located in the Town of Schoharie. For a number of years it has flooded repetitively during heavy storm events in the region. During Hurricane Irene, the creek migrated towards Stony Brook Road and undermined its shoulder to the point of collapse. This road is a vital linkage in the community as it serves as an evacuation route for northern parts of the Town, without it, the residents in this area would be essentially cut off from essential response services and unable to evacuate.

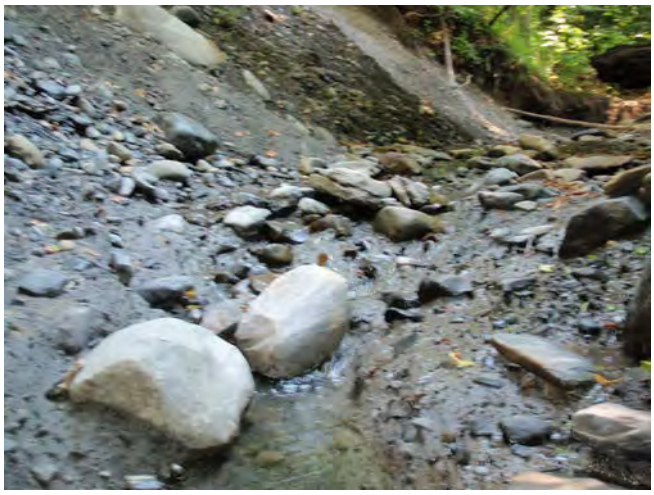


Photo credit: Schoharie County Soil and Water Conservation District

Mass failure in a reach of Stony Brook Creek in the Town of Schoharie

Additionally, houses along nearby Frisbieville Lane also experienced considerable flooding from Stony Brook Creek during Hurricane Irene. Flooding was exacerbated along the road due to the failure of stackable stone revetments and retaining walls along the creek. With the failure of these structures, debris littered the flood zone and alluvial deposits have since changed the flow of the creek.

This project would create a more substantial solution to the problematic sections of Stony Brook which need considerable repair. Repairs to be undertaken in this project include addressing discrete locations for: floodplain reconnection; grade control; and culvert modifications/upgrades, where appropriate, to fix damage caused by flooding during Hurricane Irene to mitigate against flooding during future storm events. In total, approximately 1.5 miles of the creek need repair and construction including a minimum of three mass failure points where the creek overran its banks during Hurricane Irene.

Overall, this project intends to reduce the flood risk and propensity for flood damage of the primary flood evacuation route, one bridge, two culverts, and over a dozen private properties along Stony Brook Road and Frisbieville Lane.

Estimated Project Costs

The costs of this project consist of construction, repair, and mitigation measures along Stony Brook Creek. The total cost of the project is estimated at **$2,100,000**. These costs include: project administration; legal requirements and permitting; design, engineering, and construction of bed raising, floodplain reconnection, and grade control; and culvert modifications/upgrades on a total of 1.5 miles of the creek.

Approximate project location along Stony Brook.

Project Benefits

Housing

Implementation of the proposed Stony Brook Creek Mitigation project will help provide protection to over a dozen private properties along Stony Brook Road and Frisbieville Lane. Mitigating damage to these structures will help minimize the need for evacuation, emergency response, and subsequent repairs. Additionally, property values will increase as the threat of flood damage to homes is reduced,

which is expected to improve the value of home investment in the Town. Additionally, the project will help reduce potential public health risks associated with flood-impacted residential water supplies.

Infrastructure

Flood damage to transportation infrastructures is a significant burden for the Community as a whole. Implementation of the proposed Stony Brook Creek Mitigation project will contribute to the reduction in flooding impacts for roadways used to reach public services including an evacuation route for the northern portion of the Town.

Natural and Cultural Resources

Implementation of the proposed Stony Brook Creek Mitigation project will contribute to regional efforts for watershed management to promote healthier waterways and stabilized aquatic habitat for fish and other aquatic life. Because Stony Brook Creek drains into the Schoharie Creek, and therefore contributes to its flooding, this project will provide regional environmental benefits for water quality and flood control.

Risk Reduction and Cost-Benefit Analysis

This project will reduce risk by undertaking construction of mitigation measures along sections of Stony Brook Creek that will help limit future flooding and flood impacts through bed raising, floodplain reconnection, grade control, and culvert modifications/upgrades. These efforts will improve the health of this riverine system to minimize flooding, and thereby provide protection to roadways, and private properties. As part of this project, a cost-benefit analysis was completed and the analysis concluded that the benefits associated with the project, including the tangential benefits of protecting human life through evacuation during a disaster, outweigh the cost of the project itself.

Implementation Strategy

This project is expected to extend over two years. During the first field season, six months are expected to be required to obtain permits, and issue a request for proposal and select contractors. Approximately six months of construction activities are anticipated during the second field season.

Photo credit: Schoharie County Soil and Water Conservation District

Failed retaining wall along Stony Brook Creek in the Town of Schoharie

Regulatory Requirements

Execution of the project will involve collaboration between State, County, and local agencies to ensure permitting and other compliance

measures are met. This project will likely require New York State Department of Environmental Conservation (NYSDEC) Article 15 permits, New York State Department of Transportation (NYSDOT) highway work permits, and United States Army Corps of Engineers (USACE) permits.

Town Highway Garage Replacement

Project type: Proposed

Associated Strategies

- Community Storm Preparedness
- Infrastructure Resilience

Associated Recovery Functions

- Community Planning and Capacity Building

Location

- Town of Schoharie

Jurisdiction

- Town of Schoharie

Due to its location near the Schoharie Creek, the Town of Schoharie Highway Department's garage has regularly suffered inundation from floods. During Hurricane Irene, six and a half feet of floodwaters filled the building and resulted in impacts to municipal assets, the disruption of emergency services within the Town, and the need for extensive repairs. The garage is essential for staging public works vehicles, equipment, and materials, and is also used for equipment repair and maintenance activities. The existing garage is an old wood frame structure with small bays.

This project intends to relocate the garage and associated facilities to a vacant five acre parcel of land outside the floodplain. The proposed facility would consist of a 6,000 square foot metal single-story, and a four bay building for storage and repair of public works vehicles and equipment. Additionally, the building would contain storage space for materials, administration offices, restrooms, and locker rooms complete with showers. The project will also include a half acre parking lot and enclosure of the entire property by a chain-link fence for security.

Estimated Project Costs

This project's costs consist of the design, permitting, and construction estimates associated with replacing the Town Highway Department garage. The total project cost is estimated at **$1,970,000**. This cost includes the acquisition of the five-acre parcel, construction of a 6,000 square foot metal structure building with four garage bays, an office, restrooms, and locker rooms with showers; a half acre parking lot; and construction of the chain link fence surrounding the entire facility. Project costs include permitting, designing, and constructing the facility.

Project Benefits

Community Planning and Capacity Building

Implementation of the proposed construction effort will help ensure the capacity of public works services, which are essential during storms for the protection of infrastructure and homes, and help ensure roads are kept clear of debris to allow emergency vehicles to operate more quickly and efficiently and allow for evacuation of residents. This will help limit damage and reduce costs of recovery following flood events thereby saving property owners and taxpayer money.

Risk Reduction and Cost-Benefit Analysis

This project reduces the risk to the Town through the enhancement of public services during flood emergencies. This will lessen the damage during an event, and will also decrease the time it takes to recover from a disaster. Given the expected lifetime of the new garage is greater than 25 years; the benefits of its construction are expected to exceed its cost.

Implementation Strategy

The estimated timeline for this project is approximately two years. This will consist of approximately to two three months to develop a scope and select a contractor, two months for permitting, two to four months for engineering design, and 12 to 16 months for construction.

Photo credit: Ecology and Environment, Inc.
The existing Town Garage

Regulatory Requirements

A New York State Department of Transportation (NYS DOT) highway work permit is expected to be required as will a local building permit.

Central Bridge Main Street Repairs

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Housing Resilience
- Resilient Economy

Associated Recovery Functions

- Infrastructure

Location

- Town of Schoharie

Jurisdiction

- Town of Schoharie

While the stormwater system in the Town of Schoharie had survived numerous heavy storms and flood events, the vast amount of water that was dropped by Hurricane Irene completely overwhelmed the system leading to massive flooding and extensive damage. A primary area of damage was North and South Main Street in the Hamlet of Central Bridge where this project is focused.

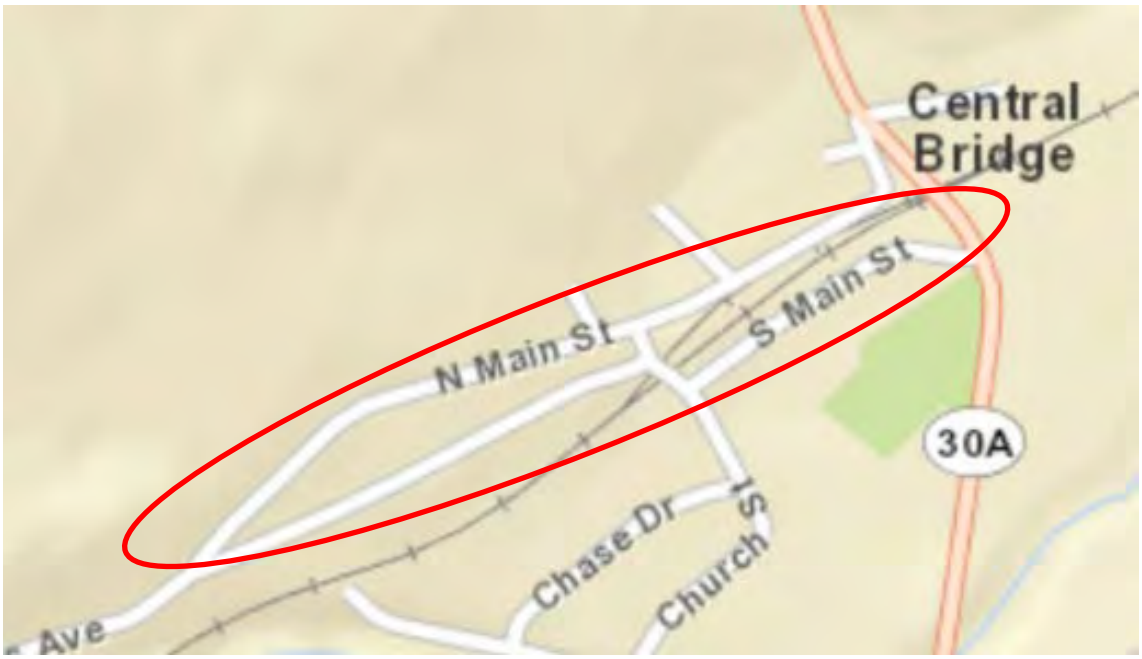
This project includes North and South Main Street: repair of stormwater systems; demolition of damaged infrastructure or replacement where repair would not be sufficient; installation of new storm sewer pipe in areas where it does not currently exist; installation of catch basins; creation of a stone lined ditch; completing the repair and replacement of damaged sidewalks; and repairing damaged asphalt.

Photo credit: Wikipedia.

Flood damaged road in need of repair

Estimated Project Costs

This project consists of design, permitting, and construction activities associated with repairing and improvements to the stormwater systems of the Town. As a part of this, the project will install new storm sewer pipe and catch basins, create a stone lined ditch, replace damaged sidewalks, and repair damaged asphalt along Main Street in Central Bridge. The estimated cost of this project is **$1,150,000**. Repairs to North Street are estimated at $782,000, and South Main Street are estimated at $370,000.



Approximate project location along North and South Main Streets.

Project Benefits

Infrastructure

Implementation of the Central Bridge Main Street Repairs will result in the protection of assets, including homes, businesses, and public infrastructure, from excess stormwater runoff through improvements to the drainage system. This project will improve the ability of the stormwater system to handle large scale flood events to mitigate damage in the future.

Risk Reduction and Cost-Benefit Analysis

This project will reduce risk of flooding along Main Street in Central Bridge by increasing the volume of water that can be routed out of the area via stormwater drainage systems. The current system does not allow for excess stormwater to properly drain resulting in flooding of surrounding assets. Increased drainage will protect homes, businesses, and public infrastructure resulting in less damage during storms, minimizing response activities, and speeding recovery. These benefits are expected to exceed the costs of this project.

Implementation Strategy

The estimated timeframe for this project is approximately two years. The timeframe consists of two to three months to develop the scope and select a contractor, three to five months for engineering and design, and 16-19 months for construction.

Regulatory Requirements

The expected permits required for this project are New York State Department of Transportation (NYS DOT) highway work permits, a New York State Department of Environmental Conservation (NYS DEC) State Pollution Discharge Elimination (SPDES) permit, and local building permits.

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South End Drainage Improvements

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Health and Social Services
- Housing
- Infrastructure

Location
- South End, Village of Schoharie

Jurisdiction
- Village of Schoharie

Over the years, ad hoc small scale development in the Village of Schoharie's South End led to increasing problems with stormwater runoff, as existing infrastructure has become overwhelmed. During the flooding caused by Hurricane Irene and subsequently Tropical Storm Lee, stormwater drainage systems in the South End were overcome resulting in flooding of several blocks of homes and businesses on Route 30/Main Street. Route 30 is a primary transportation corridor through the Schoharie Valley that is used by emergency services vehicles and evacuating residents such that any areas of flooding created cascading emergency response challenges. Ponding water which remained after Hurricane Irene, and continues to develop during storms, presents a human health hazard since it provides a breeding ground for mosquitos.

Photo credit: Ecology and Environment, Inc.

Ponding water in the Village of Schoharie South End along Route 30 / Main Street

Stormwater drainage system improvements in this area will contribute to protection of Village assets during floods and increase resiliency of South End homes and businesses, and Route 30/Main Street. The necessary improvements will be determined during the design phase of the project and are expected to include a combination of built infrastructure improvements, green infrastructure, and stream restoration elements. Examples include construction of swales, retention ponds, culverts and storm drains, and the stabilization of stream banks to allow water to drain to the Schoharie Creek. The goal of the South End Drainage System project is to alleviate flooding and stormwater ponding in the Village's South End along State Route 30 and Sunset Drive.

Estimated Project Costs

It is estimated that the construction of the swales, retention ponds, culverts and storm drains, and the stabilization of the stream banks will cost **$1,015,000**. This cost includes approximately $230,000 for project engineering, design, and permitting to help ensure the elements which make up the South End Drainage System are adequate to meet the existing development in the area, as well as planned and possible future development. The remainder of costs will be finalized by selection of the design and have been estimated here for demolition and construction and include a contingency for scope changes.

Project Benefits

Health and Social Services

A key concern driving the project and its anticipated outcome is to reduce the risk of flooding in the South End, and ponding of water which represents a human health threat.

Housing

As a direct result of inadequate stormwater runoff infrastructure, flooding in the South End of the Village of Schoharie has become an increasing problem, and was devastating during Hurricane Irene and Tropical Storm Lee. By enhancing the capacity of drainage systems in the area, this project will protect homes in that neighborhood.

Map Showing proposed project location.

Infrastructure

It is expected that improving the drainage system will support regional stormwater management efforts, and will contribute to upgrading vital infrastructure in the area. This will, in turn, help protect the Main Street Business District, identified as a Community asset at severe risk.

Risk Reduction and Cost-Benefit Analysis

This project will reduce flooding risks to residences and businesses located within the South End Drainage Area including the Main Street Business District, a community asset identified as being at severe risk. It will also protect the business Harva, Village of Schoharie Offices, Schoharie Library, Schoharie Area Long Term (SALT), Inc. offices, and the Reformed Church of Schoharie. The project is expected to minimize flooding resulting from overflows of the existing stormwater system. The benefits associated with reducing: risk to a significant number of assets, including those at severe risk; and the costs associated with repair to damaged buildings, are expected to outweigh project costs.

Implementation

It is expected that it will take approximately 14-15 months to complete the project engineering, design, and permitting phase of the project including two to three months to develop the scope of work and hire an appropriate contractor, followed by 12 months for the studying of water flows, existing storm-water infrastructure, and flooding in the area, and to develop the design for the needed drainage infra-structure. The second phase is expected to include four months for construction and project completion. Scheduling of these project phases will be weather and season dependent.

Regulatory Requirements

Anticipated regulatory requirements for this project include: a New York State Department of Transportation (NYS DOT) Highway Work Permit; a New York Department of Environmental Conservation (NYS DEC) Article 15 permit, State Pollution Discharge Elimination (SPDES), and wetland permits; and U.S. Army Corps of Engineers (USACE) permits.

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Hilgert Parkway Stormwater Pumping Station

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Housing
- Infrastructure

Location
- Hilgert Parkway

Jurisdiction
- Village of Schoharie

Land along Hilbert Parkway is lower than the nearby Spring Brook streambed and other local water outlets. As a result, water will typically pool in this area during rain events, and was severely impacted by Hurricane Irene. Homes, Village offices, and other community assets were damaged as a result of the flooding exacerbated by poor drainage. Due to the depressed elevation in this area, ponded water cannot drain by gravity. This project includes the construction of a pumping station intended to relieve these chronic flooding problems which are excessively worsened during storms. The proposed solution is a pump station that will divert stormwater from the depression into the Village's stormwater system.

Photo credit: timesunion.com with permission

Flooding Along Hilgert Parkway after Hurricane Irene

Estimated Project Costs

It is estimated that the project will cost approximately **$242,000** to implement. This cost includes hiring a consultant to perform an assessment to determine the appropriate size and location of the pump station. The project cost also includes construction costs such as labor, equipment, and material costs for the installation of the stormwater pump system, a wet well, roughly 250 feet of storm sewer piping, and three catch basins.

Map Showing proposed project location on Hilgert Parkway in the Village of Schoharie.

Project Benefits

Housing

Installing the pumping station to prevent ponding of water in the depressed area along Hilgert Parkway is expected to protect five to 10 residences on this street from flooding.

Infrastructure

It is expected that improving the drainage system will support regional stormwater management efforts for the protection of the Main Street Business District, and associated businesses and residences.

Risk Reduction and Cost-Benefit Analysis

This project will reduce the risk of flooding to five to ten residential properties on Hilgert Parkway. As one component of local stormwater management, the risk to some high and severe risk assets may be reduced. These may include the Main Street Business District, Daughters of the American Revolution Lasell Hall, and Schoharie Area Long Term (SALT), Inc. offices. The benefits associated with the reduction in risk of homes, and an additional potential number of at-risk assets, are expected to outweigh the costs of installing the pumping station.

Implementation

It is expected to take approximately two to three months to develop a scope of work and hire a consultant to evaluate the flooding and establish the size for the pumping stations, approximately two months to obtain the required permits and nine months to undertake construction and complete installation of the pump station. The construction phase of the project may vary depending on the season in which it begins and the weather.

Regulatory requirements associated with this project may include: a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit and State Pollution Discharge Elimination (SPDES) permit; and a local building permit.

Young's Spring Intake Line Replacements

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Infrastructure
- Health and Social Services
- Natural and cultural resources

Location
- Young's Spring

Jurisdiction
- Village of Schoharie

There are two springs which supply public drinking water to the Village of Schoharie; they are both located on Barton Hill on the north side of Route 443. One of the springs, Young's Spring, has siphon pipes which emerge from it to feed the public water supply infrastructure. The force of Hurricane Irene caused a geologic shift at the cave opening at Young's

Spring and damaged the siphon pipes. The weakened siphon pipes are now susceptible to breakage which threatens the public water source for the Village. The proposed project will harden or replace the existing siphon pipes of the water intake and/or ensure that wells are drilled to the source. This will help stabilize and protect the main drinking water resource for the Village.

Photo credit: Lamont Engineers

Looking north at Young's Spring

Estimated Project Costs

The approximate project cost of **$70,000** is expected to bolster and harden the infrastructure in place to feed groundwater from Young's Spring into the public water supply of the Village, to help ensure that it remains continuous and is protected from future storm events to ensure safety of the Village drinking water supply.

Project Benefits

Infrastructure

Hardening the water intake at Young's Spring will help ensure this critical infrastructure system can withstand the force of future storms, and is essential to repair damage caused by Hurricane Irene so that it can continue to provide clean drinking water to the Village.

Health and Social Services

A safe and continuous supply of drinking water is essential to the health of Village residents and visitors. Through hardening of siphon lines and stabilization of the Young's Spring water source, the risk of a failed water supply system is reduced.

Natural and Cultural Resources

It is expected that implementation of the project will contribute indirectly to regional environmental efforts by protecting water quality, especially for groundwater.

Risk Reduction and Cost-Benefit Analysis

Repair of the Village drinking water intake reduces the risk of system failure with potential risks to human health.

The proposed project is also to harden the intake lines and, if necessary, drill to the source. In combination, these project elements will reduce the current risk of system failure as well as protect the system from damage by future storms. There are also anticipated benefits for groundwater quality, in that the risk of cross-contamination through damaged lines will be reduced. These benefits to public health, the natural environment and the reduced risk to this critical facility are expected to outweigh the costs associated with this project.

Photo credit: Lamont Engineers

Young Spring, Looking West

Implementation

It is anticipated that two to three months are needed to develop the scope of work and hire a consultant, two months are expected to be needed to obtain permits, and nine months will be required for construction and installation of the new lines. Construction elements of the project will be depended on season and weather.

Regulatory Requirements

Anticipated regulatory requirements for this project include a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit, and water supply permit modification.

Master Drainage Plan

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Economic Development
- Health and Social Services
- Housing
- Infrastructure
- Natural and Cultural Resources

Location

- Village of Schoharie

Jurisdiction

- N/A

Photo credit: Sherri Meyer-Veen

Flood waters remain in the Village of Schoharie after Hurricane Irene

The flood damage sustained by the Village of Schoharie during Hurricane Irene and Tropical Storm Lee revealed a critical need for a master drainage plan to be developed. This project will enable the Village be proactive in its planning for future development, including mixed use, within the village. It will also allow for improved engineering design that will address the amount of flooding experienced in 2011, and for the volume of flooding that could occur as a result of future storm events. This study will support decisions made by the community to become more resilient, and help protect assets identified as critical to the community. The result of the master drainage study could help inform other flood mitigation projects proposed for the Village.

The scope of this project will include: identifying drainage complaints; a desktop study of the 1,088-acre Village and surrounding drainage area that includes an analysis of the Village's physical, hydrologic, and climatic characteristics, and development of modeling of the drainage area; an evaluation of the City's design and Small Municipal Stormwater Systems (MS4) permit requirements (if applicable); the identification of recommended Best Management Practices (BMPs); and development of a plan for future development. This project will thus provide information critical to informed decision making by the planners and engineers who are responsible for future design, growth and protection of Village assets.

Estimated Project Costs

The Master Drainage Study for the Village will cost approximately **$288,000** to complete and will include: summarizing drainage complaints; a desktop study and model of the Village and surrounding drainage area; an evaluation of the Villages' stormwater systems; recommendations of BMPs; and development of a plan for future development.

Project Benefits

Economic Development

The immediate economic development benefits associated with the project are twofold: first, helping to ensure that critical Village assets are better protected from flooding, thereby increasing the confidence of those investing in the community; and second, reducing the cost associated with recovery from flood damage which supports further investment in Village resources.

Health and Social Services

The trauma associated with flooding from Hurricane Irene and Tropical Storm Lee has endured in the Community for several years. The stress of protecting, evacuating, and rebuilding homes or businesses has impacted the general well-being of individuals, especially among vulnerable populations in this low/moderate income community. Conducting a full drainage study will create a basis for decision-making about future building and infrastructure development efforts for protection of the Community, and will indirectly support a general preservation of physical health for residents.

Housing

The Master Drainage Plan will enable property owners to make informed decisions about how to mitigate flooding on private properties, and inform Village planners on how to guide future development. It will contribute to protecting homes by identifying opportunities to improve drainage and reduce flooding.

Infrastructure

As part of the Master Drainage Plan, BMPs for stormwater drainage will be identified and will inform the future management of stormwater within the Village. These BMPs will allow the Village to identify ways of mitigating stormwater damage to infrastructure within the Village. Additionally, this project carries the indirect benefit of potentially reducing costs associated with rebuilding infrastructure after storm events by implementing the BMPs and Master Drainage Plan elements.

Natural and Cultural Resources

The Master Drainage Plan will contribute to regional environmental and stormwater management efforts by producing a thorough and science-based approach to planning for and dealing with stormwater to maintain water quality at the local and watershed scale, and minimize damage to riverine systems during storms.

Risk Reduction and Cost-Benefit Analysis

Assets, homes, and businesses are located within the drainage area that will be studied in the Master Drainage Plan. Specific high and severe risk assets include the Main Street Business District, Niagara Engine Co. 6, DAR Lasell Hall, Schoharie County Emergency Management Office, and Schoharie Area Long Term (SALT), Inc. Other community assets include residences as well as infrastructure such as roads and bridges. This project is expected to help the Village better understand its drainage patterns and thereby its flood risks as a first step in taking measured actions to minimize flooding due to existing drainage structures being overwhelmed by stormwater. This will reduce risk to physical assets and persons located within the study drainage area. The benefits expected through implementing this project, including reduced risk to assets, are expected to outweigh investment in the project.

Implementation

It is expected to take approximately 13 months to complete this project. Three months are expected to be needed to develop a scope of work for the drainage study and select a consultant to undertake the project. The data collection and analysis phase is expected to require five months, followed by two months of public input. A final three months will be used to finalize the Master Drainage Plan.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

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Northern Drainage/Stream Improvement

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Natural and Cultural Resources

Location

- Fox Creek and Tributaries, North End, Village of Schoharie

Jurisdiction

- Village of Schoharie

This project is proposed to address the flooding of Fox Creek, a large watershed in the Schoharie Valley covering over 110 square miles with headwaters reaching to Albany County. During Hurricane Irene, extensive flooding occurred where Fox Creek intersects with Schoharie Creek. It was determined after the storm that this was likely the result of poor stream conditions in the Fox Creek tributaries. This led to an acute rise in flood waters that multiplied in volume and velocity as they flowed downstream.

Photo credit: Ecology and Environment, Inc.

Fox Creek Park, Village of Schoharie

Photo credit: Schoharie County Soil and Water Conservation District

Dumped riprap near Fox Creek Park

Floodwaters from Fox Creek tributaries led to extensive downstream damage in Fox Creek Park including the destruction of multiple baseball fields. In addition, stream banks downstream of the tributaries were highly eroded and the rip rap that was installed along these banks after the 2006 floods was washed away leaving raw banks that continue to erode. Although Hurricane Irene occurred in 2011, every flood event since has exacerbated this erosion, as a result of which the public park asset continues to be at risk and stream health continues to decline.

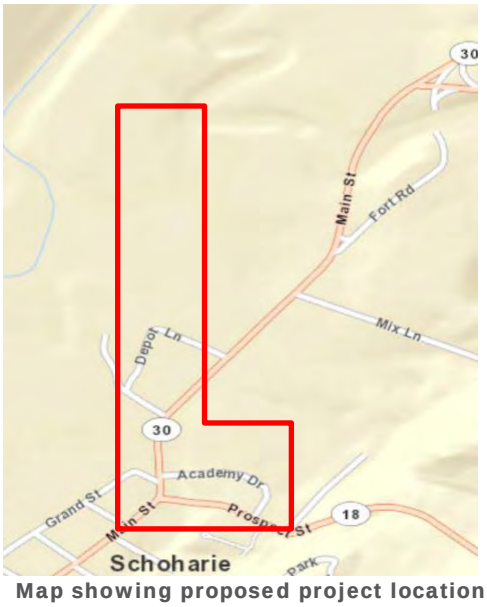
This project will include drainage improvements along the Fox Creek tributaries that run from the center of the Village to Fox Creek. Specifically, silt and debris will be removed from the tributaries that discharge to Fox Creek in order to reduce continued downstream impacts. Additionally, as part of this project a Rosgen level II Assessment will be conducted. It will include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling. This assessment will help inform improvements to the stream banks and channels of the tributaries.

Schoharie County Soil and Water Conservation District

Left bank erosion along Fox Creek

Estimated Project Costs

The Rosgen Level II Assessment study and the silt and debris removal from approximately 7,600 linear feet along the tributaries are estimated to cost **$290,000**. Four sections of Fox Creek and the Fox Creek Tributaries are targeted for silt and debris removal pending validation based on the Rosgen Level II Assessment including 3,500 linear feet from Fox Creek to Route 30; 1,000 linear feet from Route 20 to the North End of the Quarry; 1,050 linear feet from Route 30 to the Mid-Quarry Area; and 2,050 linear feet of from Route 20 to the School Fields.



Map showing proposed project location.

Project Benefits

Natural and Cultural Resources

It is expected that project activities will contribute directly to regional environmental efforts of watershed management, and the overall improvement of stream health. By removing silt and debris, deposited during the recent floods, from targeted reaches of the stream that have been badly degraded these reaches will be left in a more natural state and water quality is also expected to be improved. The results are expected to be improved riverine health and aquatic habitat.

As a result of this project, downstream public assets including Fox Creek Park and the Fox Creek Covered Bridge will be protected from future flood damage. In addition, it is expected that the associated assessment will provide information useful for further decision-making on watercourse rehabilitation, park development, and flood mitigation activities.

Risk Reduction and Cost-Benefit Analysis

This project will increase the overall stream health of Fox Creek and minimize flooding resulting from stormwater overflows and cascading flooding related to poor stream bank integrity and associated erosion. The result will be to directly reduce flood risks for adjacent and downstream assets located within the drainage areas of the Fox Creek Watershed. Risks to the following assets are expected to be significantly reduced: Fox Creek Park, Fox Creek Covered Bridge, Village of Schoharie drinking water intake, and the Village of Schoharie drinking water treatment plant. Based on the expected benefits, including reduction of risk to assets, the costs of implementing this project are supported.

Implementation

To conduct the Rosgen Level II Assessment, it is anticipated to take two to three months to develop the scope of work and hire a consultant, followed by two to four months to conduct the study, analyze the results and develop draft recommendations.

Once the Assessment has been completed and the project is approved, two to three months are expected to be needed to develop the scope of work and hire a contractor, followed by two months to obtain the needed permits. It is expected that it will take twelve to twenty-four months to perform the necessary silt and debris removal and any additional work prescribed by the Rosgen Level II Assessment depending on seasonal conditions.

Regulatory Requirements

The regulatory requirements associated with this project are expected to include a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit. Additionally, a water supply permit modification may be required.

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Land Use Study for Floodplain Management

Project type: Proposed

Associated Strategies

- Community Storm Preparedness
- Infrastructure Resilience
- Housing Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Economic Development
- Housing
- Natural and Cultural Resources

Location

- Village of Schoharie

Jurisdiction

- N/A

Many village assets (e.g., homes, businesses, infrastructure, agriculture) are located within the 100-year floodplain, the 500-year floodplain, and/or in an area beyond a delineated floodplain which remains susceptible to flood impacts. Hurricane Irene and Tropical Storm Lee had a significant detrimental impact to many assets located within the floodplain within the Village of Schoharie. In some areas more than eight feet of water inundated both public and private assets. While the storms delayed emergency responders from providing service to residents in need, their effects were largely economic.

Photo credit: timesunion.com with permission

Flooded streets in Schoharie Village

As a result, the proposed Land Use Study will evaluate floodplain usage and development in the village and assist in developing a long-term plan for protection of Village. This project will include identification of adjacent lands out of the floodplain that can be used to promote development outside flood-prone areas and strategically relocate flood-vulnerable structures.

Estimated Project Costs

The Land Use Study will cost approximately **$100,000** and will include: defined boundaries of the floodplain; establishment of best practices recommendations for set structure finished floor elevation to

avoid additional damage by storm events; evaluation of elevations of existing structures within the study area; the identification of areas outside of the floodplain where infrastructure can be improved and growth promoted.

Project Benefits

Economic Development

This planning project proposes to identify areas outside the floodplain in which the Village can grow at a reduced flood risk. It is expected that economic development activities will thrive in a more stable environment outside the flood plain and that investors will be attracted to establish businesses in locations with less flood risk. This project therefore has the potential to stimulate much needed economic growth for businesses in the Village which will be expected to result in additional jobs for Village residents.

Housing

Housing in the Village is currently distributed in high flood risk areas. A benefit of the project will be the identification of areas that are better suited for residential development outside the floodplain. This project will provide a tool with which to begin identifying low flood risk areas to promote housing development and/or relocation to reduce vulnerability of Village housing. This will help to increase the flood resiliency of the Village's housing and make it more sustainable.

Natural and Cultural Resources

This project will contribute to regional environmental planning efforts for floodplain management. This management is intended to increase the natural buffering and water storage capacity of the system and promote stream health.

Risk Reduction and Cost-Benefit Analysis

The Land Use Study will develop a comprehensive strategy to minimize future risk to highly vulnerable assets within the community, contributing to economic development activities rooted in resiliency and sustainability, and supporting the health of riverine systems. These potential economic, housing, and natural and cultural resource benefits that may be achieved as a result of the implementation of the findings of this study are expected to outweigh the costs of its performance.

Implementation

It is anticipated that this project will require approximately 13 months to complete. It is expected to take three months to develop a scope of work and select a consultant to perform the land use study. The next five months will be used for data collection and analysis, followed by a two months public input period, and a final three months to develop the final report.

Regulatory Requirements

No regulatory requirements are anticipated for this project.

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Contribution to Firehouse Replacement

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Health and Social Services

Location
- Village of Schoharie

Jurisdiction
- Village of Schoharie

Photo credit: Ecology and Environment, Inc.

Schoharie Fire Department

During Hurricane Irene the Village of Schoharie firehouse and the equipment it housed were entirely destroyed. The Village fire service supports the Town and Village of Schoharie as well as neighboring jurisdictions through mutual aid. It is currently operating from a temporary structure on a former farm implement dealership property on Fort Road; this location is out of the floodplain. The Federal Emergency Management Agency (FEMA) is providing funding for the replacement of the former 9,000 square foot firehouse, however, because of new code and life safety requirements the new facility must be 14,000 square feet in order to meet the same mission of community life and property protection as the previous station. Construction of the new facility must adhere to code and life safety requirements as prescribed by the National Fire Protection Association standards, Occupational Safety and Health Administration, New York State Building Code, and the American National Standards Institute. The requirements of these standards and codes have necessitated the increase in facility size to 14,000 square feet which has led to additional costs that will not be covered by FEMA.

Estimated Project Costs

The costs of this project include demolition of the existing building along with the design, engineering, and construction of the new permanent 14,000 square foot facility. The project will require agreement and financial support between the Town and Village of Schoharie and FEMA. The total funding being requested from the Town and Village's CDBG-DR allocation is **$850,000**. The total cost being requested of the Town of Schoharie's allocation is estimated to be $550,000 and the total cost being requested of the Village of Schoharie's allocation is estimated to be $300,000. Design firms and construction contractors may be used on this project and would be selected through a competitive bid.

Project Benefits

Community Planning and Capacity Building

This project will support increased response and recovery operations through replacement of the destroyed facility. Operations housed in the new facility will include the protection of resident and visitor life safety through evacuation support, lifesaving and rescue operations, and protection of Community assets.

Health and Social Services

This project supports emergency response activities that provide protection to the health and safety of residents and visitors during emergencies by providing a base of operations for emergency responders and their equipment.

Risk Reduction and Cost-Benefit Analysis

This goal of the project is enhanced community capacity and life safety protection. It is expected to

mitigate damage during future storm events by providing emergency services with a facility in which to stage mobile equipment such as fire trucks, to store necessary response equipment, and to maintain a base of operations and communication outside the floodplain. The benefits associated with the project, including life safety protection and enhanced response capability are expected to outweigh the costs of the project.

Photo credit: Ecology and Environment, Inc.

Village of Schoharie Fire Department temporary fire equipment facility

Implementation

It is expected to take approximately 21 to 25 months to complete this project. Two to three months are expected to be required to develop the scope of work and select the contractor followed by four to six months for design and engineering of the new firehouse, and then approximately 12 to 16 months for the demolition of the existing structure and construction of the new firehouse. Construction activities and time line will be season and weather depended.

Regulatory Requirements

Local building permits and a water supply permit modification may be required to undertake this project.

Rebuilding Police Emergency Services Center

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Health and Social Services

Location
- Academy Drive, Village of Schoharie

Jurisdiction
- Village of Schoharie

The building that housed the Village of Schoharie Police Department, and its vehicles and equipment, was destroyed during Hurricane Irene. This has restricted the capacity of the community to respond to emergencies and support public safety.

The project will construct a new shared service facility outside of the floodplain on the Schoharie Central School District Property. The building will house emergency services, police vehicles and equipment, and the police department's safety office. This project will enhance the community's resilience to future disaster and emergency events by providing an essential facility for law enforcement operations that is protected from flooding by being located outside flood vulnerable areas.

Map showing proposed project

Estimated Project Costs

It is estimated that providing the new shared service facility on the identified School District property will cost **$200,000**. This cost includes building design and permitting, and construction.

Project Benefits

Community Planning and Capacity Building

The project supports community recovery activities, by re-building facilities needed for the emergency services of the Village that were destroyed during Hurricane Irene. By strategically housing the necessary facilities outside the flood vulnerable areas, the building will improve the ability of Safety/Emergency Management response operations to respond efficiently and continuously during storms.

Health and Social Services

More rapid, sustainable, and assured response services will contribute to preserving and safeguarding the physical health of individuals in the Community.

Risk Reduction and Cost-Benefit Analysis

This project is expected to enhance community planning and capacity building by providing law enforcement services the necessary equipment and base of operations to support the community during emergencies. The construction of a new Police Emergency Services Center will increase the efficacy of response, and provide associated benefits to the Community well beyond the costs of this project.

Implementation

The project is expected to require approximately 24 to 31 months to complete. Two to three months are anticipated to develop a scope of work and select a contractor. Following this an additional two to four months will be required to design the new facility and obtain the necessary permits, followed by 20 to 24 months for construction. Construction activities will be season and weather dependent.

Regulatory Requirements

It is anticipated that local building permits may be required to undertake this project.

Parrott House

Project type: Proposed

Associated Strategies

- Resilient Economy
- Housing Resilience

Associated Recovery Functions

- Economic Development
- Housing

Location

- Main Street, Village of Schoharie

Jurisdiction

- N/A

This project involves the acquisition and repurposing of the historic Parrott House. The Parrott House was sufficiently impacted by Hurricane Irene and Tropical Storm Lee to have remained vacant since because of building code concerns. As a result, the building, despite being considered the anchor structure of Main Street in the village, is at risk of blight. The intent is to purchase the building, make flood protection improvements through the elevation of utilities, and bring the building up to code so it can be re-sold for commercial use. The ground floor of the building already is designed as a commercial space and since the Parrott House used to be a hotel, there is a mix of hotel rooms and apartments that will be part of the planned renovation on the upper two floors. They could be renovated into low/moderate housing, for which there is a need in the Village. The Community believes that this is a keystone project which addresses an urgent need related to flooding that could simultaneously provide positive opportunities for low/moderate income families, and address economic development.

Photo credit: timesunion.com with permission

Damage to the Parrott House from Hurricane Irene

Photo credit:Ecology and Environment, Inc

Sign in front of the Parrott House on Main Street in the Village of Schoharie

Estimated Project Costs

The historic structure needs to be brought up to code and undergo flood proofing through the elevation of utilities. It is one of two buildings considered as anchors for Main Street, is a regional icon, and is of high value to the Community. The upstairs floors of the building provide a real opportunity to make low and moderate cost housing available, meeting an existing gap in the local property market. It is estimated that the project will require **$980,000** to complete.

Project Benefits

Economic Development

This project is about restoring confidence and character to the Community, while providing opportunities to attract new businesses into an anchor location on Main Street. The residents of the Village believe revitalizing the building will provide a keystone anchor attraction and restore vitality to the damaged Main Street Business District.

Housing

There is a need to attract businesses into the Village, but there is also a need to provide housing for new families coming into this low and moderate income Community, or families seeking to remain there. By repurposing the upper floors of the Parrott House, and making the structure safe and more resilient to flooding, this need can be met in a very attractive way. Achieving the conversion will also help contain the risk of blight spreading on Main Street.

Risk Reduction and Cost-Benefit Analysis

The acquisition, restoration and successful sale of the Parrott House for commercial purposes will help eliminate the risk of community blight that is demonstrated by this property. The sale and repurposing of this building will reduce the potential for lower property values in surrounding buildings. The economic benefits in terms of new business opportunities and low/moderate income housing options associated with this project are anticipated to outweigh its costs.

Implementation

This project is anticipated to require 24 to 32 months to complete. It is expected to take approximately two to three months to purchase the Parrot House from the current owner, two to four months for project engineering design followed by an estimated 20 to 24 months for construction. Construction activities will be season and weather dependent.

Regulatory Requirements

Local building permits and a review by New York State Parks Recreation and Historic Preservation (OPR&HP) are likely required for this project.

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Taylor Block

Project type: Proposed

Associated Strategies

- Resilient Economy
- Housing Resilience

Associated Recovery Functions

- Housing
- Economic Development

Location

- Village of Schoharie

Jurisdiction

- N/A

Photo credit: Ecology and Environment, Inc.

Taylor Block, Village of Schoharie

The project includes the purchase and renovation of the Taylor Block building. This project will make flood protection improvements by elevating utilities and bring the building up to code so it can be re-sold for commercial use. The ground floor of the building has been, and is, a commercial space while the upper floors are apartments. Flooding by Hurricane Irene and Tropical Storm Lee had a severe impact on the building which needs to be thoroughly flood proofed to support continued use. The Village has a need for low/moderate income housing, and the six existing apartment spaces can be renovated to meet this need. The Community believes that this is a keystone project which addresses an urgent need related to flooding that could simultaneously provide positive opportunities for low/moderate income families, and address economic development.

Estimated Project Costs

It is estimated that it will cost **$655,000** to purchase the Taylor Block and make the needed renovation, flood proofing and mitigation improvements through the elevation of utilities.

Project Benefits

Housing

The six apartments on the upper floors of the building can be repurposed to provide housing suitable to meet the low/moderate income population demand, for which inadequate stock is currently available. With flood proofing of the building, these units will be expected to withstand future storms.

Economic Development

It is expected that implementing this project will provide a keystone anchor attraction within the community through supporting the ground floor businesses, and making them more secure economically to withstand future storms.

Risk Reduction and Cost-Benefit Analysis

Flood proofing measures implemented in this project will contribute to protection of the Taylor Block. The acquisition and successful sale of the Taylor House for commercial and residential purposes, will address community blight which threatens the economic recovery and stability of the Community. The sale and repurposing of this building will also reduce the potential for reduced value of surrounding properties. The risk reduction and economic benefits associated with this project are anticipated to outweigh the costs.

Implementation

This project is anticipated to require 24 to 32 months to complete. It is expected to take approximately two to three months to acquire the building, and two to four months for project engineering design followed by an estimated 20 to 24 months for construction. Construction activities will be season and weather dependent.

Regulatory Requirements

Local building permits and a review by New York State Parks Recreation and Historic Preservation (OPR&HP) are likely required for this project.

New Ambulance Building and Shelter

Project type: Proposed

Associated Strategies

- Community Storm Preparedness

Associated Recovery Functions

- Community Planning and Capacity Building
- Health and Social Services

Location

- Cotton Hill Road

Jurisdiction

- Town of Middleburgh

The Town of Middleburgh faced several challenges related to response efforts during Hurricane Irene and Tropical Strom Lee. The first challenge was related to the need for additional shelter spaces by Town of Middleburgh residents. The existing shelter is located in the Town of Middleburgh Elementary School; however, during Hurricane Irene this building was surrounded by flood waters from Gorge Creek and was therefore inaccessible. Second, the Middleburgh Emergency Volunteer Ambulance Corps, (MEVAC) Inc. response during Hurricane Irene and Tropical Storm Lee was challenged by the limited work space provided by its current location, the Town's Department of Public Works (DPW) garage. A third challenge was that traffic between Emergency Medical Services (EMS) vehicles – both ambulances and response workers' personal vehicles – became congested as DPW vehicles use the same entrance from the main road leading to increased response times.

Photo credit: Ecology and Environment, Inc.

Current location of the Middleburgh Emergency Volunteer Ambulance Corps, (MEVAC) Inc. in the Town Department of Public Works building

This project proposes to address these three identified needs through construction of a new 2,300 square foot EMS building with three bays and an attached 4,000 square foot emergency shelter on the DPW property. The 4,000 square foot shelter would provide adequate space to house 100 displaced people. The project's location on Cotton Hill Road is out of the floodplain, up a hill, away from Gorge Creek, and within 1 mile of the designated existing shelter in the Elementary School. This location is therefore a suitable site for an alternative shelter for residents coming from the east end of the Village or Town. This location also serves as a protected site for EMS and DPW bases of operations. A separate driveway will be built for ambulance vehicles, alleviating traffic congestion between EMS and DPW vehicles.

Estimated Project Costs

It is estimated that the design, engineering, and permitting costs associated with this project will be roughly $600,000 while construction costs of the new EMS building with attached emergency shelter, and the separate driveway/entrance are anticipated to be roughly $1,700,000. In total this project is estimated to cost **$2,300,000**.

Project Benefits

Community Planning and Capacity Building

The new Ambulance Building and Shelter will increase the capacity of emergency responders to operate during and after storm events as the increased space will allow for quicker and more efficient response times and reduce traffic and congestion while EMS vehicles enter and exit the facility.

Approximate location of the Middleburgh Emergency Volunteer Ambulance Corps, (MEVAC) Inc. in the Town Department of Public Works building

Health and Social Services

This project supports enhanced emergency response operations by the DPW, and provides critical shelter resources for people displaced by disasters. Additionally, by increasing the efficiency of EMS response, public health and safety will benefit as responders will be able to reach people that are in need of life-saving services more efficiently.

Risk Reduction and Cost-Benefit Analysis

This project is expected to increase community planning and capacity building capabilities, better preparing emergency responders, municipal services, and residents for future storm events. This project is not intended to directly reduce the flood risk of physical assets but it will help ensure that individuals displaced from their homes have access to resources required for human health and safety and will improve the capacity of the Town's EMS and DPW. These benefits to public safety are expected to out-

Source: Ecology and Environment, Inc.

Proposed new location of the MEVAC building and emergency shelter

weigh the costs of implementing this project.

Implementation Strategy

This project is expected to be implemented within 24 months. Approximately three months are expected to be required to develop a scope, select a contractor, and secure the required local building permit. Design, engineering and construction are estimated to require 21 months.

Regulatory Requirements

The expected permits required for this project are New York State Department of Transportation (NYS DOT) highway work permits, and local building permits.

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Commercial Node Development and Public Utility Extension Feasibility Study

Project type: Proposed

Associated Strategies
- Resilient Economy

Associated Recovery Functions
- Economic Development

Location
- Route 30

Jurisdiction
- N/A

During Hurricane Irene, most of the commercial locations in the Village of Middleburgh (Main Street) and Town of Middleburgh (Route 30) were significantly impacted by flood waters because they are in the floodplain. The Town currently has no other commercial locations along its major transportation corridor identified, ready, or zoned for business use. While there has been significant rehabilitation of Main Street buildings and reuse by businesses in the Village, the commercial area in the Town has not recovered and the current commercial district remains mostly vacant. Of particular significance is the loss of basic retail services such as grocery stores within the Town that has resulted because of flood impacts to the commercial district. A similar condition exists in the Town of Schoharie north of Middleburgh.

Photo credit: Ken Hubert

Main Street Business District in Middleburgh covered in mud that remained after Hurricane Irene

This project consists of two complementary feasibility studies; the first, the commercial node development feasibility study, will evaluate alternate locations north along Route 30, out of the floodplain that could accommodate a new commercial node and restore basic retail services within the Community. The second, the public utility extension feasibility study, will determine the feasibility of extending public utilities to the potential commercial node locations identified in the first study.

The commercial node development feasibility study will identify location(s), acquisition options, permitting needs, recommended zoning and other regulatory changes, infrastructure improvements, and site design that would be required to make this a viable commercial node to serve both Middleburgh and Schoharie. As part of this project, the study would develop a Generic Environmental Impact Statement (GEIS) so that compliance with the State Environmental Quality Review Act (SEQRA) is completed. It would also identify marketing and business incentives that could be implemented by the community

and/or local development agencies to recruit new businesses to that location. This project would result in identification of sites, permit requirements, and propose infrastructure designs so that acquisition of the property and installation of improvements could be implemented pending funding.

Following the completion of the commercial node development feasibility study, the public utility extension study will evaluate the feasibility, and conduct a cost/benefit analysis of extending public utilities to the potential commercial node areas that have been identified. Currently, public utilities end at the border of the Village of Middleburgh. As the availability of public utilities is required by some retailers, it is anticipated that the expansion of public utilities out of the Village of Middleburgh would provide an incentive to attract new business to develop out of the floodplain.

Estimated Project Costs

This project is expected to cost approximately **$140,000.** The commercial node development feasibility study is estimated to cost approximately $47,000 and include: the commercial node site selection work; GIS analysis including looking at floodplain and other natural resource features; traffic counts; GIS work related to an adjacent land study; a conceptual site design; an analysis of business incentives; the development of the GEIS; an evaluation of zoning and permits needed; and additional architect and engineering design. The utility extension feasibility study is expected to cost approximately $93,000 and will include: a cost/benefit analysis of extending public utilities roughly 5 miles out of the Village of Middleburgh; an engineering evaluation of water and septic systems; an engineering evaluation of the expansion of existing infrastructure; and a conceptual site design.

Project area of the feasibility study, Route 30 in the Town of Middleburgh

Project Benefits

Economic development

Removing development from the floodplain will reduce future losses, saving taxpayer money on rebuilding efforts. Pre-planning for a new site will enhance recruitment of businesses and spur economic growth. Planning for a commercial node will direct economic growth to a planned location instead of sprawling along Route 30 in a haphazard way. By identifying a commercial node between communities in Middleburgh and Schoharie, both communities will benefit from the increase in commercial options in close proximity to each municipality. By going through a site design planning process, the commercial node will be

developed in a way that is consistent with community character. Additionally, the extension of public utilities will be an incentive for business development which could spur economic growth in the Town of Middleburgh. The provision of public water could also increase land values in the area.

Risk Reduction and Cost-Benefit Analysis

The project will promote economic development out of the floodplain and in a manner which would benefit both the Middleburgh and Schoharie communities. As businesses and assets are able to relocate out of the floodplain, risks to these assets will be reduced. Identification of a new commercial node will take into consideration critical environmental features that need to be protected and further protect floodplain areas. The study would plan to protect resources nearby including wetlands, aquifers, the agriculture district, archaeology, historic features, and the Mohawk Valley Heritage Corridor.

Implementation Strategy

It is anticipated that for each study it will take two to three months to develop a scope and hire a consultant, four to six months will be required for data collection, four months will be needed for data analysis and modeling, and six to eight months will be needed to produce the final study.

Regulatory Requirements

No regulatory requirements are anticipated to conduct this study.

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Huntersland Volunteer Fire Department Berm Enhancement

Project type: Proposed

Associated Strategies

- Housing Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Housing

Location

- Huntersland Volunteer Fire Department

Jurisdiction

- Town of Middleburgh

The Huntersland Volunteer Fire Department is located next to the Little Schoharie Creek. There is a short berm set back from the creek located on Huntersland Volunteer Fire Department property to protect against floodwaters. However, during Hurricane Irene and Tropical Storm Lee, the Little Schoharie Creek spilled its banks, overtopped the berm, and flooded the nearby Huntersland Methodist Church and residences. This project will increase the height of the setback berm, stabilize it, and extended its length to hold stormwater on the floodplain and prevent it from impacting the nearby church and residences.

Photo credit: Ecology and Environment, Inc.

View of Huntersland Volunteer Fire Department from Huntersland Road

Estimated Project Costs

This project will cost a total of approximately **$144,000**. This includes an estimate of $42,000 for design, engineering and permitting costs, and an additional $102,000 for the construction costs which will include: the enhancement of approximately 210 linear feet of the existing berm so that it measures 3 feet high by 24 feet wide; and the construction of an additional 150 linear feet of new berm that also measures 3 feet high by 24 feet wide.

Project Benefits

Housing

Residences surrounding the Huntersland Fire Department and the Huntersland Methodist Church will be protected from flood waters as a result of the enhancement of the existing set back berm. These assets will be protected from flood waters as the berm will block flood waters from the Little Schoharie Creek from reaching the properties. This will reduce flood risks to these assets as well as any potential recovery costs that may be incurred as a result of future flood events.

Risk Reduction and Cost-Benefit Analysis

This project will protect a neighboring church and residences from floodwaters from the Little Schoharie Creek that currently can get past the existing setback berm. By extending the setback berm and preventing future flooding of these assets, the financial strains associated with rebuilding and recovery post flooding will be eliminated. These benefits associated with reducing risks to residential and community assets are expected to outweigh the costs of this project.

Implementation Strategy

It is expected that this project will require seven to eight months to complete. Two to three months are expected to be needed to develop a scope and hire an engineer; two months are needed to obtain permits; and approximately three months will be needed for construction.

Regulatory Requirements

The project will likely require a NYS Department of Environmental Conservation (NYS DEC) Article 15 permit.

Gorge Creek Hydrologic Study

Project type: Proposed

Associated Strategies

- Understanding Regional Flood Risks
- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Natural and Cultural Resources

Location

- Town of Middleburgh

Jurisdiction

- N/A

During Hurricane Irene, the high school and elementary school, the Main Street Business District in the Village of Middleburgh, and many homes were flooded as a result of the floodwaters from Gorge Creek. As Gorge Creek has cut into the valley floor, the banks of the creek near its headwaters have become increasingly unstable and have failed across wide areas. The bank failures deposit large amounts of sediment and woody debris in the creek. During major storms, this debris and sediment then washes downstream toward the village. This material picks up velocity before being forced through a five-foot box culvert under Middleburgh High School and Elementary School and a three-foot bypass, both of which are undersized. This backup of sediment and debris at the culvert and bypass block the existing drainage system forcing flood waters over and down Main Street.

When the culvert and bypass were installed, it is unlikely anyone could have predicted the changes in land use in the headwaters and the new hydrologic regime that would develop. Therefore, this project will undertake a hydrologic study of approximately one mile of Gorge Creek to determine suitable measures to stabilize the Creek banks and increase the capacity

Photo credit: Schoharie County Soil and Water District

Debris in Gorge Creek above Trombley

Photo credit: Ecology and Environment, Inc.

Middleburgh Elementary School

of the Creek in order to mitigate downstream flooding. The study will be a Rosgen Level II assessment and include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling. The construction recommendations that are anticipated to come out of this study include aggressive bank armoring in some locations, and simple channel shaping, minor bank tapering, and planting in others. This project will complement and inform the project proposed by the Village of Middleburgh's Gorge Creek Culvert Repair project.

Estimated Project Costs

The Gorge Creek hydrologic study/Rosgen Level II assessment is estimated to cost **$40,000**.

Project Benefits

Natural and Cultural Resources

The study will contribute to regional environmental efforts for watershed management and stream quality improvements. Additionally, the study will result in recommendations that, when implemented, will have a direct impact on improving stream health and water quality and will effectively reduce risks to downstream assets.

Risk Reduction and Cost-Benefit Analysis

This project would identify measures that, once implemented, will reduce flooding risk to physical assets located within the Creek's drainage area. The findings of this study will result in projects that will protect a number of assets throughout the Town of Middleburgh and which include critical facilities. Specific assets that will be protected include the Village of Middleburgh Office which operates out of a Town-owned building, the Middleburgh Post Office, St. Mark's Evangelical Lutheran Church, Bassett Healthcare Middleburgh, Middleburgh Central School, St. Catherine's Church, Middleburgh Library, Best House Medical Exhibit, and Middleburgh Telephone Company. The benefit of contributing to the reduction in risk for community assets as well as the protection of residences and environmental benefits are expected to outweigh the costs.

Implementation Strategy

It is expected that this study will require two to three months to develop a scope of work and hire a consultant, four to six months for data collection, four months for data analysis and modeling, and an additional six to eight months to produce the final study and recommendations.

Regulatory Requirements

No regulatory requirements are anticipated for this study.

Town of Middleburgh Watershed Restoration Project

Project type: Proposed

Associated Strategies

- Infrastructure Resilience
- Resilient Green Spaces

Associated Recovery Functions

- Economic
- Housing
- Infrastructure
- Natural and Cultural Resources

Location

- Town of Middleburgh

Jurisdiction

- Town of Middleburgh

Two tributaries of the Schoharie Creek in the Town of Middleburgh, Little Schoharie and Line Creek, were severely damaged by Hurricane Irene. These creeks are now completely incised; they have essentially become chutes down which water now flows with increased velocity.

Flooding of the Little Schoharie and Line Creeks during Hurricane Irene also caused damage to adjacent prime agricultural land (over a dozen farms). Many roads and homes are also close to these creeks and exist under constant threat of flood damage. During Hurricane Irene, flood damaged roadways left residents stranded in several locations. These creeks were also a trout fishing destination of Community members and tourists. Damage from Hurricane Irene has resulted in a significant decline in the trout population, and therefore tourism, which has critically impacted the local economy.

Design and engineering for the restoration of these creeks could consist of solutions to re-establish the natural channels up to the ideal floodplain level and repair the riparian buffer as well as to stabilize areas where landslides occurred during Hurricane Irene and Tropical Storm Lee.

Photo credit: Schoharie County Soil and Water District

Eroded and Raw Stream Bank in the Town of Middleburgh

Photo credit: Schoharie County Soil and Water District

Eroded and Raw Stream Bank in the Town of Middleburgh

Estimated Project Costs

The Town of Middleburgh would contribute up to **$1M** to support this restoration project.

Project Benefits

Economic

This project could support protection of over a dozen agribusinesses along the creeks and help ensure main commerce transportation routes remain open through protection of bridges on highways. Restoration of the creeks is expected to result in the restoration of trout populations and return of tourism, which is a critical source of economic support to the Community.

Housing

This project could reduce flooding impacts to landowners with property along the stream.

Infrastructure

This project could help ensure transportation infrastructure remains open, since the roads that run parallel to these creeks are designated flood evacuation routes.

Natural and Cultural Resources

This project could protect water quality and watershed health, limit subsequent damage to prime agricultural land, and support restoration of the trout population which has significantly declined since Hurricane Irene.

Risk Reduction and Cost-Benefit Analysis

This project would contribute to reducing flooding impacts to assets along Little Schoharie and Line Creeks. The economic, housing, infrastructure, and natural and cultural resources benefits associated with this project are anticipated to outweigh its costs.

Implementation Strategy

The timeframe for this project is to be determined.

Gorge Creek Culvert Repair and Stormwater and Drainage Infrastructure Improvements

Project type: Proposed

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Housing
- Infrastructure

Location
- Main Street, Village of Middleburgh

Jurisdiction
- Village of Middleburgh

Significant flooding at the Middleburgh High School caused by Hurricane Irene could have been averted by addressing drainage of Gorge Creek. Currently, its channel runs under the school where conveyances were overwhelmed by the volume of stormwater and debris. This project proposes to replace the existing culverts, and enhance the stormwater system in the vicinity to build capacity for future storm events.

Photo credit: Schoharie County Soil and Water District

Gorge Creek woody debris

Approximate location of the existing culvert at the leader arrow

The Gorge Creek channel under Main Street/Route 145 consists of a 60-inch and a 36-inch box culvert. The channel begins in the northeast corner of the intersection of Main Street, Wells Avenue, and Clauverwie where the water is directed to it in a trough. Both culverts continue under the roadway. The 60-inch culvert turns south onto the Middleburgh High School property and connects to Gorge Creek on the south side of the school. A portion of the high school is located over the culvert. The 36-inch culvert runs along Main Street and then turns to connect into an existing manhole on the lawn of the western part of the school. The neighborhood north and west of the culverts is composed of both residences and commercial businesses. No stormwater drains exist in the neighborhood so that stormwater runoff from the

neighborhood properties travels overland, entering the 60-inch culvert via catch basins located at the Main Street, Wells Avenue, and Clauverwie intersection. In recognition of flood related threats, nearby commercial businesses have installed sump pumps in their basements to pump out flood water from major rain events.

Photo credit:Ecology and Environment, Inc.

Box culverts transmit Gorge Creek under Main Street and Middleburgh Middle School

To address the excessive flooding that resulted in this area during Hurricane Irene this project includes the construction of two new four by eight foot box culverts that will replace the existing culverts. In addition, new stormwater systems will be constructed along Main Street to the west, and Railroad Avenue, Railroad Court, Sheldon Street and Danforth Avenue to the north.

The first box culvert will be four by eight feet and approximately 410-feet long. The culvert will be constructed in Clauverwie and connect the existing 60-inch box culvert on the northeast corner of the Main Street, Wells Avenue, and Clauverwie intersection with Gorge Creek via a new headwall south of the school. The second culvert will also be four by eight feet and approximately 300 feet long. The culvert will be constructed along Main Street and connect the existing 36" culvert at the manhole on the school lawn which is located just behind the sidewalk along Main Street. The culverts will be designed to accommodate potential stormwater runoff from a 100-year storm. Panels will be installed at 150-foot intervals to provide access to the culvert for regular cleaning and flushing. The existing 60- and 36-inch culverts, which are too small and cannot be easily maintained, will be abandoned in place and their ends filled with concrete.

*A **headwall** is a retaining wall placed at a culvert outfall to hold back surrounding soils.*

*The **100-year storm** is a modeled rain event that represents rainfall that has a 1% chance of occurring at a location in any particular year. Similarly, the **25-year storm**, mentioned at the end of this section, is a rain event that has a 4% chance of occurring in a particular year.*

The new box culverts will be complemented by the installation of five new stormwater systems. The first new stormwater sewer system, hereafter referred to as the Main Street system, will be constructed in Main Street from Chestnut Lane and connect to the second new stormwater system in River Street. If connections to the River Street stormwater system at the intersection of River Street and Main Street are available by gravity flow, the Main Street system will be terminated at the intersection of River

Street and Main Street. If the connections cannot be met, then a new manhole will be constructed. Businesses along Main Street will be connected to the stormwater system via house connections at the request of the Village of Middleburgh. The house connections will allow businesses with sump pumps to pump out accumulated water to the system. A check valve will be installed on each service connection to prevent water from flowing back to the house or business from the stormwater system.

The third new stormwater system will be constructed on Railroad Avenue to collect runoff from the fourth new stormwater system constructed in Sheldon Street and Railroad Court. The Railroad Avenue stormwater system will convey stormwater from the new Sheldon Street and Railroad Court system to the stormwater system on Main Street. The fifth new stormwater system will be constructed on Danforth Avenue and connect to the Main Street stormwater system at River Street.

The stormwater systems will discharge to the Schoharie Creek. A 36-inch diameter outfall to the Schoharie Creek will be constructed between Main Street and Danforth Avenue on River Street. A manhole will be constructed in River Street connecting the stormwater system from Main Street and River Street to the outfall.

This project will also include a detailed drainage study to confirm the required pipe and culvert sizes and to develop the culvert designs. A 25-year storm will be used for sizing the pipes and a 100-year storm for sizing the culvert.

Estimated Project Costs

It is estimated that the new box culvert and drainage system improvements will cost approximately **$2,600,000**. This cost includes approximately $600,000 in engineering, design, and permitting costs and approximately $2,000,000 in construction costs of which the culvert replacement portion of the project will cost approximately $1,300,000 and the stormwater systems installation will cost approximately $700,000.

Project Benefits

Housing

It is expected that improving the stormwater drainage system for Gorge Creek will directly protect dozens of homes in local neighborhoods that were heavily impacted by the creek overflowing its banks which in turn overwhelmed the existing stormwater system during Hurricane Irene and Tropical Storm Lee.

Infrastructure

Implementation of this infrastructure project is expected to reduce flooding caused by Gorge Creek and therefore provide protection to Village residences, businesses and a school on and around Main Street.

Risk Reduction and Cost-Benefit Analysis

Middleburgh High School was flooded during Hurricane Irene and now continues to be flooded during large storm events. By installing new culverts and stormwater runoff systems, The Middleburgh High School and surrounding neighborhoods will be better protected from flooding as stormwater is managed and directed to discharge into Schoharie creek. The benefits associated with reducing risk to a significant number of assets, including those at severe risk, will outweigh project costs.

Implementation Strategy

The overall timeframe for this project is expected to be 29 to 35 months. Approximately three months will be required to develop a scope of work and select a contractor, project design and permitting is expected to take an additional four months, and construction is anticipated to require between 22 to 28 months. Construction timeframes will be season and weather dependent.

Regulatory Requirements

Regulatory requirements for this project are expected to include: a road opening permit issued by the Village of Middleburgh and New York State Department of Transportation (NYS DOT); a New York State Department of Environmental Conservation (NYS DEC) Control permit for connecting to an existing 60-inch culvert, Article 15 permit, and a water quality certification will be needed; and a Soil Erosion and Sediment Control Plan needs to be approved by the Schoharie County Water & Soil Conservation District.

Stream Bank Erosion Control – Schoharie Creek off of Baker Avenue

Project type: Proposed

Associated Strategies

- Understanding Regional Flood Risks
- Community Storm Preparedness
- Housing Resilience

Associated Recovery Functions

- Housing
- Natural and Cultural Resources

Location

- Baker Ave, Village of Middleburgh

Jurisdiction

- Village of Middleburgh

A stretch of Schoharie Creek that runs along Baker Avenue has become unstable. Hurricane Irene and Tropical Storm Lee exacerbated the conditions of the creek leaving the creek banks raw and open to further erosion. This stretch continuously floods and has led to multiple housing buyouts by the Federal Emergency Management Agency (FEMA) along its banks. In addition to these properties which have been converted into open space, and a community garden, there are multiple houses that still remain. Continued erosion and an incredibly unstable stream bank persist and threaten the community assets and individual homes along Baker Avenue. In fact, over the past five to six years, the banks which are now raw have encroached on these village assets. Additionally, as the stream bank migrates it has begun to threaten the State Route 145 Bridge. The proposed project is to install rip rap and stone revetments to slow creek flow, reduce erosion, and mitigate flooding along approximately 1,000 feet of the Schoharie Creek parallel to Baker Avenue.

Photo credit: Ecology and Environment, Inc.

A raw bank of Schoharie Creek off of Baker Avenue

Estimated Project Costs

It is estimated that installing rip rap and stone revetments along a 1,000 foot stretch of Schoharie Creek will cost **$400,000**. This includes permitting, design and construction.

Approximate location of the stream bank erosion control project, Village of Middleburgh

Project Benefits

Housing

Improvements to the stream bank and hydrologic function of the creek will protect homes located along Baker Avenue.

Natural and Cultural Benefits

Stream bank erosion is a persistent concern along the Schoharie Creek and its tributaries. Repairing and installing rip rap and revetments will build in additional armor along the creek's bank to reduce further erosion and stabilize the bank.

Cost-Benefit Analysis

This project will reduce the risk of flooding to residential homes and transportation infrastructure along Schoharie Creek. The value of the threatened homes on Baker Avenue, and State the Route 145 Bridge, outweigh the costs associated with this project.

Implementation Strategy

The overall timeframe for this project is expected to be approximately 18 to 26 months. Two months are required to develop a scope of work and select a contractor, permitting is expected to take an additional two months and an additional 14 - 22 months for design and engineering, and construction.

Regulatory Requirements

This project is expected to require a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit; and a U.S. Army Corps of Engineers (USACE) permit.

Local Disaster Recovery Manager

Project type: Proposed

Associated Strategies

- Regional Storm Preparedness
- Resilient Economy
- Resilient Green Spaces

Associated Recovery Functions

- Community planning and capacity building

Location

- Village of Middleburgh

Jurisdiction

- N/A

Photo credit: Village of Middleburgh Fire Department

Recovery and response efforts being organized after Hurricane Irene, Village of Middleburgh.

After Hurricane Irene and Tropical Storm Lee, the Village of Middleburgh struggled to cope with the impacts felt throughout the community. This project will include employing a disaster recovery manager to secure funding for future restoration and development projects and will help to coordinate recovery efforts after emergency events. This employee will help the community adapt and recover to storm and disaster impacts with greater ease. Additionally, this employee could develop project ideas and solicit needed recovery funding, and will organize recovery efforts still needed as a result of Hurricane Irene and Tropical Storm Lee. As a part of this task, the disaster recovery manager will work with the Community Rating System (CRS) coordinator in order to help the community participate in the CRS program. Future projects could include completing the Village water and sewer system, restoring the theater, and adding new Schoharie Creek access points. This project will cover the costs of a full time manager for five years with benefits.

Estimated Project Costs

The estimated cost to hire a local disaster recovery manager for five years with benefits is estimated at **$300,000**.

Project Benefits

Community Planning and Capacity Building

This project is expected to support community recovery through enhancing labor capacity to organize, direct, and implement Community recovery activities. Outcomes are expected to be streamlined recovery activities across the community, acquisition of additional funding for recovery projects through grant applications, and a centralized location for acquiring and distributing resources across the community.

Cost-Benefit Analysis

This project is not intended to directly reduce the flood risk to physical assets. However, employing a Local Disaster Recovery Manager will increase the likelihood of obtaining adequate and additional funding under state and federal grant programs to could be put towards future infrastructure improvements and other projects that will directly improve the community's flood resiliency, local economy, and quality of life. The investment in this project is outweighed by its long-term benefits to the community.

Implementation Strategy

The estimated timeframe for this project is five years and six months. Six months are expected to be required to prepare the job description, advertise and hire the individual. The position will be funded for five years.

Regulatory Requirements

There are no anticipated regulatory requirements associated with this project.

Emergency Response Equipment

Project type: Proposed

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building
- Health and Social Services

Location
- Village of Middleburgh

Jurisdiction
- Village of Middleburgh

The Village of Middleburgh Fire Department responded swiftly and effectively during Hurricane Irene. It provides emergency response services to both the Town and Village of Middleburgh. However, gaps in equipment and tools were identified that will aid the fire department in future flood events. The Village of Middleburgh Fire Department will purchase new equipment to replace specific aging and non-compliant equipment which will allow the department to respond more efficiently to flood emergencies. The equipment that is needed includes:

Photo credit: learyfighters.org

Turnout gear

- **New Fire Engine Pumper/Tanker.** The fire department will purchase a new National Fire Protection Association (NFPA) 1901 compliant fire pumper/tanker to replace the existing non-compliant equipment. Demand for the existing aged pumper was exceeded by Hurricane Irene and Tropical Storm Lee flood waters.
- **Storm Emergency Fire Unit (SEFU).** Fire department response during Hurricane Irene would have benefited from a storm emergency unit. The fire department will purchase a unit, which will assist the department in responding to future disasters and conducting water rescues.
- **25 Sets of Turnout Gear.** The fire department does not own enough full sets of turnout gear to properly equip and protect its volunteer personnel. Purchasing 25 sets of turnout gear will allow the department to fully equip its firefighters.
- **Jaws of Life.** Replacement of the department's Jaws of Life is considered essential. This equipment is over 30 years old and has exceeded its useful operational life. During the fire department's response to Hurricane Irene and Lee there was significant concern that the Jaws of Life would fail.
- **100 kilowatt (KW) Generator.** Fire department services are more frequently requested during storms and power outages. Purchasing a back-up generator will provide uninterrupted power to

the firehouse, thus allowing the fire department to operate more efficiently during power outages. Once an alternate source of power has been installed, the firehouse will serve as an emergency evacuation site for the local elementary school, which will provide an additional response capability for the community.

- **Bullard Thermal Imagers with Remote Screen.** A threefold increase in call volume over the last several years and a significant spike during Hurricane Irene put a strain on the department's search and rescue operations. Thermal imagers will aid in the effectiveness of search and rescue operations, operations to rescue trapped persons, and detection of hot spots. The thermal imagers also will increase the department's ability to respond to missing person's calls received by the State Forest System.

Photo credit: Village of Middleburgh Fire Department

Middleburgh Fire Department fireman using the jaws of life

Photo credit: Ecology and Environment, Inc.

The Village of Middleburgh Fire Department firehouse

Estimated Project Costs

The total cost of the fire equipment is **$975,000**. The total amount being requested of the Town of Middleburgh's allocation is estimated to be $175,000 and the total amount being requested of the Village of Middleburgh allocation is estimated to be $800,000.

Project Benefits

Community Planning and Capacity Building

This project is expected to increase community planning and capacity building capabilities by better preparing emergency responders for future storm events and increasing the efficacy of response efforts. The new fire engine pumper/tanker is expected to increase the rate at which flood waters can be removed from buildings; the additional sets of turnout gear will generate extra capacity in the volunteer service force; the backup generator will support ongoing response operations during power outages; and thermal imagers will increase the efficiency and success of rescue operations. A more effective response will translate into reduced flood damage to assets and the financial burden associated with repair and recovery.

Health and Social Services

The fire department provides lifesaving services including search and rescue, fire suppression, and evacuation support. All of these activities will be improved by the purchase of new equipment that equips firefighters and is expected to benefit residents and visitors to the Town and Village of Middleburgh as well as other jurisdictions to which the Village provides mutual aid support. The purchase of new turnout gear will provide better health and safety protection for emergency responders. Through the purchase of the new pumper/tanker, this project will potentially protect public health through the reduction in the growth of mold which can proliferate in flooded structures.

Risk Reduction and Cost-Benefit Analysis

This project offers enhanced response services to homes, businesses, and public buildings in the Village and Town of Middleburgh. Purchase of a new, more efficient, fire engine pumper/tanker is expected to increase the protection to flooded Community buildings thereby reducing the need for resident evacuation, supporting continuity of government operations, and reducing damage to businesses. More importantly are the expected benefits to resident, visitor, and emergency responder health and safety. The value of these combined benefits is expected to exceed the cost of this project.

Implementation Strategy

The timeframe for this project is estimated at 12 months to identify and purchase equipment and navigate the procurement process.

Regulatory Requirements

There are no anticipated regulatory requirements associated with this project aside from the adherence to any requisite procurement policies.

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Build a Multi-use Trail from Central Bridge through Schoharie to Middleburgh

Project type: Featured

Associated Strategies

- Regional Storm Preparedness
- Resilient Economy

Associated Recovery Functions

- Community Planning and Capacity Building
- Health and Social Services
- Economic Development
- Natural and Cultural Resources

Location

- Regional

Jurisdiction

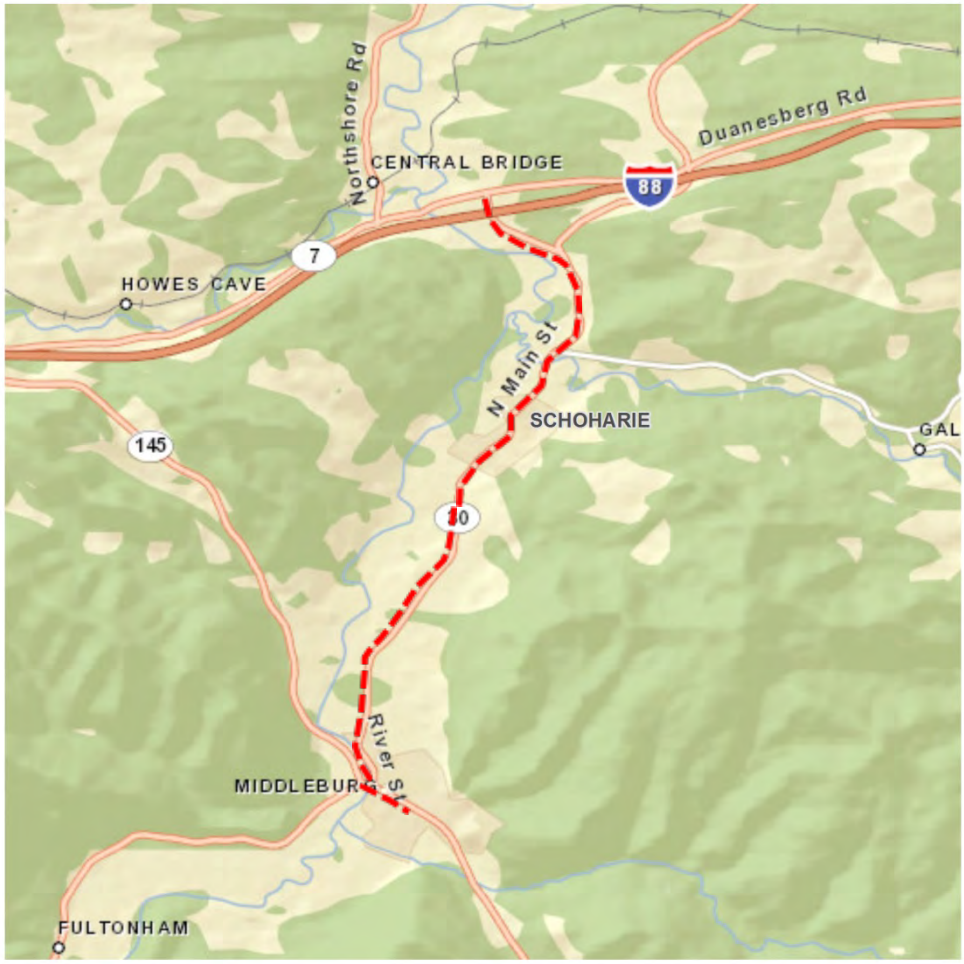
- Town of Esperance
- Town and Village of Schoharie
- Town and Village of Middleburgh
- Schoharie County

In an effort to improve stormwater management, increase conservative land use, and promote prudent use of local resources for open space activities, the Villages of Schoharie and Middleburgh, and Town of Esperance propose to construct a multi-use trail connecting the municipalities for recreational use by residents, an attraction for tourism, and enhanced resiliency of open space within flood prone areas. This trail will connect residents and visitors to all three municipalities and their individual resources, while incorporating green infrastructure technology to manage stormwater.

Photo credit: Ecology and Environment, Inc.

Vegetated swales alongside a walking path

The project proposes an approximately 3.4-mile multi-use trail through portions of the Villages of Middleburgh and Schoharie, and the Hamlet of Central Bridge along Routes 145, 30, and 30A. Sections of the project areas in the Towns, between the Villages and Hamlet, are at higher elevations outside of the floodplain. The green infrastructure technology will be implemented for sections of the trail within the Villages and Hamlet that are within the floodplain and is expected to improve stormwater management within the floodplain by retaining and building capacity for stormwater in open spaces for the protection of Community assets. Examples of green infrastructure that may be used in the trail's construction include infiltration landscape planters in downtown areas, open cavity pavers for walking paths and downtown sidewalks, and vegetated swales along roadways. Additionally, green technology will help improve the aesthetics of the main streets, which will help promote commercial, cultural, and tourism growth.



Map of the approximate trail location as indicated by the dashed red line

The proposed project will be accomplished in a series of phases beginning with a design phase in which green infrastructure and flood mitigation elements will be conceptualized. As funding is available the subsequent construction phases could be implemented in stages over time, beginning in areas of greatest importance to the Community.

Estimated Project Costs

It is estimated that the entire project will cost **$2,200,000** to implement. The first phase, which will include design and permitting of the trail, as well as minor demolition, project administration, and engineering, is expected to cost approximately $600,000. Construction costs of the trail are estimated at $1,600,000 but will be informed by the final engineering design and public input.

Funding sources for this project may include the following:

- Discretionary federal assistance opportunities available through New York State Department of Transportation (NYS DOT) pursuant to the Disaster Relief Appropriations Act of 2013;
- The United States Department of Transportation's Federal Highway Administration's (FHA's) Recreational Trails Program (RTP); and
- Environmental Protection Fund (EPF) grants administered by the New York State Department of Environmental Conservation's (NYS DEC's) Mohawk River Basin Program.

Project Benefits

Community Planning and Capacity Building

This project is expected to be designed to help safeguard critical roads in the Community, most notably the Main Street Business Districts of the Villages of Schoharie and Middleburgh, from stormwater run-off, flooding, and subsequent subsidence and failure. Roadway protection will help ensure that all areas of the Community remain accessible during flood events; do not become cut off from emergency services and evacuation routes remain passible. This is expected to be accomplished through the construction of green infrastructure intended to absorb heightened runoff and flood waters.

Health and Social Services

The design of the green infrastructure to double as a recreational resource will help provide an important health benefit for Community members and visitors as a place in which to walk, cycle, or run in safety.

Economic Development

The trail will help connect consumers, both residents and visitors, to the Main Street Business Districts of the Villages of Schoharie and Middleburgh to promote vitality of local businesses.

Natural and Cultural Resources

The project will provide access to cultural resources within the Villages and Hamlet and provide access to natural resources of the Schoharie Valley. Additionally, the inclusion of green infrastructure in this project will improve water quality through stormwater retention and infiltration.

Risk Reduction and Cost-Benefit Analysis

This project will directly reduce risks to the adjacent roadways through installation of green infrastructure designed to manage stormwater. This will protect the target roads which were damaged during Hurricane Irene and Tropical Storm Lee and which serve as important evacuation routes for the Community. The adjacent Main Street Business Districts in the Villages of Schoharie and Middleburgh are also expected to be protected as a result of these flood mitigation elements. Community health promo-

tion of outdoor activities is also a significant benefit as is the economic benefit that is expected through a return of tourism to the Community. The cost of building the trail is expected to be less than the community planning and capacity building, economic, health, and natural and cultural benefits associated with its installation.

Implementation

It is expected to require two to four months to develop a scope of work and hire the needed contractor. Once in place, it will take four to six months to develop engineering designs and the project work plan. A further two to four months will be needed to ensure that appropriate permits are in place. These elements will complete the first phase of the project. The second phase which will include construction of the project is anticipated to take one to two years of field seasons.

Regulatory Requirements

Various portions of the project are expected to require New York State Department of Environmental Conservation (NYS DEC) stream and wetland permits; and New York State Department of Transportation (NYS DOT) highway work permits.

Install municipal sewer to prevent future health risks in the Village of Esperance, Phase II

Project type: Featured

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Infrastructure
- Health and Social Services

Location
- Village of Esperance

Jurisdiction
- Town of Esperance
- Village of Esperance

The Village of Esperance residents currently rely on septic tanks that drain into aging leach fields on their properties for their sewage treatment and wells on the same property for drinking water. During Hurricane Irene and Tropical Storm Lee, the aged septic leach fields were flooded, putting the adjacent groundwater drinking wells at risk of contamination. Storm drains tested after Hurricane Irene showed the presence of *E. coli* bacteria that can be harmful to human health.

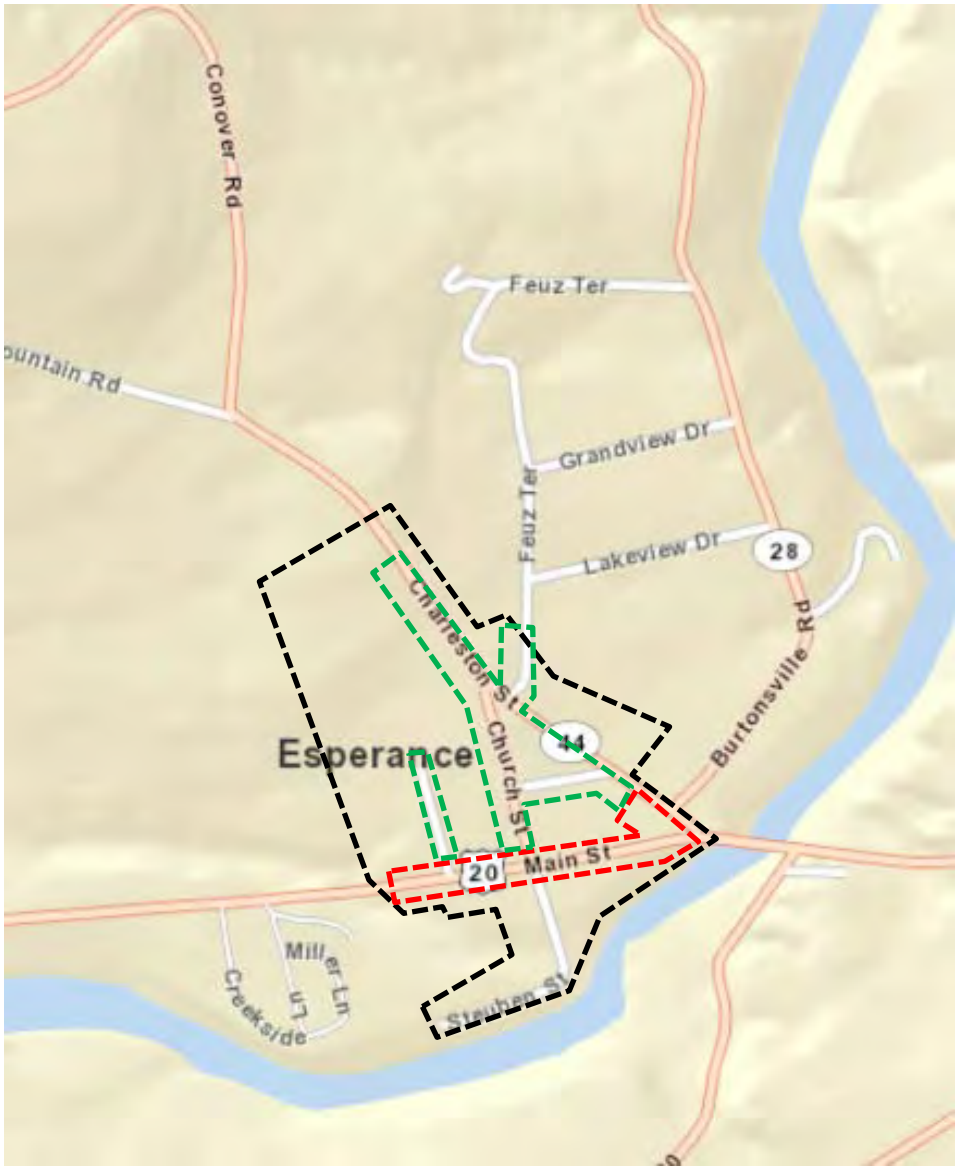
The confirmation of *E. coli* bacteria in Village storm drains indicated the need to address potential for groundwater contamination as well. If left in their current condition, the aging leach fields could potentially contaminate surface and ground water and thereby impact the Village's drinking water wells and the adjacent Schoharie Creek. Contamination of the Creek would pose further water quality concerns throughout the watershed and degrade the Creek's habitat.

The Village of Esperance proposes to design and install a public sewer system enabling their 345 residents to convert from individual septic tanks with leach fields to a Village-wide sewer system which will contain and treat wastewater. The project is proposed to be completed in two phases, the first of which is being proposed for funding under the municipality's Community Development Block Grant- Disaster Recovery (CDBG-DR) Funding. This second phase of the project will include the completion of an engineering design and permitting, and the installation of a collection system from the remaining residences to the truck line on Main Street.

The map below shows the proposed sewer district in black dotted lines with the elements of Phase I shown in red and Phase II shown in green.

Estimated Project Costs

Phase II of the project includes engineering design and permitting, and installation of a collection system from the remaining residences in the proposed sewer district to the trunk line on Main Street. Phase II is expected to cost approximately **$1,700,000.**



Map showing proposed phases of sewer system installation in the Village of Esperance

Final completion of the public sewer system solution requires that residences and businesses connect to the public sewer system by laterals from their private properties to the public system, and that their septic systems be closed. Lateral connections from the public system are estimated to cost $2,000 per structure, and closure of each septic system is estimated at $500-$1,000. Closure of septic systems is a necessary final step in each phase to prevent future safety hazards due to unsecured tank openings or from tank collapse, and to prevent an adverse impact to drinking water wells by contamination of groundwater. The steps in septic system closure include pumping the septic tanks, breaking or perforating the tank bottoms so that they can no longer hold water, and filling the tanks with sand or gravel to

secure the tank void to protect against a future collapse hazard. Lastly, piping between the building foundation and septic tank, and septic tank and leach field will be disconnected.

A potential alternate source of funding for this phase of the project is the New York State Environmental Facilities Corporation (EFC) Clean Water State Revolving Fund. This project has been listed on the Intended Use Plan Multi-Year list for the New York State Environmental Facilities Corporation (EFC) Clean Water State Revolving Fund for an estimated cost of $3.5M (#C4-5420-01-00).

Project Benefits

Infrastructure

Aging leach fields across the Village pose a contamination risk to drinking water wells that are relied upon by Village residents during flood events. A public sewer system would protect local drinking water supplies, and waterways from contamination by untreated sewage.

Health and Social Services

With access to a sewer system, Village home and business owners will be able to close their septic leach fields to protect the Village's drinking water supplies. This is expected to protect public health from risks such as *E. coli* bacterial infections related to the flooding of septic leach fields.

Risk Reduction and Cost-Benefit Analysis

The design and construction of a sewer system in the Village of Esperance will reduce risks to human and environmental health. This project is also expected to enhance the reliability of infrastructure in the community and allow the Village to close aging infrastructure that currently poses a health risk during flood events. In combination, the benefits associated with project implementation and the expected useful life of the project elements is expected to substantiate its costs.

Implementation Strategy

This phase of the project is expected to take two to three months to select an engineering firm, four to six months to develop engineering designs and obtain permits, and 20 months for construction.

Regulatory Requirements

This project is expected to require a series of regulatory approvals and permits including: New York State Department of Health (NYS DOH) permits; New York State Department of Environmental Conservation (NYS DEC) permits; New York State Department of Transportation (NYS DOT) highway work permits; and local building permits.

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Karkerdorf Road Boat Launch

Project type: Featured

Associated Strategies
- Resilient Green Spaces

Associated Recovery Functions
- Natural and Cultural Resources

Location
- Karkerdorf Rd

Jurisdiction
- Town of Schoharie

Karkerdorf Road is a dead end spur off Smith Road that runs along the west bank of the Schoharie Creek in the Town of Schoharie. It is readily accessible from the Route 88 expressway and Route 7. During Hurricane Irene, the majority of homes on Karkerdorf Road were severely damaged by floodwaters. As a result, these properties underwent Federal Emergency Management Agency (FEMA) buyouts. The Town proposes to repurpose these properties in a way that highlights their location and proximity to the Creek while taking a resilient and sustainable approach to floodplain management. This project will therefore build a public boat launch on Schoharie Creek which will promote recreational usage by residents of this low/moderate income municipality, and visitors for the promotion of tourism to spur economic recovery. The project includes: construction of a concrete boat launch for small water craft including fishing boats, canoes, and kayaks; fortification of the creek banks; a paved parking lot; and a nature trail. Also included are picnic tables and barbeque grills to encourage day use.

Karkerdorf Road indicated by the red circle.

Estimated Project Costs

The total cost of this project is estimated at **$600,000** which includes engineering design and construction of the boat launch, stream bank stabilization, and nature trail, as well as the cost of purchasing and installing the barbeque grills and picnic tables.

Project Benefits

Natural and cultural resources

This project offers the benefits of addressing the Community's vision to highlight the Schoharie Creek as an asset to residents and visitors. This conveniently located property is an ideal location for public recreational use of the Schoharie Creek as a primary natural resource of the Community. It offers the oppor-

tunity of attracting visitors to share in the natural beauty of the Schoharie Valley which is also expected to contribute to the economic recovery of this low/moderate income municipality.

Risk Reduction and Cost-Benefit Analysis

This project will repurpose former residential properties to open space to ensure development does not occur in this extreme risk flood area. It also provides the benefit of public recreational use of the Creek as a primary natural resource for residents and visitors. This project proposes a long-term and resilient use of buyout properties whose benefits to the community are expected to exceed the cost of its implementation.

Implementation Strategy

This project is expected to take approximately two to three months to develop the scope and hire a contractor, one month for permitting, one month for design and engineering, and nine months for construction.

Regulatory Requirements

In order to complete this project, the following regulatory requirements are likely applicable: a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit; U.S. Army Corps of Engineers (USACE) permits; and local building permits.

Alternate Funding Source

A potential alternate source of funding for this project is the U.S. Department of Transportation Boating Infrastructure Grant (BIG) Program.

Photo credit:Ecology and Environment, Inc.

View of the proposed Community access site on Schoharie Creek.

Photo credit:Ecology and Environment, Inc

FEMA buyout properties on Karkerdorf Road in the Town of Schoharie

Central Bridge Water Reservoir Restoration

Project type: Featured

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Health and Social Services

Location
- Town of Schoharie

Jurisdiction
- Town of Schoharie

Natural, clean, and fresh drinking water is considered a key feature of the region and is essential for public health. As a result of Hurricane Irene, the quality of drinking water in the Town of Schoharie Hamlet of Central Bridge has dangerously declined. During the storm, large amounts of debris and sediment were washed into the drinking water reservoir which is located on a tributary of Cobleskill Creek. This project intends to remedy this problem through the removal of that debris and sediment to improve the quality of this important drinking water resource.

Central Bridge reservoir at the leader arrow

Estimated Project Costs

The project costs include removal of the debris and sediment loading in the drinking water reservoir which was deposited by Hurricane Irene. The estimated cost for the project is **$640,000**.

Project Benefits

Health and social services

The implementation of this restoration effort will have significant health benefits through providing safe clean drinking water for residents and visitors of Central Bridge thereby reducing reliance on bottled water by residents and cutting down on the waste produced in the area.

Risk Reduction and Cost-Benefit Analysis

This project will directly protect the people of the Town of Schoharie who rely on the Central Bridge water reservoir for a safe public drinking water supply. This project reduces the risk of contamination from the debris and sedimentation caused by Hurricane Irene through its removal and safe disposal. The cost-benefit analysis conducted determined that the costs of this project were outweighed by the benefits to the community and the region.

Implementation Strategy

The estimated timeframe for this project is 9 to 12 months depending on season and weather. The timeframe consists of one to two months to develop a scope and select a contractor, two months for obtaining permits, and six to eight months for debris removal activities.

Regulatory Requirements

In order to complete the project the following regulatory requirements likely apply: New York State Department of Health (NYS DOH) permits; New York State Department of Environmental Conservation (NYS DEC) permits; and a U.S. Army Corps of Engineers (USACE) permit.

Alternate Funding Sources

Potential alternate sources of funding for this project include the New York State Department of Environmental Conservation (NYS DEC) Water Quality Improvement Project Program (WQIP); and U.S. Department of Agriculture (USDA) Emergency Watershed Protection Program.

Fox Creek Study

Project type: Featured

Associated Strategies
- Understanding Regional Flood Risks
- Infrastructure Resilience

Associated Recovery Functions
- Infrastructure
- Natural and Cultural Resources

Location
- At State Route 30 crossing

Jurisdiction
- N/A

Fox Creek serves as the dividing line between the Town and Village of Schoharie. The Creek has had historic problems with flooding. During Hurricane Irene, one short reach of this vulnerable creek, extending 1,500 feet from the State Route 30 bridge, experienced serious flooding that permanently damaged it and exacerbated a known issue with sharp changes in the stream channel's slope and backwater in the area. The issues created from this have resulted in a ripple effect that threatens assets both up- and downstream with further flooding. Of particular concern are the six foot tall ice jams that now occur during the winter months. As a primary transportation route through the Town of Schoharie, State Route 30 is a critical road used for emergency service vehicles and as an evacuation route during emergencies. This project consists of two phases, the first of which includes the execution of an engineering study to determine the most appropriate approach to flood mitigation on the Fox Creek. Phase two of this project would consist of construction of the recommended flood mitigation measures identified in the first phase of this project.

Estimated Project Costs

The estimated cost of the planning phase of this project, including required survey work, is **$40,000**. This cost includes a detailed study of the area and would result in a recommended approach to flood mitigation in the area. This cost of implementation of the second phase of this project depends on the recommended flood mitigation measures identified in planning phase of the project.

Photo credit: Ecology and Environment, Inc.

Fox Creek in the Town of Schoharie

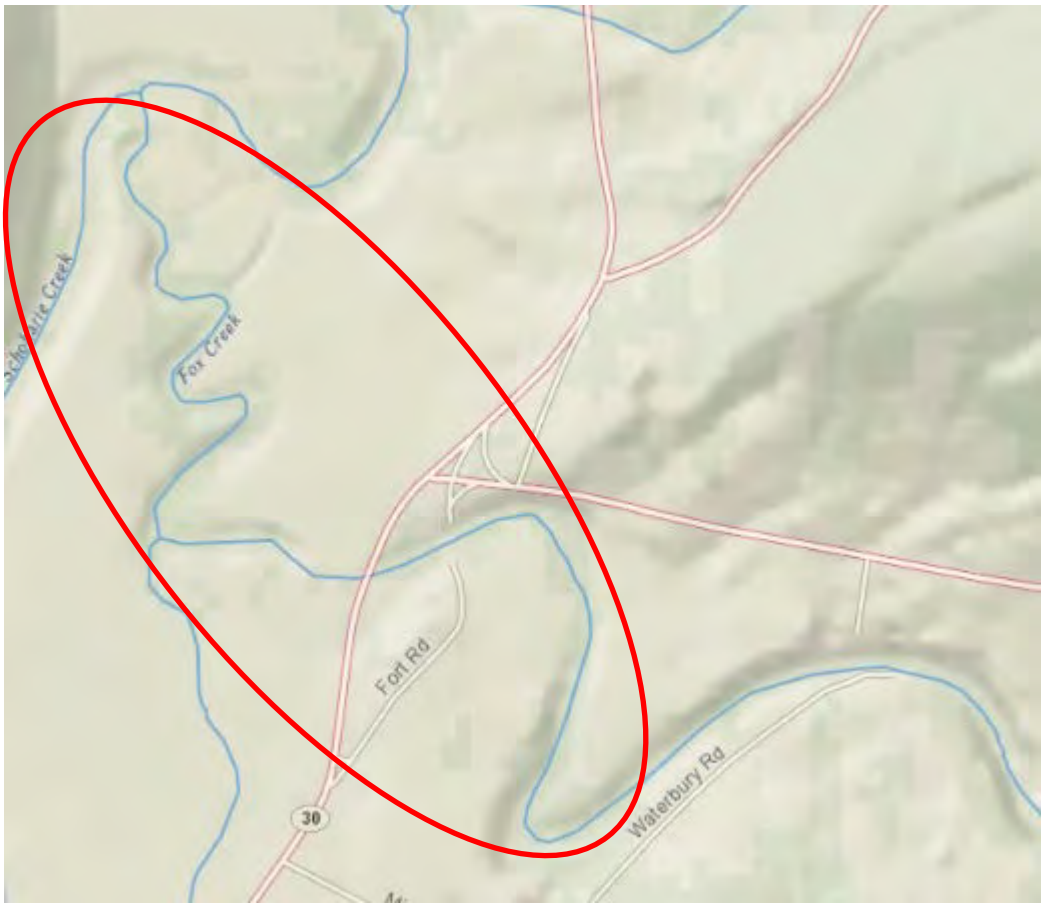
Project Benefits

Infrastructure

This survey performed in this project will determine the best alternatives for stream restoration to protect assets along Fox Creek. State Route 30 and its bridge, under which Fox Creek flows, are primary assets that will be a focus. Route 30 is the main route in and out of the Town and Village of Schoharie, and is part of the Community's designated evacuation route. The implementation of the results of this study will help ensure that this evacuation route remains open in the event of flooding.

Natural and Cultural Resources

The implementation of this study will help to develop other projects along Fox Creek that would improve the health of the creek and watershed as a whole. While the goal of this study is to recommend projects that will mitigate flooding in the Creek and protect State Route 30, by alleviating ice jam flood issues, watershed and stream health will also be improved.



Fox Creek, Town of Schoharie

Risk Reduction and Cost-Benefit Analysis

This study will determine the best course of action necessary in order to mitigate the damage to State Route 30 from the flooding of Fox Creek. By implementing the recommendations of the study, the Community will reduce its risk of being cut off during an emergency and therefore being unable to evacuate or receive emergency services from outside the area. The cost-benefit analysis conducted as a part of this project determined that the costs of this project were outweighed by the benefits to the community and the region.

Implementation Strategy

The estimated time frame for this project is one year. This timeframe consists of three months for the development of scope and hiring a consultant; and nine months for data collection and analysis, modeling, and production of the final study. Data collection for this project would be dependent on season and weather.

Regulatory Requirements

No permits are expected to be needed for this project.

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Town of Schoharie Comprehensive Plan Update

Project type: Featured

Associated Strategies
- Community Storm Preparedness

Associated Recovery Functions
- Community Planning and Capacity Building

Location
- Town of Schoharie
- Village of Schoharie

Jurisdiction
- N/A

The Town and Village of Schoharie have collaborated since the 1960's to develop a joint Town/Village Comprehensive Plan (Plan). The original Plan, adopted in 1964 and later updated in 1997 outlined a vision, goals and issues, and recommended policies. The Plan emphasizes controlling growth in a manner that protects community character and economic development. Flood has not historically been a primary issue for the municipalities. Since Hurricane Irene however, the emphasis on growth and development has shifted, and now they recognize that their Plan needs to address growth in the floodplain and strategies to promote flood mitigation. An updated Plan is critical because it forms the basis for land use regulations and sets a critical direction for future actions. In fact, as per Town Law 272-a, the Plan is recognized as the document that establishes the long-term vision and policy for the municipalities. Thus, the Plan must be updated to address the reality of floods and address the need to reduce risks to future events. The Town and Village will work together to update the Plan according to the required 272-a process. They will incorporate community input, mapping, and analysis in the Schoharie Valley NY Rising Community Reconstruction (NYRCR) Plan. New mapping and studies, and identified flood mitigation, risk reduction, and resiliency policies will be incorporated. Once adopted, the new Plan will provide the Town and Village with the necessary tools to implement zoning and land use regulatory changes as well as other programs. Having an updated plan that articulates the needs of the municipalities will also be necessary to be successful in grant applications for future funding.

Photo credit:Ecology and Environment

Historic Schoharie sign

Estimated Project Costs

The project consists of the integration of the Schoharie Valley NYRCR plan along with new mapping and studies, and identified flood mitigation, risk reduction, and resiliency policies into the Town of Schohar-

ie's Comprehensive Plan. The costs associated with this project are **$40,000**. These costs include the hiring of a consultant and/or planning firm to integrate new information to update the Comprehensive Plan.

Project Benefits

Community Planning and Capacity Building

Implementation of the updated Comprehensive Plan project will result in significant benefit to planning and preparing for future storms. The plan will update floodplain maps, establish stream buffers, and identify measures to protect community assets and increase local flood mitigation. Additionally, the plan will identify park, recreation, and historic resources to help identify and establish policies that protect those natural and green spaces; identify locations appropriate for future development and recommend standards and guidelines for that development; and establish a long term plan to assist homeowners in flood resiliency through the establishment of policies that promote resilient development within the floodplain.

Risk Reduction and Cost-Benefit Analysis

This study provides a reduction in risk to the Town through the promotion of long-term planning efforts that enhance resiliency and reduce the risk from future storms. Other long-term plans and policies will be easier to create as a result of the updates to the Town and Village of Schoharie's Comprehensive Plan. The cost-benefit analysis conducted as a part of this project determined that the costs of this project were outweighed by the benefits to the Town and the region.

Implementation Strategy

The anticipated timeframe for implementation for this project is 20 months. This timeframe consists of three months to select a consultant, five months for data collection and public input, nine months for development of plan documents and public hearings, and a final three months for a second public hearing and adoption process.

Regulatory Requirements

No regulatory permits are required for this project.

Alternate Funding Sources

An additional source of funding which may support this Featured project includes the Cleaner, Greener Communities Phase II-New York State Energy Research and Development Authority (NYSERDA) under the Consolidated Funding Application (CFA).

Research and Install Photovoltaic Systems

Project type: Featured

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Community Planning and Capacity Building
- Economic Development
- Natural and Cultural Resources

Location
- Village of Schoharie

Jurisdiction
- Village of Schoharie

The Village of Schoharie was burdened with costs associated with the response and recovery efforts of Hurricane Irene and Tropical Storm Lee. The Community considers the installation of renewable energy to be an attractive option that may result in significant annual savings for the municipality's operating expenses. In addition to providing cost savings to the municipality, the installation of a solar energy system will provide alternate sources of power during electrical outages which was a significant issue during Hurricane Irene.

Photo credit: Ecology and Environment, Inc.

Rooftop solar panels

This project includes two phases: the first is an examination of the cost-benefit of solar energy installations for municipal buildings throughout the Village; and the second is the implementation of solar energy installations based on the cost-benefit findings. The second phase of the project will result in the siting and installation of two 15 kW-dc Photovoltaic systems on municipal buildings used by the Village which may include the town offices and fire houses.

Estimated Project Costs

The first phase will include a cost-benefit analysis of solar installations as well as a feasibility assessment of existing municipal buildings that are candidates for the installation of these systems. The second phase will use the findings gained in the first phase to establish a program to support solar installations for Village municipal buildings.

Incentives available through the New York State Energy Research and Development Authority (NYSERDA) Solar PV Program Financial Incentives program will be leveraged to offset the cost of the installation of these two systems. The total cost of **$150,000** reflects the anticipated reduction in price based on this incentive program.

A potential additional source of funding for this Featured project is the Cleaner, Greener Communities Phase II-New York State Energy Research and Development Authority (NYSERDA) under the Consolidated Funding Application (CFA).

Project Benefits

Community Planning and Capacity Building

The proposed project is in line with projects across the State for communities to become more energy resilient, including in preparation for storms. This will provide public buildings with access to a redundant captive electricity source to maintain operations during electrical outages. As a result, the project will not only support increased preparedness activities, but also support public services which might be compromised during an outage.

Economic Development

It is anticipated that the project will reduced energy costs for the municipality, therefore freeing up funds for other necessary investments and public activities.

Natural and Cultural Resources

Using solar energy to power public buildings will reduce reliance on, and expenditure for, fossil fuel as well as lower greenhouse gas emissions, and provide an example for others in the Community to follow.

Risk Reduction and Cost-Benefit Analysis

While the project does not directly reduce the flood risk to physical assets, it can help ensure that municipal services have a continuous source of power in the event of a power outages which frequently occur during storms. This project is also expected to benefit the Community by reducing the cost of electricity over time while providing a redundant electricity source for public buildings and the services they house. The economic, environmental, and government support benefits of this project are expected to outweigh the costs of its undertaking.

Implementation

It will take approximately two to three months to develop a scope of work and hire a consultant to conduct the study, which will take approximately eight months to complete. An additional two to three months will then be needed to develop a scope of work based on the study, and select a contractor who will purchase and install the panels on the buildings.

Regulatory Requirements

Local building permits are expected to be required to undertake this project.

Spring Brook Drainage Improvements

Project type: Featured

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Community Planning and Capacity Building
- Infrastructure
- Natural and Cultural Resources

Location
- Village of Schoharie

Jurisdiction
- Village of Schoharie

Photo credit:Ecology and Environment, Inc.

Culverts in need of replacement

Spring Brook is a small stream fed by adjacent ditches and swales. Despite its small size, it frequently overflows its banks and is a continual problem for the Village, because of associated drainage issues resulting from back-water and debris. During Hurricane Irene and Tropical Storm Lee flooding was particularly excessive and contributed to impacts at the County office building, historical landmarks, and other critical Community assets. This project proposes to make improvements made to enhance flow capacity into the stream channel including lowering the streambed, expanding the culvert sizes, installing retaining walls, and generally clearing out flood deposit and debris. Improvements within Spring Brook will greatly enhance flow capacity into the stream channel and subsequently into the Schoharie Creek.

Estimated Project Costs

This project will address a key factor contributing to flood damage caused by Hurricane Irene. The overall costs of this project are estimated at **$3,800,000**.

Potential alternate sources of funding for this Featured project include the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program, the U.S. Department of Agriculture (USDA) Emergency Watershed Protection Program and Natural Resources Conservation Services (NRCS) Watershed Protection and Flood Prevention Program.

Project Benefits

Community Planning and Capacity Building

This project will significantly reduce the flood cycles that threaten the Main Street business district and provide protection to businesses and residents in this area.

Infrastructure

The risk of flooding to infrastructure in the stream's drainage area is expected to be reduced by ensuring adequate drainage from this area.

Natural and Cultural Resources

Investments in and improvement to the drainage system will support regional stormwater management efforts.

Risk Reduction and Cost-Benefit Analysis

This project will reduce flooding risks to residences and businesses located within the Spring Brook drainage area. Specific high and severe risk assets that will be protected include the Main Street Business District, DAR Lasell Hall, and Schoharie Area Long Term, Inc. The project is expected to minimize flooding from overflows of the existing stormwater system. The housing, economic, and environmental benefits associated with the reduction in risk to this large number of assets are expected to outweigh the costs.

Implementation

It is expected to take two to three months to develop the project scope and select a consultant followed by six to nine months for engineering design and permitting. It is estimated that 20 months will be needed for construction dependent on season and weather.

Regulatory Requirements

To undertake this project multiple regulatory requirements are anticipated including a Highway Work Permit from New York State Department of Transportation (NYS DOT), and a New York State Department of Environmental Conservation (NYS DEC) Article 15 permit and a U.S. Army Corps of Engineers (USACE) permit.

Implementation of the Commercial Node Town of Middleburgh Utility Extension

Project type: Featured

Associated Strategies
- Infrastructure Resilience

Associated Recovery Functions
- Economic Development
- Infrastructure Strategies

Location
- Route 30

Jurisdiction
- Town of Middleburgh
- Village of Middleburgh

During Hurricane Irene, most commercial locations in the Village of Middleburgh (Main Street) and Town of Middleburgh (NYS Route 30) were significantly impacted by flood waters. In fact, the area's only grocery store, the Grand Union, was in the floodplain and destroyed during Hurricane Irene. As a result of this vulnerability, there is a desire among Town residents to promote economic development outside the floodplain and in locations that would benefit both the Middleburgh and Schoharie communities.

Photo credit: Ken Hubert

The Grand Union grocery store after Hurricane Irene

Up until Hurricane Irene, business growth in the Town of Middleburgh occurred along Route 30 at the northern edge of the Village of Middleburgh – all of which is within the floodplain. The floodplain extends further north along Route 30 for some distance where other land uses include low density residential development and farms. To attract new businesses and encourage them to build outside this floodplain area, this project will extend public water along Route 30 from the Village of Middleburgh out approximately five miles towards the Town of Schoharie municipal boundary. In addition to providing this service as an incentive to spur economic development, public water would be available to those residents and farms located in the valley along the route.

The overall needs of the project include engineering, design, and construction of the water utility extension, and the creation of a new water district. These design, engineering, and siting of this project will be informed by the feasibility study that is proposed to be completed as part of the Commercial Node Development and Public Utility Extension Feasibility Study project.

Estimated Project Costs

This project will include the design, engineering, and permitting of the utility extension which would cost approximately $1,000,000, and the construction of the utility extension including the installation of 11,500 linear feet of 8-inch water main, lateral service lines, water stubs for future connections, and fire hydrants, which would cost approximately $2,000,000. The total cost of the project is anticipated to be approximately **$3,000,000**.

Potential area for the utility extension up Route 30 in the Town of Middleburgh

Project Benefits

Economic development

Removing development from the floodplain will reduce future losses that result from flood reconstruction costs, thereby saving taxpayers money. Providing water infrastructure will be an incentive for business development which could spur economic growth in the Town of Middleburgh. The provision of public water could increase land values in the area.

Infrastructure

An extension of the existing water utility outside of the floodplain would encourage commercial development on higher ground. The Town of Middleburgh proposes to study this alternative and, if found to be feasible, construct and extend its water utility. By providing public water, the reliance on private groundwater well resources would be reduced.

Risk Reduction and Cost-Benefit Analysis

The project would promote economic development out of the floodplain and in a manner which would benefit both the Town and Village of Middleburgh. As businesses and assets are able to relocate out of the floodplain, risks to these assets will be reduced. These economic development, environmental, and health and social service benefits associated with this project are expected to outweigh the costs.

Implementation Strategy

The first phase of utility extension, the feasibility study, is estimated to require 16 months. If found feasible, two to three months will be needed to develop a scope and hire a contractor, three months are needed to obtain permits, and 24 months are expected to be required for the construction of the utility extension.

Regulatory Requirements

Regulatory requirements that are anticipated include: a New York State Department of Transportation (NYS DOT) Highway Work permit; Agriculture and Markets review (Agriculture District); New York State Department of Environmental Conservation (NYS DEC) permits; New York State Historic Preservation Office (NYS SHPO) review since the area is within the NYS Mohawk Valley Heritage Corridor; and a New York State Department of Health (NYS DOH) permit.

Alternate Funding Source

An alternate funding source for this project could be the U.S. Department of Agriculture (USDA) Rural Development Assistance – Utilities grant.

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Alternate Emergency Route

Project type: Featured

Associated Strategies
- Community storm preparation

Associated Recovery Functions
- Community planning and capacity building

Location
- Town of Middleburgh

Jurisdiction
- Town of Middleburgh

During Hurricane Irene and Tropical Storm Lee, many roads, including evacuation routes, were closed as a result of storm impacts. This project includes the construction of a road that would provide an emergency evacuation route alternative to State Route 145 and River Street, two main evacuation routes that run parallel to the Schoharie Creek and flood frequently during storms. The road would be constructed perpendicular to a series of dead end residential streets (e.g., Christmas Tree, Alfalfa, Koska Dale, and Milk Can Lane), east of Schoharie Creek. This alternate route would provide access to residents that live on these lanes and were stranded by floods during Hurricane Irene and Tropical Storm Lee, and would provide an evacuation route for others in the Town.

Photo credit: NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYS DOT)

One of the County's current evacuation routes that was impassable during Hurricane Irene

Estimated Project Costs

The estimated cost to construct this road is **$900,000.** This will include $225,000 for a feasibility study and analysis to secure the necessary rights-of-way, design, engineering, and permitting costs, and $675,000 for demolition and construction of 8,500 linear feet of compacted gravel roadway, drainage swales along each side of the roadway and the installation of 16 culverts.

Project Benefits

Community Planning and Capacity Building

This project would benefit residents that need to evacuate in the event of emergencies and will allow residents to avoid becoming isolated during storm events. The construction of an alternate evacuation route will also increase the ability of emergency responders to respond, and will allow for increased Community operations during and after storm events.

Risk Reduction and Cost-Benefit Analysis

This project is expected to increase community planning and capacity building capabilities, better preparing emergency responders for effective response during emergency events. Additionally, this project would reduce the risks to residents living in areas that may become isolated as a result of flooding. Through this project, emergency responders would be able to provide services to Community members in need of emergency assistance including assistance with evacuations. These safety and health benefits to the Community are expected to outweigh the costs of this project.

Implementation Strategy

The construction of an alternate emergency route is expected to take 25 months. Four months is needed to develop a scope and hire a contractor and site the project, nine months is needed for permitting, environmental review and engineering and approximately 12 months will be needed for construction dependent on season and weather.

Regulatory Requirements

This project is expected to require a New York State Department of Transportation (NYS DOT) Highway Work Permit; a New York State Department of Environmental Conservation (NYS DEC) permit; and local building permits.

Alternate Funding Sources

Potential alternate funding sources for this project include the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Grant Program; and the FEMA Flood Mitigation Assistance Program.

Become a FEMA Community Rating System Community

Project type: Featured

Associated Strategies
- Community Storm Preparedness
- Understanding Regional Flood Risks

Associated Recovery Functions
- Housing
- Economic Development

Location
- Village of Middleburgh

Jurisdiction
- N/A

Insurance premiums are sky-rocketing as a result of recent flooding and insurance claims from Hurricane Irene and Tropical Storm Lee. This financial burden is particularly devastating to residents of the Village of Middleburgh who live in this low/moderate income community attempting to also recover from the physical and emotional toll of these storms. The community is investigating opportunities and solutions to help reduce flood damage which will subsequently reduce insurance premiums for businesses and homeowners and the number of claims that are filed after storms. Obtaining a rating under the Federal Emergency Management Agency (FEMA) Community Rating System (CRS), will help the community prepare for, mitigate against, and respond to flooding. Participation in the program will reduce the cost of flood insurance premiums for businesses and homeowners with a reduction in rates from 10% to 40%.

The highest rating in the CRS program is one with 10 being the lowest; the Village of Middle burgh's goal is to achieve a rating of at least nine.

There are six prerequisites to become and stay a CRS Class nine or better community. They include being in full compliance with the minimum requirements of the National Flood Insurance Program (NFIP), receiving credit for maintaining FEMA Elevation Certificates, and repetitive loss criteria. Details on each requirement are provided below.

(1) The community must have been in the Regular Phase of the NFIP for at least one year.

The Village of Middleburgh meets this requirement.

(2) The community must be in full compliance with the minimum requirements of the NFIP. There must be correspondence from the Regional Office FEMA stating that the community is in full compliance with the NFIP. The correspondence must have been sent within six months of the initial CRS verification visit. The FEMA

Photo credit: FEMA

CRS Coordinator's Manual

Regional Office or State NFIP Coordinator may need to conduct a Community Assistance Visit if neither has been in the community recently. If a community is determined at any time to be in less-then-full compliance, it will retrograde to a Class 10.

The Village of Middleburgh meets this requirement.

(3) The community must maintain FEMA Elevation Certificates on all new buildings and substantial improvements constructed in the Special Flood Hazard Area (SFHA) after the community applies for CRS credit. This is explained in Activity 310 (Elevation Certificates) in the CRS manual.

The Village of Middleburgh will need to meet this requirement.

(4) If there are one or more repetitive loss properties in the community, the community must take certain actions as specified in Sections 501–504 of the CRS manual. These include reviewing and updating the list of repetitive loss properties, mapping repetitive loss areas, describing the causes of the losses, and sending an outreach project to those areas each year. A community with ten or more repetitive loss properties (a "Category C" community) must also prepare a plan for addressing its repetitive flood problem.

The Village of Middleburgh will need to meet this requirement.

(5) The community must maintain all flood insurance policies that it has been required to carry on properties owned by the community. The community's Chief Executive Officer (CEO) signs the verification visit cover sheet, which includes a statement that the signer certifies that the community has all the flood insurance policies that it has been required to maintain on properties owned by the community.

The Village of Middleburgh will need to meet this requirement.

(6) If a coastal community receives a draft Flood Insurance Rate Map (FIRM) that delineates the Limit of Moderate Wave Action (LiMWA), the community must agree to show the LiMWA on its final published FIRM. Although showing a LiMWA on a FIRM is voluntary for non-CRS communities, it is a prerequisite for CRS participation. The LiMWA delineation is for informational purposes only. There is no CRS requirement to regulate the area differently, but the series of International Codes has special construction requirements in areas subject to breaking waves of 1.5 feet or higher.

This requirement does not apply to Village of Middleburgh.

This project is to support the Village in meeting the requirements three, four and five to meet the overall six prerequisites to become and maintain a CRS Class nine rating.

Estimated Project Costs

The estimated cost to support the Village in achieving a CRS Class nine rating is **$50,000**.

Project Benefits

Housing

The process of obtaining a rating under the FEMA Community Rating System (CRS) will help the community prepare for, mitigate against, and respond to flooding of homes.

Economic Benefits

Home and business owners are expected to realize cost savings through this project by reducing flood damage and flood insurance costs. Reductions in home damage is also expected to expedite recovery from storms, saving homeowners and businesses money on repairs, and allowing residents who have jobs to return to them more quickly.

Cost-Benefit Analysis

This project is intended to reduce the community's flood risk through planning and specified activities under the FEMA CRS. The benefits of participation in this program have been demonstrated to reduce flood risk and result in tangible reductions in flood insurance rates. The expenditure for this project is expected to be outweighed by the benefits of participation, even if a Class 9 rating is not achieved.

Implementation Strategy

This project can be implemented over several years to accomplish the rating goal of the community. Requirements one and have been met. It is expected that it will require one year to accomplish requirement three, two years to accomplish requirement four with identification of repetitive loss properties occurring in year one; and six months to accomplish requirement five.

Regulatory Requirements

No permits are required for a community to join and monitor the CRS. Specific activities that may be selected for undertaking as part of the program may require permits.

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Business Restoration and Incentives Program

Project type: Featured

Associated Strategies
- Resilient Economy

Associated Recovery Functions
- Economic Development

Location
- Main Street, Village of Middleburgh
- Main Street, Village of Schoharie

Jurisdiction
- N/A

Nearly every business in Schoharie County was impacted by the floods caused by Hurricane Irene. The total damage reported to date by 78 businesses is nearly $6.7 million for structural damage, machinery and equipment that needs to be replaced, and lost inventory. This figure does not include the lost revenue from businesses due to closure during the storm. Commercial buildings on Main Street in the Village of Middleburgh sustained structural damage, in some cases requiring substantial rehabilitation. Programs are needed to strengthen the Main Street district and improve its resiliency, including the identification and evaluation of options for flood-proofing buildings.

Photo credit: Ecology and Environment, Inc.

Middleburgh business

The project seeks to create a financial incentive program to offer existing or prospective Main Street property owners zero-interest or low interest loans or matching grants targeted at rehabilitating commercial buildings. Many buildings along Main Street remain vacant and idle as a result of the flooding. This not only contributes to a pervasive sense of blight, but also holds back other revitalization efforts and has made it impossible for tax revenues to recover in the Village. The impact on this low/moderate income community has been high as costs for services and taxes increase.

The Business Restoration and Incentives Program will provide current or prospective Main Street property owners zero-interest or low interest loans or matching grants targeted to the purchase and/or rehabilitation of commercial buildings. The financial incentives could be provided through an economic development revolving loan fund, or a small grant program. The funds will cover some portion of the total rehabilitation cost, up to a pre-set amount.

Incentives will be targeted to rehabilitating vacant and blighted buildings including the Middleburgh Theater (307 Main Street), the Good Earth building, the Old Five and Dime building, and the three offices located at 308 Main Street (Railroad Avenue). Some of the Main Street buildings include multiple retail spaces or upper floor apartments that could be rehabilitated and leased. For many business owners, owning a building with space that can be leased to commercial or residential tenants provides greater financial flexibility. All rehabilitation work will be done to the maximum extent with green materials and energy efficient materials and appliances, and using building techniques that increase flood resiliency.

The financial incentive program, while directly serving as an economic development program, addresses the urgent need to rebuild the Village's tax base after the floods. Recovery of the tax base will help ensure that the Village remains a quality and affordable place to live and work. If any funds remain after addressing the critical building rehabilitation needs in the Main Street business district, these funds could be saved to aid business recovery following future storm events or awarded as micro-grants to encourage business start-ups.

The Villages of Middleburgh and Schoharie have committed to collaborate and share information on their programs, both of which are proposed as projects under this initiative. This collaboration will help the Villages capitalize on lessons learned and recruit businesses that benefit both communities.

Estimated Project Costs

The estimated cost to creating a business restoration and incentives program is **$400,000.**

Additional sources of funding which may support this project include the NY Rising Small Business Storm Recovery Program, Empire State Development (ESD) Economic Development Fund, and ESD Small Business Revolving Loan Fund.

Project Benefits

Economic Benefits

This project will provide economic incentives to business owners to restore flood-impacted businesses on Main Street and create new commercial enterprises. The program will generate new economic activity in the Village and support the economic and social vitality of Main Street.

Cost-Benefit Analysis

This project will include elements such as flood proofing of businesses damaged by Hurricane Irene and Tropical Storm Lee to reduce future flood risk to the Community's Main Street business districts. It is also expected to support the long-term economic recovery of these low/moderate income jurisdictions which is critical for their survival. As such the risk reduction and economic benefits of this project are expected to outweigh the costs.

Implementation Strategy

It is anticipated that four to six months will be required to identify qualified businesses that may be enrolled in the program. An additional four to six months are expected to be needed to develop, set up, and launch the incentives program. It is anticipated that the program will be administered for three or more years.

Regulatory Requirements

There are no anticipated regulatory requirements associated with implementing this project.

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Add the Village to the Town of Middleburgh's Comprehensive Plan Update

Project type: Featured

Associated Strategies

- Resilient Economy
- Resilient Green Spaces

Associated Recovery Functions

- Community Planning and Capacity Building

Location

- Village of Middleburgh

Jurisdiction

- N/A

Photo credit:Ecology and Environment, Inc.

Village of Middleburgh sign

Since the devastation caused by Hurricane Irene and Tropical Storm Lee, there has been a growing appreciation for the need to establish planning policies that enable the Town and Village of Middleburgh to be more resilient communities. This project proposes that the Village of Middleburgh update their components of the joint Town and Village comprehensive plan taking into account resiliency in the face of ongoing threats related to storm damage and severe weather events. The updated comprehensive plan will address development in the floodplain and flood mitigation strategies. The plan update will incorporate new maps and studies and identify resilient land use practices. An updated comprehensive plan will be necessary to be successful in future applications for grant funding. By adding the Village to this effort, resources may be maximized and a coordinated planning effort will be achieved.

Estimated Project Costs

The estimated cost to update the Town of Middleburgh's comprehensive plan and include the Village of Middleburgh is **$40,000**.

An additional source of funding which may support this Featured project includes the Cleaner, Greener Communities Phase II-New York State Energy Research and Development Authority (NYSERDA) under the Consolidated Funding Application (CFA).

Project Benefits

Community Planning and Capacity Building

This project will draw the Town and Village together to establish and document coordination in planning for, responding to, and recovering from future storm events. It is expected that the outcomes of the process will provide significant benefits the resilience of these jurisdictions.

Cost-Benefit Analysis

The ultimate goal of the project is to inform long-term planning efforts that are directed towards enhancing resiliency and reducing risks to community members and assets. The project is also expected to increase the community's ability to plan for and respond to storm events to mitigate damages. The benefits of this comprehensive multi-jurisdictional planning project are expected to outweigh its costs.

Implementation Strategy

This plan is expected to take 19 months to develop. Three months are required to select a consultant, five months for data collection and public input to update the comprehensive plan. Five months are expected for the development of policies, three months for development of plan documents and a public hearing and an additional three months for a second public hearing and adoption process

Regulatory Requirements

There are no anticipated regulatory requirements associated with implementing this project.

Figure 7: Project Location Map Series Overview

Area-wide Projects

- Flood Warning and Response System
- Flood Resilience Public Education Campaign
- Generators for Healthcare Facilities and Emergency Services
- Recruit Volunteer First Responders
- Provide Resources for Homeowners
- Build a Multi- Use Trail from Central Bridge through Schoharie to Middleburgh
- Schoharie Creek Flood Study

Map Series Index
Extreme Risk Area
High Risk Area (100-year flood plain)
Moderate Risk Area (500-year flood plain)
Municipal Boundary
USA Named Streams and Rivers
County Boundary

0 0.5 1 Miles

ESRI - World Topo Imagery; NYSDOS - Floodplains

Figure 7: Project Location Map Series
Frame 1 of 4

Equip Landis Arboretum as an Emergency Shelter

Install Sewer to Prevent Future Health Risks in the Village of Esperance

Town of Esperance

Village of Esperance

Esperance Cemetery

Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)

Village of Esperance Firehouse Rescue Facility

Town of Esperance Town Hall

Cemetery Road Repair

Village of Esperance Village Offices

Town of Esperance Offices

Town Hall Restoration and Flood Proofing

Post Office - Esperance

Schoharie Creek

Schenectady County

Schoharie County

Town of Duanesburg

Risk Score:
(Color Indicates Risk)
- Residual Risk
- Moderate Risk
- High Risk
- Severe Risk

Asset Classification:
- $ Economic
- Health and Social Services (i.e. health care, all government agencies)
- Infrastructure Systems
- Natural and Cultural Resources

- Mitigative Project
- Extreme Risk Area
- High Risk Area (100-year flood plain)
- Moderate Risk Area (500-year flood plain)

- Municipal Boundary
- USA Named Streams and Rivers
- Major Highway
- Other Major Road

0 500 1,000 Feet

ESRI - World Topo Imagery; NYS DOS, NYS DEC, FCC, NPS, NYS ED, National Pipeline Mapping System - Assets; NYSDOS -Floodplains

Figure 7: Project Location Map Series
Frame 2 of 4

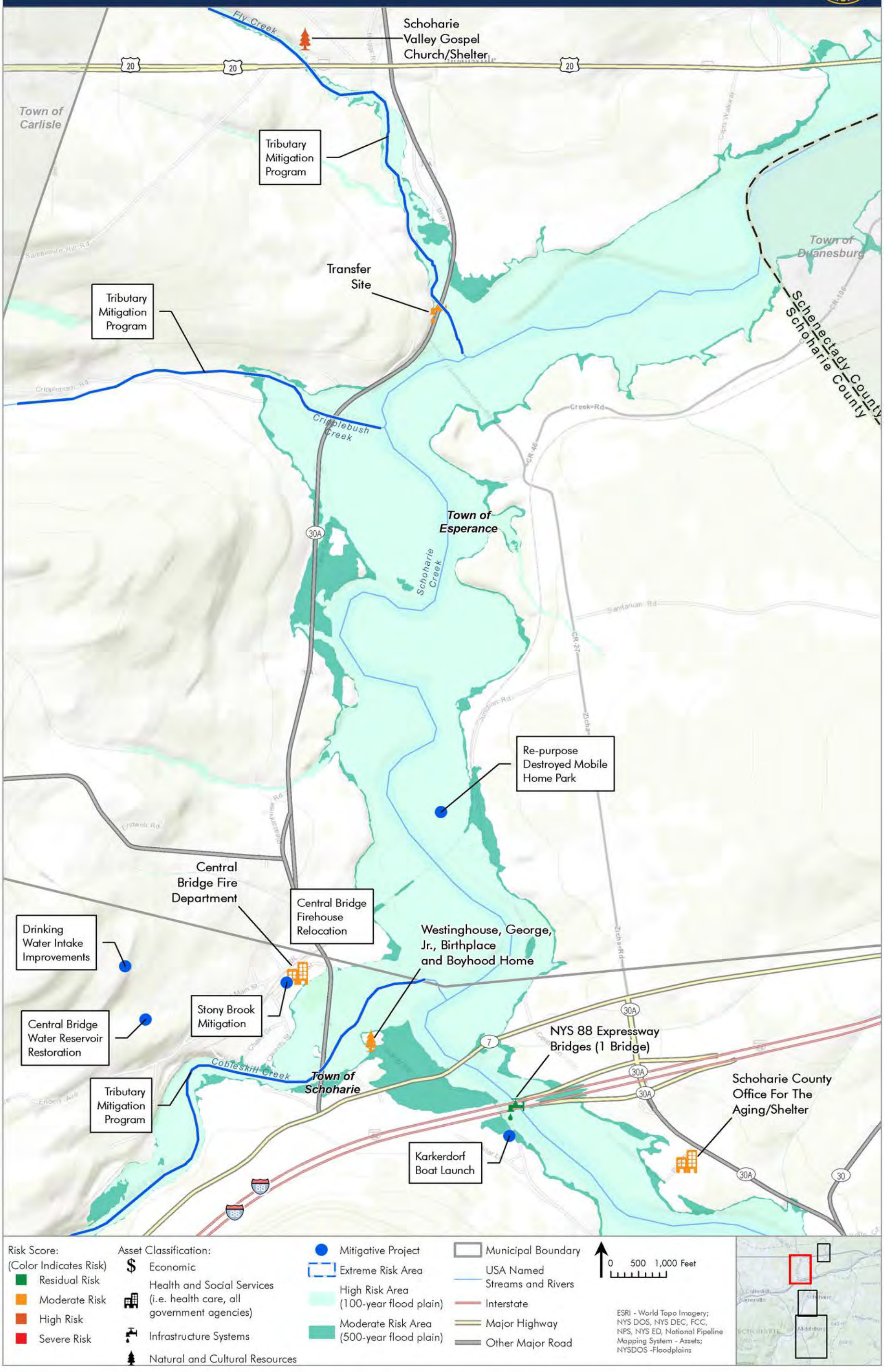

Figure 7: Project Location Map Series
Frame 3 of 4

Covered Bridge Fox Creek
Fox Creek Study/Northern Drainage/Stream Improvement
Young's Spring Intake Line Replacements
Fox Creek Park
Contribution to Firehouse Replacement
Drinking Water Intake - Schoharie Village
Drinking Water Treatment Plant - Schoharie Village
Fire Resource - County Of Schoharie
Schoharie County - Emergency Management Office
Schoharie Valley Railroad Museum
Schoharie Colonial Heritage Association
Schoharie Valley Railroad Complex
Master Drainage Plan
Land Use Study for Floodplain Management
Post Office - Schoharie
Rebuilding Police Emergency Services
Research Solar and Other Renewable Energy Improvements
Schoharie Central School
Niagara Engine Company 6
Taylor Block Restoration
Town of Schoharie
Town of Schoharie Comprehensive Plan Update
Town Highway Garage Replacement
NYS DOT Bridges (28 Bridges)
Schoharie Library
Town of Schoharie Town Clerk
Schoharie County Courthouse Complex
Historic Parrot House Restoration
South End Drainage Improvements
Hilgert Parkway Stormwater Pupming Station
Spring Brook Drainage Improvements
Stony Brook Mitigation
Middleburgh Telephone Satellite Cable Installation
Town of Middleburgh

Taylor Block Restoration
Historic Parrot House Restoration
Schoharie County Mental Health Service
Town of Schoharie Town Clerk
Town of Schoharie
Schoharie County Courthouse Complex
DAR Lasell Hall
Reformed Church of Schoharie
Harva
SALT - Schoharie Office
Village of Schoharie Village Offices
Hilgert Parkway Stormwater Pumping Station

Risk Score:
(Color Indicates Risk)
- Residual Risk
- Moderate Risk
- High Risk
- Severe Risk

Asset Classification:
- Economic
- Health and Social Services (i.e. health care, all government agencies)
- Infrastructure Systems
- Natural and Cultural Resources

- Main Street Business District - Schoharie
- Mitigative Project
- Extreme Risk Area
- High Risk Area (100-year flood plain)
- Moderate Risk Area (500-year flood plain)

- Municipal Boundary
- Other Major Road
- USA Named Streams and Rivers

0 500 1,000 Feet

ESRI - World Topo Imagery; NYS DOS, NYS DEC, FCC, NPS, NYS ED, National Pipeline Mapping System - Assets; NYSDOS -Floodplains

Figure 7: Project Location Map Series
Frame 4 of 4

NY RISING COMMUNITIES

Town of Schoharie

Town of Wright

Schoharie Creek

Middleburgh Reformed Church

Bellinger--Dutton House

Middleburgh Fire Department 96

Alternate Emergency Route

Village of Middleburgh

Gorge Creek Hydrologic Study

Town of Middleburgh

Middleburgh DPW Building

Local Disaster Recovery Manager

Middleburgh Central School/Shelter

Middleburgh Elementary School/Shelter

New Ambulance Building and Shelter

Town and Village of Middleburgh Comprehensive Plan Update

Commercial Node Development Feasibility Study and Utility Extension

Become a FEMA CRS Community

Middleburgh Diversion Dam

Town of Middleburgh Watershed Restoration Project

Huntersland Fire Department

Huntersland Volunteer Fire Department Berm Enhancement

St. Mark's Evangelical Lutheran Church

Middleburgh Fire Department 96

Business Restoration and Incentives Program

Middleburgh Fire Station

Emergency Response Equipment

Drinking Water Treatment Plant - Middleburgh Village

Middleburgh Library

Post Office - Middleburgh

Middleburgh Telephone Company

Drinking Water Well -Middleburgh Village

Our Lady of the Valley Church

Bassett Healthcare Middleburgh

Gorge Creek Culvert Repair and Stormwater and Drainage Infrastructure Improvements

Best House Medical Exhibit

Village of Middleburgh Village Clerk

Middleburgh Central School/Shelter

Stream Bank Erosion Control -- Schoharie Creek off of Baker Avenue

Risk Score:
(Color Indicates Risk)
- Residual Risk
- Moderate Risk
- High Risk
- Severe Risk

Asset Classification:
- $ Economic
- Health and Social Services (i.e. health care, all government agencies)
- Infrastructure Systems
- Natural and Cultural Resources

- Main Street Business District - Middleburgh
- Mitigative Project
- Moderate Risk Area (500-year flood plain)
- High Risk Area (100-year flood plain)
- Extreme Risk Area

- Municipal Boundary
- Major Highway
- Other Major Road
- USA Named Streams and Rivers

0 1,000 2,000 Feet

ESRI - World Topo Imagery; NYS DOS, NYS DEC, FCC, NPS, NYS ED, National Pipeline Mapping System - Assets; NYSDOS -Floodplains

Home damage as a result of Hurricane Irene
Source: Ken Hubert

V. Additional materials

This final section of the NY Rising Community Reconstruction (NYRCR) Plan includes additional materials that support and/or elaborate on content presented in Sections I – IV. They include:

- **A table of Additional Resiliency Recommendations;**
- **A master table of all projects;**
- **A description of the public engagement process;**
- **Community asset inventory;**
- **Federal Emergency Management Agency's (FEMA) definition of critical facilities;**
- **Risk assessment methods;**
- **End notes;**
- **Glossary; and**
- **Photo credits.**

A. Additional resiliency recommendations

Table 14 Additional Resiliency Recommendations

Strategy	Project Name	Project Description	Estimated Cost	Regional (Y/N)	Municipality
Regional Storm Preparedness Resilient Economy Understand Regional Flood Risks	Resiliency for Businesses Program	Program will fund flood resiliency audits of impacted businesses. Audits will provide business owners with flood mitigation recommendations and help identify and allocate funding to implement recommendations.	$200,000	Y	Regional
Regional Storm Preparedness	Expand Cellular and Broadband Across the County	Expand cellular and broadband coverage across the county and provide back-up power to ensure these systems remain operational during storms.	$1,750,000 (can be phased)	Y	Regional
Resilient Economy	Regional Business Development Coordinator	Local businesses were significantly impacted from a loss of income following the storms, and have not returned to pre-storm conditions. Fund a business coordination agent with the goal of increasing tourism, supporting business recovery, and implementing a long term strategy to help the region get back on its feet and be more economically resilient to future storm events. Establish metrics to track successes and identify gaps to determine additional business needs.	$280,000	Y	Regional
Resilient Green Spaces	Women of the Valley Recreational Park	Establish a small park and recreational area along the proposed trail and include a monument to the Women of the Valley.	$125,000	N	Town of Schoharie

Table 14 (continued) Additional Resiliency Recommendations

Strategy	Project Name	Project Description	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy	Business Restoration and Incentives Program	This funding will assist in rebuilding Main Street's economy and to increase downtown business opportunities and includes financial incentives. A zero- or low-interest loans or matching grants program will be established to assist existing or potential Main Street property owners with rehabilitation of commercial or commercial/mixed –use buildings in the Village. The program would work in concert with Rebuild, Restore, and Repopulate Main Street.	$600,000	N	Village of Schoharie

Table 14 (continued) Additional Resiliency Recommendations

Strategy	Project Name	Project Description	Estimated Cost	Regional (Y/N)	Municipality
Resilient Green Spaces	Schoharie Healthy Initiatives, Complete Street and Waterfront Reconnections	The project includes enhancement of the Fox Creek Park through construction of a playground, a trail along the creek that follows under the Route 30 Bridge to connect to the Old Stone Fort Complex (which includes the covered bridge and historic district of the village), a pathway from the Fox Creek Park west to the Schoharie Creek a connection to the Village via pedestrian access to the adjacent Schoharie Valley Farm (Carrot Barn) property so that there is alternative access to farm fresh foods for Village residents, and connection to the main part of the village with sidewalks. The park will serve as a significant part of the green infrastructure of both the Schoharie and Fox creeks. A comprehensive system of sidewalks and paths are needed to allow pedestrians, bicyclists, and others to access healthy recreational opportunities.	$500,000	N	Village of Schoharie

Table 14 (continued) Additional Resiliency Recommendations

Strategy	Project Name	Project Description	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy	Rebuild, Restore, and Repopulate Main Street	A main street recovery and revitalization program will include multiple components such as design, organization, promotion, and economic restructuring. This is a comprehensive approach to recovery and downtown revitalization that will build quality, foster public/private partnerships and focus on existing assets. The project also includes funds so that a Main Street Local Development Corporation can be formed with a staff person to administer the work.	$2,000,000	N	Village of Schoharie
Community Storm Preparedness Resilient Green Spaces	Route 30 Park and Emergency Services Training Location	Repurpose Federal Emergency Management Agency (FEMA) buyout properties on Christmas Tree Lane (Valley Bible Baptist Church and residential properties). The parcel will be owned by the Village fire department and used for training. When not used by the fire department it will be accessible to the public as a park.	$1,400,000	N	Town of Middleburgh
Resilient Economy Resilient Green Spaces	Turtle Rock Café Park and Ride	Create a needed park and ride location at the former Turtle Rock Café. Design would include permeable pavers and green elements.	$460,000	N	Town of Middleburgh
Resilient Green Spaces	Construct Farmers Market Pavilions at FEMA Buyout Properties	Construct pavilions on one of the FEMA buyout properties on Baker Avenue to host a seasonal farmers market. This project will also include the construction of an informal recreational trail that will connect local parks and FEMA buyout properties throughout the Village.	$100,000	N	Village of Middleburgh

B. Master table of projects

The Towns and Villages of Esperance, Schoharie and Middleburgh undertook a comprehensive process for identifying projects that would contribute to the community's future resiliency for flooding and other catastrophic incidents. From the initial list of projects the NY Rising Schoharie Valley Community Planning Committee (Committee) evaluated each project according to risk reduction to community assets and results of the cost-benefit analysis. Projects were then grouped into three categories:

1. Proposed Projects are projects proposed for funding through a NYRCR Community's allocation of CDBG-DR funding.
2. Featured Projects are projects and actions that the Committee has identified as important resiliency recommendations and has analyzed in depth, but has not proposed for funding through the NYRCR Program.
3. Additional Resiliency Recommendations are projects and actions that the Committee would like to highlight and that are not categorized as Proposed Projects or Featured Projects.

The following master table presents all projects identified by the Towns and Villages of Esperance, Schoharie and Middleburgh grouped by municipality and project category.

Table 15 Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Regional Storm Preparedness Understand Regional Flood Risks	Flood Warning and Response System	Develop a flood warning and response plan to improve emergency communications and regional emergency and contingency vehicle routes.	Proposed	$500,000	Y	Regional
Regional Storm Preparedness Understand Regional Flood Risks	Flood Resilience Public Education Campaign	Develop and distribute educational materials to help residents understand key steps to prevent or reduce flood damage.	Proposed	$85,000	Y	Regional
Regional Storm Preparedness Understand Regional Flood Risks	Schoharie Creek Flood Study (Schoharie Creek Tributary Hydrologic Modeling)	Build hydrologic model of Schoharie Creek and tributaries to identify and evaluate the feasibility of long term solutions to flooding, drainage, and stormwater management. Develop conceptual mitigation projects that could be funded via future grants.	Proposed	$48,000	Y	Regional
Regional Storm Preparedness Resilient Economy	Generators for Healthcare Facilities and Emergency Services	Fund purchase and installation of emergency generators in five to ten selected critical healthcare facilities or emergency shelters that currently do not have or have inadequate generators.	Proposed	$500,000 (can be phased)	Y	Regional
Regional Storm Preparedness	Recruit Volunteer First Responders	Implement focused recruitment program with appropriate training and marketing efforts to increase the number of trained emergency response volunteers.	Proposed	$60,000	Y	Regional

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Regional Storm Preparedness Understand Regional Flood Risks	Provide Resources for Homeowners	Provide financial support for a variety of mitigation efforts such as resiliency audits, home elevations, relocation of utilities, and filling-in cellars.	Proposed	$2,060,000	Y	Regional
Infrastructure Resilience	Drinking Water Intake Improvements	Implement water supply and transmission line improvements for Central Bridge to prevent the intake of floodwaters at the water treatment plant during storm events and impacts to water quality.	Proposed	Phase I: $1,280,000 Phase II: $1,200,000	N	Town of Esperance
Community Storm Preparedness	Central Bridge Firehouse Relocation	Relocate the Central Bridge firehouse to a new location on higher ground because the roads surrounding the firehouse were flooding during Irene, preventing effective response.	Proposed	$2,900,000	N	Town of Esperance
Community Storm Preparedness	Town of Esperance Town Hall Restoration and Flood Proofing	This project includes two components: (1) Renovate the Esperance Town Hall building and add flood proofing by raising the utilities, and (2) Construct an additional building next to the existing transfer station to serve as a secondary location for services, and storage of archives and records.	Proposed	$606,000	N	Town of Esperance
Infrastructure Resilience Housing Resilience Resilient Green Spaces	Tributary Mitigation Program	Implement mitigation activities identified in a previous study on Fly Creek and perform like studies on Cripplebush and Cobleskill Creeks to identify appropriate mitigation efforts.	Proposed	$680,000	N	Town of Esperance

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Community Storm Preparedness	Equip Landis Arboretum as an Emergency Shelter	Upgrade the Landis Arboretum Meeting House to serve as an emergency shelter install back-up generator and a water purification and filtration system	Proposed	$40,000	N	Town of Esperance
Resilient Green Spaces Resilient Economy	Repurpose Destroyed Mobile Home Park	Although homes in the mobile park home on Junction Road were completely destroyed by flooding, the site is now stable and functional utilities still remain. The proposed project is to convert the site for use by RVs; creating an opportunity for tourism for the area.	Proposed	$100,000	N	Town of Esperance
Infrastructure Resilience	Install Sewer to Prevent Future Health Risks in the Village of Esperance, Phase I	Conduct engineering study, prepare an engineering design, and install a sewer trunk line and wastewater treatment plant in the Village of Esperance. Septic leach fields adjacent to groundwater wells were flooded during Irene, putting the groundwater supply and community health at risk. The leach fields are aging, not maintained and no program exists for testing.	Proposed	$2,400,000	N	Village of Esperance
Community Storm Preparedness	Village of Esperance Firehouse Rescue Facility	Construct a new rescue facility for the Village of Esperance. The current firehouse is too old to accommodate modern fire trucks which are larger than the size of the truck bays. This lengthens response time due to difficultly getting trucks in and out of the firehouse.	Proposed	$750,000	N	Village of Esperance

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Infrastructure Resilience Resilient Green Spaces	Cemetery Road Repair	Pave the cemetery dirt roads which were heavily damaged by Irene. Takeoff quantities for asphalt have already been estimated.	Proposed	$130,000	N	Village of Esperance
Infrastructure Resilience Resilient Green Spaces	Stony Brook Mitigation	Address sections of the Stony Brook which need repair to mitigate extensive flooding. Repairs could include bed raising, floodplain reconnection, grade control, and culvert modifications/upgrades.	Proposed	$2,100,000	N	Town of Schoharie
Community Storm Preparedness Infrastructure Resilience	Town of Schoharie Highway Garage Replacement	Construct a new Town garage in a location away from the creek. The Town garage used by the Department of Public Works for maintenance and repair of Town equipment was severely damaged during Irene and is vulnerable to future storms in its current location.	Proposed	$1,970,000	N	Town of Schoharie
Community Storm Preparedness	Contribution to Firehouse Replacement	FEMA is providing partial funding for construction of a new firehouse to replace the Village firehouse that was destroyed during Irene. The Town and Village of Schoharie will contribute funds towards the cost of the new facility and equipment.	Proposed	$850,000	N	Town and Village of Schoharie
Resilient Economy Infrastructure Resilience Housing Resilience	Central Bridge Main Street Repairs	Stormwater repairs, including installation of storm sewer pipe and catch basins, creation of a stone lined ditch, sidewalk replacements, and asphalt repairs would be completed on portions of North and South Main Street that were damaged during Irene.	Proposed	$1,150,000	N	Town of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Infrastructure Resilience	South End Drainage Improvements	Construction of swales, retention ponds, culverts, storm drains, and the stabilization of stream banks in the Village's South End to relieve chronic problems with ponding stormwater.	Proposed	$1,015,000	N	Village of Schoharie
Infrastructure Resilience	Hilgert Parkway Stormwater Pumping Station	Constructing a pumping station will relieve flooding problems that exist. This area is prone to flooding because land on Hilgert Parkway is lower than the Spring Brook streambed and other water outlets preventing water from draining by gravity.	Proposed	$242,000	N	Village of Schoharie
Infrastructure Resilience	Young's Spring Intake Line Replacements	Stabilize and protect the main source of drinking water for the Village of Schoharie. During Irene geologic shifting threatened the water supply. This project would harden siphon pipes for water intake.	Proposed	$70,000	N	Village of Schoharie
Infrastructure Resilience Resilient Green Spaces	Master Drainage Plan	The flood damage sustained by the Village of Schoharie during Hurricane Irene and Tropical Storm Lee revealed a critical need for a master drainage plan. The plan will help the Village be proactive in its engineering and planning both for future storm events and additional mixed used development in the community.	Proposed	$288,000	N	Village of Schoharie
Infrastructure Resilience Resilient Green Spaces	Northern Drainage/Stream Improvement	This project will address flooding of Fox Creek. It includes the improvement of drainage along the Fox Creek tributaries that runs from the center of the Village to Fox Creek.	Proposed	$290,000	N	Village of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Community Storm Preparedness Infrastructure Resilience Housing Resilience Resilient Green Spaces	Land Use Study for Floodplain Management	Conduct a Land Use Study to identify lands support strategic relation of buildings and promote development outside flood-prone areas.	Proposed	$100,000	N	Village of Schoharie
Community Storm Preparedness	Rebuilding Police Emergency Services	Construct a new shared service facility outside of the floodplain on the Schoharie Central School District Property. The building will house emergency services, police vehicles and equipment, and the police department's safety office. This project is needed because the building that housed the Village Police Department was destroyed during Irene.	Proposed	$200,000	N	Village of Schoharie
Resilient Economy Housing Resilience	Parrott House	This project includes the acquisition and repair of the Parrott House. This project will purchase the building, making resiliency and flood mitigation repairs by raising the utilities to the first floor, and bringing the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Parrott House was impacted by Hurricane Irene and Tropical Storm Lee. The building is currently vacant and at risk of blight.	Proposed	$980,000	N	Village of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy Housing Resilience	Taylor Block	This project includes the acquisition and repair of the Taylor Block building. This project will purchase the building, make resiliency and flood mitigation repairs by raising the utilities to the first floor, and bring the building up to code so it can be re-sold for commercial use. The ground floor of the building is a commercial space and the upper floors are apartments. The Village believes that this is keystone project that addresses an urgent need related to the flood, impacts low/moderate income families, and addresses economic development.	Proposed	$655,000	N	Village of Schoharie
Community Storm Preparedness	New Ambulance Building and Shelter	Construct a new Emergency Medical Services (EMS) building and new emergency shelter on the Department of Public Works property on Cotton Hill Road to address a lack of sufficient EMS operating space. The new emergency shelter would be located outside of the floodplain.	Proposed	$2,300,000	N	Town of Middleburgh
Resilient Economy	Commercial Node Development and Public Utility Extension Feasibility Study	This project includes two feasibility studies. The first will consider property siting and acquisition, permitting, infrastructure improvements, and business incentives as part of the development of a commercial node outside the floodplain. The second will evaluate the feasibility and conduct a cost/benefit analysis of extending public utilities to the potential commercial node areas.	Proposed	$140,000	N	Town of Middleburgh

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Housing Resilience Resilient Green Spaces	Huntersland Volunteer Fire Department Berm Enhancement	The berm behind the Huntersland Volunteer Fire Department will be increased in height, stabilized, and extended in length to direct stormwater overflow away from the nearby church and residences.	Proposed	$144,000	N	Town of Middleburgh
Understand Regional Flood Risks Infrastructure Resilience Resilient Green Spaces	Gorge Creek Hydrologic Study	Conduct hydrologic study of approximately 1 mile of Gorge Creek to determine measures to stabilize the creek banks and increase the capacity of the creek in order to mitigate downstream flooding. Study would include a geomorphic assessment, watershed analysis, soils characterization, sediment transport analysis, riparian assessment, bank stabilization design, and hydraulic and hydrologic modeling.	Proposed	$40,000	N	Town of Middleburgh
Infrastructure Resilience Resilient Green Spaces	Town of Middleburgh Watershed Restoration Project	Design and engineering for the restoration of Little Schoharie and Line Creeks to re-establish natural channels, restore trout habitat, stabilize areas where landslides occurred during Hurricane Irene and Tropical Storm Lee, and protect homes, farms and roads.	Proposed	$1,000,000	N	Town of Middleburgh

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Infrastructure Resilience	Gorge Creek Culvert Repair and Stormwater and Drainage Infrastructure Improvements	Construct new box culvert to replace culverts beneath Middleburgh High School. The new culvert will connect existing Main Street storm-water drainage and new stormwater systems con-structed under this project along Main Street, Railroad Avenue, Railroad Court, Shel-don Street and Danforth Av-enue to Gorge Creek.	Proposed	$2,600,000	N	Village of Middleburgh
Understand Regional Flood Risks Housing Resil-ience Community Storm Prepar-edness	Stream Bank Erosion Control—Schoharie Creek off of Baker Avenue	Install rip rap and stone re-vetments to slow creek flow, reduce erosion, and mitigate flooding along approximately 1,000 feet of the Schoharie Creek parallel to Baker Ave-nue.	Proposed	$400,000	N	Village of Middleburgh
Regional Storm Prepar-edness Resilient Economy Resilient Green Spaces	Local Disaster Recovery Manager	Employ a disaster recovery manager to secure funding for future restoration and development projects. Future projects could include com-pleting Village water and sewer system, restoring the theater, and adding new Schoharie Creek access points.	Proposed	$300,000 (phased over 2 years)	N	Village of Middleburgh
Community Storm Prepar-edness	Emergency Response Equipment	Middleburgh Fire Depart-ment will purchase needed equipment including a new fire engine pumper/tanker, SEFU storm emergency unit, 25 sets of turnout gear, Jaws of Life, 100 KW generator, and Bullard thermal imagers.	Proposed	$975,000	N	Town and Village of Middleburgh

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Regional Storm Preparedness Resilient Economy	Build a Multi-use Trail from Central Bridge through Schoharie to Middleburgh	Build a multi-use trail, including bike paths along Routes 30, 30A, and 145, from Central Bridge through the Village of Schoharie to the Village of Middleburgh. Green infrastructure and flood mitigation features would be an integral part of the trail and would help to reduce flood impacts in surrounding areas.	Featured	$2,200,000	Y	Regional
Infrastructure Resilience	Install Sewer to Prevent Future Health Risks in the Village of Esperance, Phase II	Conduct engineering study, prepare an engineering design, and install a collection system to connect the remaining residences in the proposed sewer district in the Village of Esperance to the trunk line on Main Street that was installed as part of the proposed first phase of this project. Septic leach fields adjacent to groundwater wells were flooded during Irene, putting the groundwater supply and community health at risk.	Featured	$1,700,000	N	Village of Esperance
Resilient Green Spaces	Karkerdorf Boat Launch	Build a public boat and kayak launch on Schoharie Creek and adjacent open land resulting from buyouts of residential properties located off Smith Road that sustained extensive damage during Irene.	Featured	$600,000	N	Town of Schoharie
Infrastructure Resilience	Central Bridge Water Reservoir Restoration	Debris and sediment that washed into the reservoir during Irene have impacted water quality and needs to be removed.	Featured	$640,000	N	Town of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Infrastructure Resilience Understand Regional Flood Risks	Fox Creek Study	Evaluate flooding along Fox Creek near SR30 bridge	Featured	$40,000	N	Town of Schoharie
Community Storm Preparedness	Town of Schoharie Comprehensive Plan Update	Update the Town and Village's Comprehensive Plan based on the impacts of Hurricane Irene and Tropical Storm Lee	Featured	$40,000	N	Town of Schoharie
Infrastructure Resilience	Evaluate and Install Photovoltaic Systems	Renewable energy infrastructure may create significant annual savings in municipal operating expenses. This project is to examine the cost-benefit and feasibility of solar energy upgrades for the Villages' municipal buildings. Based on the study's results, a program will be established to support solar installations for municipal buildings used by the Village.	Featured	$150,000	N	Village of Schoharie
Infrastructure Resilience	Spring Brook Drainage Improvements	Spring Brook flooded severely during Hurricane Irene and Tropical Storm Lee. Improvements will be made to enhance flow capacity into the stream channel and subsequently, Schoharie Creek.	Featured	$3,800,000	N	Village of Schoharie
Infrastructure Resilience Resilient Green Spaces	Schoharie County Restoration of Little Schoharie Creek and Line Creek project	Provide a portion of the funding related to design and engineering costs for ongoing emergency watershed protection stream rehabilitation projects which will fix problems resulting from Hurricane Irene and Tropical Storm Lee.	Featured	$1,000,000	N	Town of Middleburgh

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Infrastructure Resilience	Implementation of the Commercial Node Town of Middleburgh Utility Extension	Extend public utilities out of the Village of Middleburgh into the Town to attract new businesses and encourage these to build outside the floodplain.	Featured	$3,000,000	N	Town of Middleburgh
Community Storm Preparedness	Alternate Emergency Route	Construct a road to provide an alternate emergency evacuation route to Route 145 and River Street, which flood frequently during storms. Road would be constructed perpendicular to a series of dead end residential streets east of Schoharie Creek.	Featured	$900,000	N	Town of Middleburgh
Community Storm Preparedness Understand Regional Flood Risks	Become a FEMA CRS Community	Obtain a Class 9 or better rating under the FEMA Community Rating System to reduce the cost of flood insurance premiums for businesses and homeowners.	Featured	$50,000	N	Village of Middleburgh
Resilient Economy	Business Restoration and Incentives Program	Establish a financial incentive program offering zero-interest or low interest loans or matching grants to existing/prospective Main Street property owners to purchase/rehabilitate commercial buildings.	Featured	$400,000	N	Village of Middleburgh

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy Resilient Green Spaces	Add the Village to the Town of Middleburgh's Comprehensive Plan Update	Add the Village to the comprehensive plan update currently being planned for the Town. The plan will address development in the floodplain and flood mitigation strategies. The plan update will incorporate new mapping and studies and identified flood mitigation, risk reduction measures, and resiliency policies. An updated comprehensive plan will be necessary to be successful in future applications for grant funding. By adding the Village to this effort, resources may be maximized a coordinated planning effort would be achieved.	Featured	$40,000	N	Village of Middleburgh
Regional Storm Preparedness Resilient Economy Understand Regional Flood Risks	Resiliency for Businesses Program	Program will fund flood resiliency audits of impacted businesses. Audits will provide business owners with flood mitigation recommendations and help identify and allocate funding to implement recommendations.	Additional resiliency recommendation	$200,000	Y	Regional
Regional Storm Preparedness	Expand Cellular and Broadband Across the County	Expand cellular and broadband coverage across the county and provide back-up power to ensure these systems remain operational during storms.	Additional resiliency recommendation	$1,750,000 (can be phased)	Y	Regional

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy	Regional Business Development Coordinator	Local businesses were significantly impacted from a loss of income following the storms, and have not returned to pre-storm conditions. Fund a business coordination agent with the goal of increasing tourism, supporting business recovery, and implementing a long term strategy to help the region get back on its feet and be more economically resilient to future storm events. Establish metrics to track successes and identify gaps to determine additional business needs.	Additional resiliency recommendations	$280,000	Y	Regional
Resilient Green Spaces	Women of the Valley Recreational Park	Establish a small park and recreational area along the proposed trail and include a monument to the Women of the Valley.	Additional resiliency recommendation	$125,000	N	Town of Schoharie
Resilient Economy	Business Restoration and Incentives Program	This funding will assist in rebuilding Main Street's economy and to increase downtown business opportunities and includes financial incentives. A zero- or low-interest loans or matching grants program will be established to assist existing or potential Main Street property owners with rehabilitation of commercial or commercial/mixed –use buildings in the Village. The program would work in concert with Rebuild, Restore, and Repopulate Main Street.	Additional resiliency recommendation	$600,000	N	Village of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Resilient Green Spaces	Schoharie Healthy Initiatives, Complete Street and Waterfront Reconnections	The project includes enhancement of the Fox Creek Park through construction of a playground, a trail along the creek that follows under the Route 30 Bridge to connect to the Old Stone Fort Complex (which includes the covered bridge and historic district of the village), a pathway from the Fox Creek Park west to the Schoharie Creek a connection to the Village via pedestrian access to the adjacent Schoharie Valley Farm (Carrot Barn) property so that there is alternative access to farm fresh foods for Village residents, and connection to the main part of the village with sidewalks. The park will serve as a significant part of the green infrastructure of both the Schoharie and Fox creeks. A comprehensive system of sidewalks and paths are needed to allow pedestrians, bicyclists, and others to access healthy recreational opportunities.	Additional resiliency recommendation	$500,000	N	Village of Schoharie

Table 15 (continued) Master Project List

Strategy	Project Name	Project Description	Project Category	Estimated Cost	Regional (Y/N)	Municipality
Resilient Economy	Rebuild, Restore, and Repopulate Main Street	A main street recovery and revitalization program will include multiple components such as design, organization, promotion, and economic restructuring. This is a comprehensive approach to recovery and downtown revitalization that will build quality, foster public/private partnerships and focus on existing assets. The project also includes funds so that a Main Street Local Development Corporation can be formed with a staff person to administer the work.	Additional resiliency recommendation	$2,000,000	N	Village of Schoharie
Community Storm Preparedness Resilient Green Spaces	Route 30 Park and Emergency Services Training Location	Repurpose Federal Emergency Management Agency (FEMA) buyout properties on Christmas Tree Lane (Valley Bible Baptist Church and residential properties). The parcel will be owned by the Village fire department and used for training. When not used by the fire department it will be accessible to the public as a park.	Additional resiliency recommendation	$1,400,000	N	Town of Middleburgh
Resilient Economy Resilient Green Spaces	Turtle Rock Café Park and Ride	Create a needed park and ride location at the former Turtle Rock Café. Design would include permeable pavers and green elements.	Additional resiliency recommendation	$460,000	N	Town of Middleburgh
Resilient Green Spaces	Construct Farmers Market Pavilions at FEMA Buyout Properties	Construct pavilions on one of the FEMA buyout properties on Baker Avenue to host a seasonal farmers market. This project will also include the construction of an informal recreational trail that will connect local parks and FEMA buyout properties throughout the Village.	Additional resiliency recommendation	$100,000	N	Village of Middleburgh

C. Public engagement process

To gain a real understanding of community needs, opportunities, perceived risks and priorities a vigorous public and stakeholder engagement process was initiated. Participation throughout the planning period significantly helped shape and enrich the Towns and Villages of Esperance, Schoharie, and Middleburgh NY Rising Community Reconstruction (NYRCR) Plan. The NYRCR Committee, comprised of regional and local leaders, including two Co-Chairs from the Schoharie Valley communities, developed a comprehensive outreach program. They sought to ensure outreach undertaken was appropriate to the community and dedicated themselves to facilitating public input. The public meetings were also used to educate residents and other stakeholders on severe weather events and flooding risks, critical community issues, and potential reconstruction and resiliency mitigation projects.

Residents, public and private agencies, and community organizations provided direction to the Committee through Public Engagement Events; social media including the Governor's Office of Storm Recovery's NY Rising Community Reconstruction Program website and Facebook page; and through interviews during Public Engagement Events.

The Committee held a series of three Public Engagement Events on:

- September 26, 2013; Landis Arboretum, Esperance, NY;
- November 7, 2013; Schoharie Town Hall, Schoharie, NY; and
- February 27, 2014; St. Mark's Lutheran Church, Middleburgh, NY.

At each of these open house style events, the Committee provided information on the NYRCR Program, presented key milestones of the planning process and draft components of the NYRCR Plan to give the public an opportunity to provide comments and ask questions. The public also had the option to submit comments on the Governor's Office of Storm Recovery's NYRCR Program website.

In October of 2013, the Towns and Villages of Esperance, Schoharie, and Middleburgh Conceptual Plan was posted to the NYRCR website for public review and comments. This document presented details on progress made by the Committee including the development of a community vision, inventory of existing related plans and the geographic study area that was proposed by the Committee. The Conceptual Plan also provided a snapshot on the direction the communities and the Committee was expecting to take to enhance community re-

First public meeting at the Landis Arboretum in the Town of Esperance

covery and resiliency for future flooding. With guidance from the public, the planning process then evolved from the Conceptual Plan as communities analyzed the risk to their assets, their needs and opportunities, and the potential costs and benefits of projects and actions.

This resulting NYRCR Plan, combined with other community mitigation plans, has helped strengthen community understanding and ownership of this and other ongoing efforts to improve community resilience. It is expected that ongoing input and participation from engaged stakeholders will be solicited from the Community, especially as proposed projects come underway, and funding sources are identified for projects identified in the NYRCR Plan.

D. Community asset inventory

Table 16 Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
Ambulance - Central Bridge Fire District	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Ambulance - Esperance Volunteer Fire Department Rescue Squad	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Ambulance - Middleburgh Emergency Volunteer Ambulance Corps, Inc.	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	Yes	No	Yes	**0**
Ambulance - Schoharie County Critical Care Team	N/A	Health & Social Services	Yes, FEMA	Medium	No	No	No	No	No	No	**0**
Ambulance - Scho-Wright Ambulance Service, Inc.	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Arc Day Treatment Center	N/A	Health & Social Services	no	Medium	No	No	No	No	No	No	**0**
Bassett Healthcare Middleburgh	High	Health & Social Services	Yes, FEMA	High	Yes	Yes	Yes	Yes	No	Yes	**42**
Bellinger--Dutton House	High	Natural & Cultural Resources	No	Low	Yes	Yes	Yes	Yes	No	Yes	**21**
Beretz Pond Dam	N/A	Infrastructure Systems	no	Low	No	No	No	No	No	No	**0**
Best House Medical Exhibit	Moderate	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**5**
Bethany Lutheran Church/Shelter	N/A	Natural & Cultural Resources	Yes, FEMA	Low	No	No	No	Yes	No	No	**0**
Capital Region Career & Tech Center	N/A	Health & Social Services	no	Medium	No	No	No	No	No	No	**0**
Central Bridge Fire Station	Moderate	Health & Social Services	Yes, FEMA	High	Yes	No	No	No	No	No	**9**
Central Bridge Reservoir #2 Dam	N/A	Infrastructure Systems	no	Low	No	No	No	No	No	No	**0**
Central Bridge Reservoir Dam	N/A	Infrastructure Systems	no	Low	No	No	No	No	No	No	**0**
Covered Bridge Fox Creek	High	Natural & Cultural Resources	No, Locally Significant	Medium	Yes	No	No	No	No	No	**14**
DAR Lasell Hall	High	Natural & Cultural Resources	No	Low	Yes	Yes	Yes	Yes	Yes	Yes	**36**
DOH Drinking Water Intake - Central Bridge Water District	N/A	Infrastructure Systems	yes, FEMA	High	No	No	No	No	No	No	**0**

Table 16 (continued) Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
DOH Drinking Water Intake - Central Bridge Water District	N/A	Infrastructure Systems	yes, FEMA	High	No	No	No	No	No	No	**0**
DOH Drinking Water Intake - Central Bridge Water District	N/A	Infrastructure Systems	yes, FEMA	High	No	No	No	No	No	No	**0**
DOH Drinking Water Treatment Plant - Central Bridge Water District	N/A	Infrastructure Systems	yes, FEMA	High	No	No	No	No	No	No	**0**
DOH Extension Clinic - Bassett Healthcare Schoharie	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Dr. Reddy'S Laboratories, New York, Inc.	N/A	Economic	no	Low	No	No	No	No	No	No	**0**
Drinking Water Intake - Schoharie Village	High	Infrastructure Systems	Yes, FEMA	High	Yes	Yes	No	No	No	No	**18**
Drinking Water Treatment Plant - Middleburgh Village	Extreme	Infrastructure Systems	Yes, FEMA	High	Yes	Yes	Yes	Yes	No	No	**48**
Drinking Water Treatment Plant - Schoharie Village	Moderate	Infrastructure Systems	Yes, FEMA	Medium	No	No	No	No	No	No	**6**
Drinking Water Well – Town of Middleburgh	High	Infrastructure Systems	Yes, FEMA	High	Yes	Yes	Yes	Yes	No	No	**36**
Ecker Hollow Dam	N/A	Infrastructure Systems	no	Low	No	No	No	No	No	No	**0**
Esperance Cemetery	Moderate	Natural & Cultural Resources	No	Low	No	No	No	Yes	No	Yes	**14**
Esperance Elks Lodge/Shelter	N/A	Natural & Cultural Resources	Yes, FEMA	High	No	No	No	No	No	No	**0**
Esperance Fire Station	Moderate	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**5**
Feuz Recreational Pond Dam	N/A	Infrastructure Systems	No	Low	No	No	No	No	No	No	**0**
Fire Resource - County Of Schoharie	High	Health & Social Services	Yes, FEMA	High	Yes	Yes	yes	Yes	No	Yes	**21**
FM Radio Station - WMYY	N/A	Infrastructure Systems	no	Medium	No	No	No	No	No	No	**0**
Fox Creek Park	High	Natural & Cultural Resources	No	Low	Yes	Yes	No	Yes	No	Yes	**18**
Harva	Moderate	Economic	No	High	No	No	No	No	No	No	**5**
Main Street Business District - Middleburgh	Extreme	Economic	No, Locally Significant	High	Yes	Yes	Yes	Yes	No	Yes	**68**
Main Street Business District - Schoharie	Extreme	Economic	No	Medium	Yes	Yes	Yes	Yes	No	Yes	**68**
Middleburgh Central School/Shelter	Extreme	Health & Social Services	Yes, FEMA	High	Yes	Yes	No	No	No	Yes	**53**
Middleburgh Diversion Dam	High	Infrastructure Systems	no	Low	Yes	Yes	No	No	No	No	**6**

Table 16 (continued) Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
Middleburgh DPW Building	Moderate	Infrastructure Systems	No, Locally Significant	Medium	No	No	No	No	No	No	**5**
Middleburgh Elementary School/Shelter	Moderate	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**5**
Middleburgh Fire Station	High	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	Yes	**18**
Middleburgh Library	High	Natural & Cultural Resources	No, Locally Significant	High	Yes	Yes	Yes	No	No	Yes	**36**
Middleburgh Reformed Church	High	Natural & Cultural Resources	No	Low	Yes	Yes	Yes	Yes	No	Yes	**42**
Middleburgh Telephone Company	High	Infrastructure Systems	No, Locally Significant	High	Yes	No	No	No	Yes	Yes	**23**
Middleburgh Telephone Satellite Cable Installation	Moderate	Infrastructure Systems	No, Locally Significant	Medium	No	No	No	No	No	No	**5**
Niagara Engine Company 6	Extreme	Health & Social Services	Yes, FEMA	High	Yes	Yes	Yes	Yes	No	No	**48**
NYS 88 Expressway Bridges (1 Bridge)	Moderate	Infrastructure Systems	No	High	No	No	No	No	No	No	**6**
NYS DOT Bridges (28 Bridges)	Moderate	Infrastructure Systems	No	Medium	No	No	No	No	No	No	**5**
Oil Well - Bevins W H	N/A	Infrastructure Systems	No	High	No	No	No	No	No	No	**0**
Old Lutheran Parsonage	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**0**
Old Stone Fort	N/A	Natural & Cultural Resources	No	Medium	No	No	No	No	No	No	**0**
Old Stone Fort Museum	N/A	Natural & Cultural Resources	No	High	No	No	No	No	No	No	**0**
Palentine House 1743 Museum	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**0**
Post Office - Central Bridge	N/A	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	No	**0**
Post Office - Esperance	High	Health & Social Services	No	Low	Yes	Yes	Yes	No	No	Yes	**27**
Post Office - Middleburgh	High	Health & Social Services	No	Low	Yes	Yes	Yes	Yes	No	Yes	**42**
Post Office - Schoharie	High	Health & Social Services	No	Low	Yes	No	No	No	No	Yes	**24**
Post Office - Sloansville	N/A	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	No	**0**

Table 16 (continued) Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
Public Health Office - Carl J. Stefanik	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Reformed Church of Schoharie	High	Natural & Cultural Resources	No	Low	Yes	Yes	No	No	No	No	**24**
SALT - Schoharie Office	High	Health & Social Services	No, Locally Significant	Medium	Yes	Yes	Yes	Yes	Yes	Yes	**36**
Schoharie Colonial Heritage Association	High	Natural & Cultural Resources	No	Low	Yes	Yes	Yes	Yes	No	Yes	**32**
Schoharie County - Emergency Manage-ment Office	High	Health & Social Services	Yes, FEMA	Medium	Yes	Yes	Yes	Yes	No	No	**27**
Schoharie County Mental Health Service	High	Health & Social Services	Yes, FEMA	High	Yes	No	No	No	No	No	**14**
Schoharie County Courthouse Complex	Moderate	Natural & Cultural Resources	No, Locally Significant	Medium	No	No	No	No	No	Yes	**9**
Schoharie County Fire Training Facility	N/A	Health & Social Services	No, Locally Significant	Low	No	No	No	No	No	No	**0**
Schoharie County Office For The Ag-ing/Shelter	Moderate	Health & Social Services	Yes, FEMA	High	Yes	No	No	No	No	No	**9**
Schoharie Fire Department	High	Health & Social Services	Yes, FEMA	High	Yes	Yes	Yes	Yes	No	No	**36**
Schoharie Head Start Child Development	N/A	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	No	**0**
Schoharie Junction School (historical)	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**0**
Schoharie Library	High	Natural & Cultural Resources	No, Locally Significant	Medium	Yes	Yes	No	Yes	No	Yes	**36**
Schoharie Occupational Education Center	N/A	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	No	**0**
Schoharie Park Water Company, Inc.	N/A	Economic	no	Low	No	No	No	No	No	No	**0**
Schoharie Valley Alliance Church	N/A	Natural & Cultural Resources	no	Low	No	No	No	No	No	No	**0**
Schoharie Valley Gospel Church/Shelter	High	Natural & Cultural Resources	Yes, FEMA	High	Yes	Yes	Yes	No	No	No	**30**
Schoharie Valley Railroad Complex	High	Natural & Cultural Resources	No	Low	Yes	Yes	No	Yes	No	No	**30**
Schoharie Valley Railroad Museum	Moderate	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**5**

Table 16 (continued) Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
School Number 5 (historical)	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**0**
School Number 6 (historical)	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	No	**0**
Shelter - Huntersland Methodist Church	N/A	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**0**
Sloansville Cemetery	N/A	Natural & Cultural Resources	No	Low	No	No	No	Yes	No	No	**0**
Our Lady of the Valley Church	Extreme	Natural & Cultural Resources	No	Low	Yes	Yes	Yes	Yes	No	Yes	**54**
St. Mark's Evangelical Lutheran Church	High	Natural & Cultural Resources	No, Locally Significant	Low	Yes	Yes	Yes	Yes	Yes	Yes	**48**
Town of Esperance Offices	High	Health & Social Services	No, Locally Significant	Medium	Yes	Yes	yes	Yes	No	Yes	**42**
Town of Esperance Town Hall	High	Health & Social Services	No, Locally Significant	High	Yes	Yes	Yes	Yes	No	Yes	**32**
Town of Schoharie Town Clerk	Extreme	Health & Social Services	No, Locally Significant	Medium	Yes	Yes	Yes	No	No	Yes	**48**
Transfer Site	Moderate	Infrastructure Systems	No	Low	No	No	No	Yes	No	No	**9**
Upper Middleburgh Cemetery	N/A	Natural & Cultural Resources	No	Low	No	No	No	No	No	Yes	**0**
Valley View Airport	N/A	Infrastructure Systems	no	Low	No	No	No	No	No	No	**0**
Village of Esperance Village Offices	Moderate	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	No	**5**
Village of Middleburgh Village Clerk	High	Health & Social Services	No, Locally Significant	High	Yes	Yes	Yes	Yes	No	Yes	**42**
Village of Middleburgh Village Hall	N/A	Health & Social Services	No, Locally Significant	Medium	No	No	No	No	No	Yes	**0**
Village of Schoharie Village Offices	Extreme	Health & Social Services	No, Locally Significant	Medium	Yes	Yes	Yes	No	No	Yes	**48**
Westinghouse, George, Jr., Birthplace and Boyhood Home	High	Natural & Cultural Resources	No	Low	Yes	Yes	No	Yes	No	No	**23**
Schoharie Central School/Shelter	Moderate	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**6**
Schoharie Elementary School	N/A	Health & Social Services	Yes, FEMA	High	Yes	Yes	Yes	No	No	No	**0**
Huntersland Vol. Fire Department	Moderate	Health & Social Services	Yes, FEMA	High	No	No	No	No	No	No	**5**

Table 16 (continued) Community Asset Inventory

Asset	Risk Area	Asset Class	Critical Facility	Community Value	Defensive Flood Protection Measures: Absent, below BFE, poor condition, lack maintenance commitment	Elevation: Elevation of the asset site is below BFE.	Freeboard: Elevation of the habitable or occupied portion of the asset is < 2 ft. above BFE.	Point of Confluence: Asset subject to increased flooding to confluence of merging streams.	Storm Water Discharge: Asset subject to increased flood risk due to storm water system discharge.	Vegetated Stream Bank Buffers: Asset within Floodway Fringe, and without adequate vegetated buffers	Risk Score
Bassett Healthcare Middleburgh	Moderate	Health & Social Services	Yes, FEMA	High	No	No	No	yes	No	Yes	**14**
Central Bridge Fire Department	N/A	Health & Social Services	Yes, FEMA	Medium	No	No	No	No	No	No	**0**
Schoharie Central High School/Shelter	High	Health & Social Services	Yes, FEMA	Medium	Yes	Yes	Yes	No	No	No	**30**

E. FEMA's definition of critical facilities

Assets identified through the asset inventory process were classified as a critical facility according to the Federal Emergency Management Agency (FEMA) definition or were noted as locally critical according to the community. The FEMA definition of critical facilities includes:

- Structures or facilities that produce, use or store highly volatile, flammable, explosive, toxic and/or water-reactive materials;
- Hospitals, nursing homes and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood;
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during and after a flood; and
- Public and private utility facilities vital to maintaining or restoring normal services to flooded areas before, during and after a flood.

F. Risk assessment methods

The NYRCR Risk Assessment Tool was used to evaluate the relative risk to all community assets identified during the asset inventory process. Calculations are based on multiplying three primary factors, hazard, exposure and vulnerability, in order to obtain the relative risk to each asset in the event of a 100-year storm (1% annual chance). A value was assigned to each factor according to the following criteria:

A **hazard value** described the likelihood and magnitude of future store events. Since the primary purpose was to determine the relative risk for each asset based on a 100-year flood event, a predetermined hazard value (multiplication factor) of three was assigned to each asset.

The **exposure value** was assigned for each asset based on the sum of a group of attributes. This group of attributes includes the risk area in which the asset is included, and six landscape attributes that influence the potential for storm impacts. A score of 0.5 was assigned for each landscape attribute that received a "yes" and summed together to produce the exposure value. The six landscape attributes that were evaluated include:

- **Defensive Flood Protection Measures**: Are they absent, below base-flood-elevation, in poor condition, and/or do they lack a maintenance commitment?
- **Elevation**: Is the elevation of the asset site below Base Flood Elevation?

- **Freeboard**: Is the elevation of the habitable or occupied portion of the asset < 2 feet above Base Flood Elevation?
- **Point of Confluence**: Is the asset subject to increased flooding due to the confluence of merging streams?

> ***Base Flood Elevation*** *The elevation of surface water resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year. Base Flood Elevations (BFEs) are shown on Flood Insurance Rate Maps (FIRMs) and on the flood profiles*[31]

- **Storm Water Discharge**: Is the asset subject to increased flood risk due to storm water system discharge?
- **Vegetated Stream Bank Buffers**: Is the asset within the Floodway Fringe, and without adequate vegetated buffers?

Vulnerability refers to the level of impairment or consequences that a given asset may experience from a storm event and the ability of an asset to resist damage from a storm. The **Table 17** describes the methodology by which the vulnerability scores were assigned for each asset.

Table 17 Vulnerability Based on Impact on Service or Function of Community Assets

Impact	Insignificant 1	Minor 2	Moderate 3	Significant 4	Major 5
A. Economic Assets	Limited interruption in service or short term reduced service	Service loss for up to 1 week or longer term reduced service	Service loss for more than 1 week up to 1 month or longer term reduced service	Service loss for more than 1 month or permanent reduced capacity	Permanent loss of service of the economic asset
B. Health and Social Services Assets	Limited interruption in service or short term reduced service; Services under more than usual stress but manageable	Service loss for up to 1 week or longer term reduced service; Services under more than usual stress on several fronts	Service loss for more than 1 week up to 1 month or longer term reduced service; Services under severe pressure	Service loss for more than 1 month or permanent reduced capacity	Permanent loss of service of any one of the essential services listed
C. Housing Assets	Limited inconvenience	Out of use for up to 1 week	Out of use for more than 1 week up to 1 month	Out of use for up to 6 months or permanent loss of 15% or less of housing in a group asset	Out of use for more than 6 months or permanent loss of more than 15% of housing in a group asset
D. Infrastructure Systems Assets	Limited interruption in service or short term reduced service	Service loss for up to 1 week or longer term reduced service	Service loss for more than 1 week up to 1 month or longer term reduced service	Service loss for more than 1 month or permanent reduced capacity	Permanent loss of service of any one of the facilities listed

Table 17 (continued) Vulnerability Based on Impact on Service or Function of Community Assets

Impact	Insignificant 1	Minor 2	Moderate 3	Significant 4	Major 5
E. Natural and Cultural Resources Assets	Limited interruption in service or short term reduced service or Limited loss of access, habitat, or use	Service loss for up to 1 week or longer term reduced service; Minimal natural habitat impacts, temporary loss of public access, temporary loss of open space/tourism assets	Service loss for more than 1 week up to 1 month or Moderate impacts on natural habitats, sustained loss of public access, long term loss of private open space	Service loss greater than 1 month or Permanently diminished capacity of natural resource; substantial damages of important natural habitats	Permanent loss of service of the cultural asset or complete loss of important natural habitats
F. Assets Providing Services for Socially Vulnerable Populations	Limited service interruption	Service interruption for up to 1 week	Service interruption of more than 1 week up to 1 month	Permanent service interruption of more than 1 and less than 6 months	Service interruption of 6 or more months

Description of risk scores

After the values for each of the factors described above were determined for each asset, the NYRCR Risk Assessment Tool was run. This tool multiplied together the hazard, exposure and vulnerability scores and assigned a final risk score for each asset. The risk score helps to identify the assets within the Community that may be at an increased potential for storm damage and to establish how immediately risks need to be addressed. In addition to the risk scores which are described below, the following factors will inform the process of assessing community risks and developing a community risk management strategy. The additional factors include each asset's:

- Contribution to life safety;
- Qualification as a critical facility;
- Community value;
- Potential to provide environmental services;
- Economic contribution;
- Available alternatives; and
- Capacity to adapt.

The risk scores were ranked according to the following scale:

- **Severe (greater than 53):** The asset is in a dangerous situation as a severe risk score indicates that exposure and/or vulnerability is high for the asset and should be reduced, if possible. Relocation may be a priority option for these assets.
- **High (24 to 53):** Conditions exist that could lead to significant negative outcomes from a storm, with the likely loss of service of an asset for an extended period of time. For many assets, this may be unacceptable. If a high risk score is the result of a high vulnerability, actions such as elevating or flood-proofing the asset to help avoid a long-term loss of function should be taken. If the high risk score is the result of a high exposure, many local landscape attributes that would help protect an asset against storm damages are not present. This would necessitate actions to restore landscape attributes. If the overall risk score is higher than 24, exposure and/or vulnerability are higher than may be acceptable. A score greater than 24 may necessitate relocation in the future if other possible adaptation or management actions are not effective in protecting against flood damage.
- **Moderate (6 to 23):** Conditions related to this asset pose moderate to serious consequences, but assets may have lower vulnerability or exposure scores. A combination of measures should be used to reduce exposure and/or vulnerability.
- **Residual (Less than 6):** Floods would pose minor or infrequent consequences. However, risk is never completely eliminated. Some residual risk still remains even after management measures have been implemented. It should be noted if an asset receives a residual risk score but is considered a critical facility, even this small amount of risk may not be acceptable. If this is the case, management actions should be undertaken to eliminate risks.

When considered in conjunction with the features described above (e.g. critical facility, community value, etc.) the risk scores produced by the Risk Assessment Tool are a vital component of the project selection process.

G. End notes

[1] Village of Esperance Comprehensive Plan Committee. *Village of Esperance Comprehensive Plan*. Village of Esperance Comprehensive Plan Committee, 2004. PDF file.
[2] Nicosia, Patsy, and Jim Poole. "This is our Katrina." *Times Journal*. Division Street News Corp, August 31 2011. Web. 03 April 2014.
[3] Zimmer, Erin."Videos: New York Farms Still Recovering from Hurricane Irene Aftermath, Maple Downs Farm in Middleburgh, NY." *Serious Eats*. Serious Eats, 27 September, 2011. Web. 03 April 2014.
[4] U.S. Department of State, U.S. Geological Survey. "USGS Surface-Water Daily Statistics for the Nation, USGS 01351500 Schoharie Creek at Burtonsville NY." *U.S.GS*. U.S.GS, n.d. Web. 03 April 2014.
[5] Keville, Mary Rachel, et al. *A post Hurricane Irene rapid bioassessment of the water quality of the Schoharie Creek at Burtonsville, NY.* Schoharie River Center. PDF file.
[6] Zimmer Web.
[7] Milkovich, Matt. "New York farm still recovering from Hurricane Irene." *Vegetable Growers News*. Great American Media Services, 19 March 2012. Web. 03 April 2014.
[8] Office of the Governor of New York State. *New York State Responds - Hurricane Irene and Tropical Storm Lee: One Year Later August 2012.* New York State, 2012. PDF file.
[9] Lloyd, Julia of Schoharie County Farm Service Agency. Personal interview. 20 March 2014.
[10] Schoharie County Office of Emergency Management. "*Schoharie County Hurricane Irene and Tropical Storm Lee: Flood Response After-Action Report and Improvement Plan (AAR /IP)*." Schoharie County, July 2012. PDF file.
[11] Nicosia and Poole Web.
[12] Nickle, Shane of Schoharie County Planning and Development. Personal interview. 27 October 2013.
[13] Times Journal News Staff. "Flood water race through Valley, Esperance." *Times Journal*. Division Street News Corp, August 31 2011. Web. 03 April 2014.
[14] Schoharie County. *Schoharie County Multi-Jurisdiction Hazard Mitigation Plan*. Schoharie County, 25 October 2013. Web. 03 April 2014.
[15] FEMA. *National Disaster Recovery Framework, Strengthening Disaster Recovery for the Nation*. FEMA, September 2011. PDF file.
[16] FEMA Web.
[17] Town and Village of Schoharie Comprehensive Plan Committee. *Town and Village of Schoharie Comprehensive Plan*. Town and Village of Schoharie Comprehensive Plan Committee, January/February 1997. PDF file.
[18] Town and Village of Middleburgh Comprehensive Plan Committee. *Comprehensive Plan for the Town and Village of Middleburgh Comprehensive Plan*. Town and Village of Middleburgh Comprehensive Plan Committee, March 1999. PDF file.
[19] Village of Esperance Comprehensive Plan Committee. *Village of Esperance Comprehensive Plan*. Village of Esperance Comprehensive Plan Committee, 2004. PDF file.
[20] Town of Esperance Comprehensive Plan Committee. *Town of Esperance Comprehensive Plan*. Town of Esperance Comprehensive Plan Committee, 2009. PDF file.
[21] Mohawk Valley Regional Economic Development Council. "*Mohawk Valley Regional Economic Development Council 2012 Action Plan*." Mohawk Valley Regional Economic Development Council, 14 September 2014. PDF file.
[22] Mohawk Valley Regional Sustainability Plan Planning Team. *Cleaner, Greener Communities Sustainability Plan*. Mohawk Valley Regional Sustainability Plan Planning Team, 2012. PDF file.
[23] Schoharie County Web.
[24] FEMA. *Disaster Mitigation Act of 2000*. FEMA, 2000. PDF file.
[25] Schoharie County Office of Emergency Management PDF file.
[26] The data sets provided by NYS DOS originated from Federal Communications Commission, Insurance Services Office, Inc., National Oceanic & Atmospheric Administration, NYS Department of Environmental Conservation, NYS Department of Health, NYS Department of Transportation, NYS Division of Homeland Security & Emer-

gency Services, NYS Division of State Police, NYS Office for People with Developmental Disabilities, NYS Office of General Services, NYS Office of Information Technology Services, NYS Office of Mental Health, and NYS Thruway Authority. Additionally, E & E incorporated data from NYS Department of Environmental Conservation (2009), ESRI (2010), National Park Service (2011), NYS Department of Health (2010), NYS Education Department (2000), Platts (2009), the 2012 NYSDEC-FEMA Mohawk Flood Project.

[27] Nickle Personal interview.

[28] U.S. Census Bureau Web.

[29] Data source from NYS Office of Emergency Management, FEMA, engineering estimates, and Disaster Survey Reports generated by the US Department of Agriculture's Natural Resources Conservation Service (NRCS).

[30] New York State Department of Environmental Conservation (NYSDEC). *617 State Environmental Quality Review*. New York State Department of Environmental Conservation, 2014. Web. 03 April 2014.

[31] FEMA. "*Definitions*." FEMA, 2012. Web. 03 April 2014.

H. Glossary

AAR	After Action Report
BIG	Boating Infrastructure Project
BFE	Base Flood Elevation
BW	Biggert-Waters
CDBG	Community Development Block Grant
CDBG-DR	Community Development Block Grant-Disaster Recovery
CEDAR	Code Enforcement Disaster Assistance Response
CEO	Chief Executive Officer
CFA	Consolidated Funding Application
CRS	Community Rating System
DAR	Daughters of the American Revolution
DBP	Disinfection Byproduct
DEC	Department of Environmental Conservation
DHSES	Division of Homeland Security and Emergency Services
DOS	Department of State
DOT	Department of Transportation

DPW	Department of Public Works
EFC	Environmental Facilities Corporation
EPF	Environmental Protection Fund
EMP	Emergency Management Plan
EMS	Emergency Medical Services
ESD	Empire State Development
E & E	Ecology and Environment
EOP	Emergency Operations Plan
EPF	Environmental Protection Fund
FEMA	Federal Emergency Management Agency
FHA	Federal Highway Administration
FIRMs	Flood Insurance Rate Maps
FSA	Farm Service Agency
GEIS	Generic Environmental Impact Statement
HCR	Homes and Community Renewal
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HMGP	Hazard Mitigation Grant Program
HUD	Housing and Urban Development
KW	Kilowatt
LDC	Local Development Corporation
LID	low-impact development
LiMWA	Limit of Moderate Wave Action
LTCR	Long Term Community Recovery
LWRP	Local Waterfront Revitalization Plan/Program

MEVAC	Middleburgh Emergency Volunteer Ambulance Corps
MVREDC	Mohawk Valley Regional Economic Development Council
MVRSP	Mohawk Valley Regional Sustainability Plan
N/A	Not applicable
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NYRCR	NY Rising Community Reconstruction
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
OPR & HP	Office of Parks and Recreation and Historic Preservation
RFP	Request for Proposal
RSF	Recovery Support Function
RTP	Recreational Trails Project
SALT	Schoharie Area Long Term, Inc.
SCSWCD	Schoharie County Soil and Water Conservation District
SEFU	Storm Emergency Fire Unit
SEQRA	State Environmental Quality Review Act
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SPDES	State Pollution Discharge Elimination System
SRF	State Revolving Fund
STERPD	Southern Tier Economic Regional Planning Development Board

SWCD	Soil and Water Conservation District
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
U.S.	United States
WTP	Water Treatment Plant

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