



Town of Union, New York



Community Plan for Recovery & Resilience

February 2015



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Mixed-income and mixed-age housing options will support the town's goal to create safe and affordable neighborhoods.



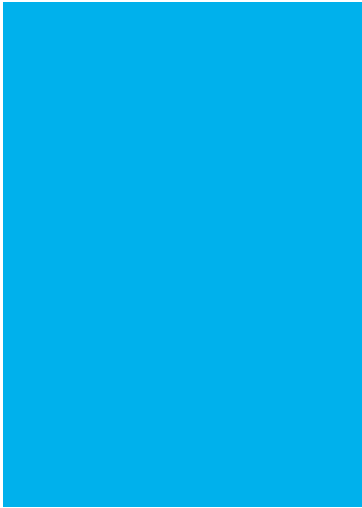


EXECUTIVE SUMMARY

The Town of Union, with its villages of Johnson City and Endicott, is located along steeply sloping streams in the hills of the floodprone Susquehanna River basin. Many people and properties in the town remain in harm's way today. This Long-Term Community Recovery Strategy charts a course to safety and a more resilient future. Union has chosen a unique path, establishing a "resiliency laboratory" of model projects that can leverage investment, both public and private, through the Southern Tier Regional Economic Development Council and the state funding initiatives it supports. This plan is structured to position critical community sites like the BAE property to capture more of the emerging technology investment in the research areas advanced by Binghamton University and its partners.

It also reflects the difficult choices the town is making about relocating some residences and businesses out of the floodplain permanently and replacing those with uses that are designed to flood periodically and bounce back without serious damage.

The town is very grateful to the many residents, nonprofit organizations, business owners, and other partners who participated in this process by providing space for meetings, participating in interviews and focus groups, attending visioning workshops, reviewing concepts at the weekend design workshop, giving neighborhood tours, and contributing to the dialogue on the website (<http://www.thereunionproject2020.com>). Reflecting the community's input, this plan helps communicate the town's bold vision.



The community views the BAE site as a significant opportunity for redevelopment.

THE SUSQUEHANNA BASIN: ONE OF THE NATION'S MOST FLOODPRONE WATERSHEDS

When Tropical Storm Lee struck in September of 2011, almost 70 years had passed since the flood of 1936 that set the record for the area at 30.5 feet. After 1936, flood protection measures including the Whitney Point and East Sidney reservoirs, pumping stations, levees, and flood walls were constructed which have helped to protect most of Union from severe flooding, except in the lower parts of South Endwell and Fairmont Park, for seven decades. In 2006, between June 24th and 29th, up to a foot of rain overwhelmed the Susquehanna River basin upstream as the Susquehanna crested at an estimated 33.7 feet. On September 8, 2011, Tropical Storm Lee broke all records for the Southern Tier of New York and portions of northeast Pennsylvania. With a peak crest of 35.26 feet and an extraordinary flow rate of 129,000 cubic feet per second, Lee generated a volume greater than the flow going over Niagara Falls. Twelve river forecast point records were broken.

IMPACT ON UNION'S NEIGHBORHOODS

There is no single cause to flooding in the Town of Union and, as a result, no simple solution to build a resilient future. Tropical Storm Lee severely affected five neighborhoods and caused damage in twelve others. Some of these neighborhoods, including Westover, South Endwell, and Northside Johnson City have considerable percentage of low and moderate income homeowners and renters. Initial damage on September 7, 2011 came from extreme flash flooding of the Nanticoke, Little Choconut, and Brixius creeks. Flash floods devastated a 50 unit mobile home park on Orman St., and a nearby pharmacy and local restaurant. Debris blocked storm water collection facilities and Nanticoke Creek washed away a section of Carrie Ann Drive, cutting off access to homes. The Kmart Plaza in Endicott filled with water and never reopened. Brixius Creek backed up and flooded South Endwell, filling the lower level of Town Hall and impacting surrounding commercial and



residential structures along Pearl Street. The Town of Union Refuse Department facility and equipment were flooded along Scarborough Drive.

As the river rose and then backwashed into the swollen tributaries a mandatory evacuation order was issued for NYS 26 from West Corners north to the town line. The Susquehanna overtopped the levees at Fairmont Park and Mersereau Park flooding nearby residences. In Westover, the river deluged BAE Systems and displaced 1,200 employees. Home Depot, the YMCA, William Hill Park, and the Village of Johnson City water treatment plant were severely impacted. Union-Endicott High School fields were inundated, but the floodwall built after 2006 held and the school building itself was spared. To the east of the high school, the Boys and Girls Club again flooded badly. Several businesses and a commercial shopping center along Vestal Avenue were impacted by the backwater effect of the river and a lack of adequate storm water detention facilities.

Two neighborhoods were damaged when flood control structures activated for the first time since being constructed in the 1970's. In the North Endwell East neighborhood, the Struble Road flood control facility released large amounts of floodwater into the spillway, which gained velocity due to the high elevation. Water damaged the sports facility and closed the road for months. In Johnson City's Oakdale-Reynolds neighborhood, the spillway at the Overbrook flood control facility discharged a large volume of water into Finch Hollow Creek, destroying a portion of the parking lot at the Oakdale Mall and damage at Arthur Avenue. Major retailers including Gander Mountain, Petco, Toys R Us, and the Christmas Tree Shops flooded badly. When New York State Electric and Gas was forced to turn off the power, several Village of Endicott utility facilities closed. The lack of pumping capacity at the South Street well drew storage tanks to dangerously low levels. The Johnson City Senior Center and surrounding neighborhood was flooded impacting seniors, residents, and local businesses.

EVALUATING THE PATH FORWARD

After the devastating impact of the 2006 flooding the town took a number of coordinated actions to reduce the risk of flooding including:

After Tropical Storm Lee hit, Union, like every other Southern Tier community, had to reevaluate its strategy. The steps identified above were positive, but the scope of need was still enormous. Union began



The central mixed-use core of the redeveloped BAE campus would offer a vibrant and pedestrian-friendly environment.

- Continued to focus its buyout activities in Westover, Fairmont Park, South Endwell, and West Corners. Since 2011 nearly 200 buyouts have been completed and more are underway.
- Worked with the United States Army Corps of Engineers to construct a floodwall at the Union-Endicott High School
- Participated in the update to the Broome County All Hazard Mitigation Plan completed in 2013
- Prepared Unified Comprehensive Plan and adopted unified land management codes

this planning process with funding from New York State Department of State and the United States Department of Housing and Urban Development to develop a Long Term Community Recovery Strategy. The steps in the process included:

- Summarizing existing local research, demographic needs data, and plans;
- Evaluating the town land and water management codes and laws;
- Conducting a series of four community engagement sessions addressing housing,

economic development, parks and recreation, and infrastructure;

- Evaluating assets and the risks they face;
- Conducting a Resiliency Workshop;
- Conducting a three day Community Design



Workshop and catalyst project graphics;

- Identifying a series of catalyst projects for redevelopment of critical sites; and
- Identifying a long term recovery strategy with specific implementation programs and projects for the town as a whole and for the Villages of Endicott and Johnson City.

Demographics for the town and villages present a significant concentration of residents considered vulnerable in the face of extreme weather and likely to face difficulty during the

immediate relief and recovery periods. Key observations include:

- Significant percentage of low and moderate income residents townwide of 54.1%



- High percentage of residents living in poverty (from 16.5% in Johnson City, 11% in Endicott, and 9.6% in the town outside of the villages)
- High percentage of single female-headed households (17%)
- Growing numbers of seniors (18%)
- Older housing stock (66% build before 1940)
- High percentage (over 40%) of cost burdened renters paying in excess of 30% of income for renters



The 27-acre BAE campus could become a model of high-density, mixed-use resilient design and green construction.

BUILDING A PLAN TOGETHER

The town engaged the public throughout the process through educational sessions and visioning and design workshops. As a result

of this engagement a vision statement and goals were developed. The town's vision for a resilient future is:

"The Town of Union and its Villages of Endicott and Johnson City are resilient places. We offer high quality and floodsafe neighborhoods that are accessible to all. We respect our waterways and offer safe public access to them for commerce and recreation. The hallmark of our response to extreme weather is a comprehensive green infrastructure system that protects neighborhoods and allows reuse of valuable commercial sites and Main Street properties. We cooperate with our neighboring communities and regional partners to mitigate hazards, manage our river and streams, and create a prosperous future."



MOVING FORWARD WITH A BOLD VISION

As a result of this work over 40 specific projects have been identified in the project narratives in Section IX. Certain overarching strategies have been identified to guide recovery and resilient redevelopment. Taken together these strategies identify a new approach for the town to work with nature, using green infrastructure and sustainable solutions whenever possible to impact flooding neighborhood by neighborhood.

These strategies include:

Continuing Buyout of Vulnerable Residential Properties

The town's approach to "buy-out areas" will be to consolidate vacated land for onsite green infrastructure by relocating or moving homes to a safer location in the area and elevating them either structurally or by location on higher ground. This approach leaves room for

rain gardens, open spaces, community gardens, and trails that enhance the neighborhoods as well as larger contiguous bio-retention areas, which provide additional flood storage and mitigation. If they follow the historical patterns the buyouts will continue to further devastate vulnerable communities, leaving them without a critical mass of activity to be livable and safe.

The key targets for buyouts are:

- The area in West Corners, north of the Village of Endicott along Route 26 above Nanticoke Dr.
- The area of South Endwell between Endicott and Johnson City north of Route 17 but south of the railroad tracks.



The central core would function like an outdoor mall, with shops, outdoor dining, a new movie theater, and gathering space.



Without redensifying the remaining residences the town and villages will be responsible for extensive infrastructure systems in water, wastewater, stormwater, and roads with a considerably reduced tax base, as well as be burdened with the additional maintenance of mowing the vacant lots and removing snow from impacted streets that potentially may have only one home remaining.

- The area of Fairmont Park between Johnson City and Endicott, north of the railroad tracks off Watson Boulevard.
- The area of Westover just to the west of Johnson City between the railroad tracks and Route 17 near William Hill Park.

■ Redevelop the BAE Campus

Take advantage of the opportunity to redevelop the BAE campus as a chance to design a model, high density, mixed-income, mixed-age, and mixed-use model of resilient design and green construction.



■ Engage the Public Sector Land Owners in Green Retrofit

Encourage public or state agencies to retrofit any property or sites they own in order to provide maximum mitigation benefit and serve as a model for the private sector. For example, this includes property the NYS



■ Retrofit Older Commercial Uses with Green Infrastructure

Examine opportunities to design a major green infrastructure and retrofit older commercial priorities, to “right size” parking lots so that all stormwater is managed onsite, as new developments are required to do. The plan studies a few existing Union sites applying resiliency measures and identifies potential retrofits for the HURON Campus, Oakdale Mall, Gander Mountain, and Kmart properties.

Department of Transportation owns along road sides and intersections. Design and rehabilitation of local municipal, state and federal properties should incorporate cost-effective green infrastructure and detention areas.

■ Create Temporary Storage

Create temporary wastewater storage by locating elevated wastewater storage tanks at strategic locations throughout the town. This component would allow the town to

temporarily store wastewater, releasing it slowly to the treatment plant over time so that the plant is not overstressed in extreme weather resulting in combined sewer overflows directly into the Susquehanna River. Create underground flood storage by evaluating opportunities to locate underground flood storage structures throughout the town, wherever groundwater conditions are favorable. This component would provide additional flood storage while reducing the impacts to existing stormwater infrastructure.

■ **Develop Neighborhood Infrastructure Improvement Strategies**

Use the “hot spot” map the town has developed to evaluate the numerous neighborhood specific infrastructure problems including the need to upsize infrastructure such as transmission lines and culverts to remove pinch points and allow the unimpeded flow of stormwater to detention areas.

■ **Update all Land and Water Management Regulations**

Like many existing land management frameworks developed prior to climate change awareness, the Town of Union Code enshrines existing patterns of development more than it shapes a more resilient future. The future town will not look like the current zoning map. Many areas now shown as industrial, commercial, and residential will become permanent green space as buyouts progress. Flood hazard areas that do not become planned green space may become derelict and abandoned as people pull investment away from those areas.

The time is now to rethink the future community in response to new realities of weather, climate, and the emerging identity of the Southern Tier economy, and create land and water management tools that can shape a Town of Union that is prosperous, resilient, and sustainable.



A satellite institutional building would anchor and activate the core campus area.



Town of Union Long Term Community Recovery Plan Goals and Strategies

COMMUNITY PLANNING AND CAPACITY BUILDING

Goals	Achieve the highest level of emergency warning and preparedness for extreme weather events. Lead regional resiliency initiatives, piloting strategies to reclaim and reuse property safely and sustainably. Employ a creative land, river, and stream management framework that increases resilience in all projects.
Strategies	Develop land use strategies for buyout areas to cluster buildings and maximize natural flood storage. Incentivize resilient new development and redevelopment. Carefully manage upland development to mitigate future river corridor flood hazards. Advance programs to prepare, alert, and provide relief to residents, businesses, and service providers. Enhance connections with nearby communities to foster regional cooperation in approaching flooding.

ECONOMIC DEVELOPMENT

Goals	Maintain sustainable and resilient commercial areas and Main Streets that foster town-wide growth.
Strategies	Retrofit older commercial areas that lack on-site stormwater systems through green techniques. Provide expanded utility infrastructure to areas where sustainable development is economically viable.

HEALTH AND SOCIAL SERVICES

Goals	Offer high quality human services to meet the needs of vulnerable people.
Strategies	Ensure the resiliency of critical infrastructure and provide redundant power supplies for facilities. Provide adequate emergency services.

HOUSING

Goals	Create and maintain safe residential neighborhoods affordable by a wide range of residents.
Strategies	Redevelop cluster housing in buyout areas and create functional areas for green infrastructure. Identify locations for replacement housing outside of hazard areas and relocate residents.

INFRASTRUCTURE

Goals	Model the use of cost-effective green infrastructure techniques as the primary form of hazard mitigation along with repair of existing constructed solutions and levees as appropriate.
Strategies	Repair, enhance, and restore existing flood mitigation structures (levees) and stormwater facilities. Reduce burdens on collection systems by reducing infiltration and separate combined sewer systems. Identify locations to provide additional stormwater storage capacity to accommodate storm events. Ensure back-up power is available at vital facilities including pump stations.

NATURAL AND CULTURAL RESOURCES

Goals	Enjoy the waterways as a safe part of a town wide recreation network. Incorporate a plan with neighboring communities and regional partners.
Strategies	Address the stormwater runoff issues related to erosion and flash flooding on a regional basis. Identify green infrastructure practices that could be implemented to reduce stormwater runoff. Identify opportunities to reclaim former residential or commercial lands for community recreation.

*The Town of Union's LTCR Plan
establishes a framework for building a
vibrant and resilient community.*



Rendering of redeveloped BAE Campus.





I. INTRODUCTION

Union is a community at risk. There have been two floods that exceeded both the “100 year” (1% chance of occurring at any given time) and “500 year” (0.2% chance of occurring at any given time) risk floods within the last seven years. Climate science indicates that extreme storms are increasing in frequency. In order to avoid repeating the losses, the toil and heartbreak of another flood, some old ways of living and some of the places people lived and worked have to change. How can the Town of Union be safe from future flooding, but still preserve its special character and the things residents love about it? If changes have to be made to avoid future floods, can they happen thoughtfully, in ways that make Union even better? The Town of Union

Long-Term Community Recovery Plan, which includes lands in the 100 year floodplain in and throughout the Town, Village of Johnson City, and Village of Endicott, establishes a framework upon which a vibrant and resilient town can be built.

PLANNING CONTEXT

In the days following Tropical Storm Lee, the town began extensive relief and recovery efforts. In late November 2011, it was announced that the State of New York would receive Community Development Block Grant Disaster (CDBG-DR) Recovery funds to assist with communities impacted by Hurricane Irene and Tropical Storm Lee. As an “entitlement community” under the CDBG program, Union



Damage to Fairmont Park homes was significant.



Fast moving runoff destroyed some local roads.

and its villages are guaranteed a share of the funding. Union's share of the state allocation is \$10.1 million. The town also applied for and was awarded a grant from New York State Department of State (NYSDOS) to prepare a Long Term Community Recovery Plan. In early 2013, the town issued a Request for Proposals for a consultant to prepare a recovery plan using both state and federal funds. The town selected a team led by River Street Planning & Development from Troy, New York, and work got underway in June 2013.

The town pursued a bottom up and resident driven planning process. An interactive website was created using Mind Mixer that resulted in 1,319 unique visitors and 7,876 page views. The town hosted four workshops on housing, infrastructure, economic development and parks and recreation. A resiliency workshop was conducted including local and regional experts on climate change. A three day interactive design workshop including two open houses was completed and resulted in site plan and advanced renderings for key sites in the town and villages. This approach

underscores the town's desire to identify both short and long term programs and projects that are feasible, fundable, and implementable.

In the months after the Town of Union began developing its Long-Term Community Recovery Plan (LTCRP), Super Storm Sandy struck New York. The state's response to that storm, as well as to Hurricane Irene and Tropical Storm Lee, is addressed in the NY Rising Community Reconstruction (NYRCR) Program, which offers professional planning support and implementation funding to the targeted communities. Union is part of a group of communities in the Southern Tier that are committed to expanding the scope to cover required elements of the NYRCR process and work together with other affected communities to develop a regional plan that addresses their shared needs as Susquehanna River communities. The Southern Tier NYRCR Plan includes Union, Johnson City, and Endicott as well as the Towns of Vestal and Conklin and the City of Binghamton. In the second round of planning to begin shortly the Town of Chenango will be brought into the program.



Recently elevated home in Fairmont Park.



New box culvert at Struble Road.

The NYRCR Plan integrates this LTR plan into a regional context. The process highlights the following six Recovery Support Functions (RSFs) established by President Obama in 2011 through the National Disaster Recovery Framework, which the plan must address:

- Community Planning and Capacity Building
- Economic Development
- Health and Social Services (vulnerable populations)
- Housing
- Infrastructure
- Natural and cultural systems

The detailed components of the NYRCR Plan that Union will address to augment this LTR plan include development of the following:

- An evaluation of vulnerable populations including those who are often underserved and displaced during storm recovery.
- Public engagement strategy and participation of the Broome Communities Steering Committee and in the Regional Resiliency Summit.

- Vision statement that addresses key issues including capitalizing on assets, rebuilding in a resilient manner, and reducing future risk.
- Community asset inventory and map.
- Risk assessment framework building on existing data to determine greatest vulnerabilities based on three factors: hazard, vulnerability, and exposure.
- Needs and opportunities assessment focused on the seven component areas listed above (economic development, health and social services, housing, infrastructure, natural and cultural systems, socially vulnerable populations, and other assets).
- Identification of reconstruction strategies, projects, programs, and actions.
- Regional planning strategy to coordinate the efforts that will emerge from the proposed Southern Tier Regional Resiliency Plan. Project narratives summarizing the implementation steps, schedule, and relative priorities.

Union is made up of multiple settlements that grew and blended together on both sides of the Susquehanna River.



View of Columbia Drive in the Town of Union.



II. HISTORY

The Town of Union, located on the north bank of the Susquehanna River in south-central Broome County, NY, has an area of 35.8 square miles and a population of 56,346, according to the 2010 Census. It includes the Villages of Endicott and Johnson City. NYS Route 17, soon to be I-86, runs east/west on the other side of the river and connects the area to New York City and Ohio. The Town of Union forms the western end of the Greater Binghamton area, made up of multiple settlements that grew and blended together on both sides of the Susquehanna River near the City of Binghamton.

The core neighborhoods in Union are:

- Choconut Center – A hamlet in the northeast part of the town at the junction of County Roads 45 and 97.
- Endicott – The Village of Endicott is on the bank of the Susquehanna River.
- Endwell – A hamlet between Endicott and Johnson City. It was formerly known as “Hooper.”
- Johnson City – The Village of Johnson City is adjacent to the City of Binghamton and is at the east town line.
- Union Center – A hamlet by the north town line on NY-26 bordering West Corners and Endwell.



The Town of Union sits on the north bank of the Susquehanna.



Endicott-Johnson Workers Arch.

- West Corners – A hamlet northwest of Endicott located on NY 26.
- Westover – A hamlet lying along the western border of the Village of Johnson City.
- West Endicott – A hamlet bordering Endicott and West Corners.

Archaeologists have located many early settlement sites along the Susquehanna, which offered pre-historic natives, the Iroquois, and then the European settlers a clear highway in the forests and some flat land with deeper soils. The region was first settled by Americans/Europeans around 1782. The Town of Union was established in 1791, while in Tioga County before the creation of Broome County. The town, a “mother town” of the county, was later reduced in size by the formation of other towns, the first being the Town of Owego then the Town of Tioga in 1800, followed by Lisle (1801, Greene (1808, now in Chenango County), Vestal (1823), and Maine (1848).

The Sullivan Expedition was sent up the Susquehanna in 1779 to destroy Tuscarora villages thought to be fighting with the British. The name “Union” is thought to have come from serving as a rendezvous location for two separate commands. In his history of the town written in 1924, William Foote Seward wrote “In his diary recording the events of this expedition, Lieutenant McKendry observes in regard to the land about Union, ‘this is a fine flat, chiefly on the right hand of the river going down.’ ” This ‘fine flat’, where the town was founded and grew, was formed by the river floodplain, and by soil washing down from the hillsides above in natural processes on-going long before human settlement.



Buildings in downtown Johnson City.



Carousel in West Endicott Park is on the National Register of Historic Places.

The Plan charts a course to safety and prosperity for a more resilient future.



Record rainfall caused the emergency spillway at the Struble Road flood control facility to activate.



III. Story of the Floods

THE SUSQUEHANNA RIVER AND ITS TRIBUTARIES

From its origin at Otsego Lake in Cooperstown, New York, the Susquehanna River flows for over 440 miles, making it the longest river on the American east coast, the 16th longest in the United States, and the longest river in the country that is not commercially navigable. With an average daily volume of 22 billion gallons of water, the Susquehanna is the largest contributor of freshwater to the Chesapeake Bay. The river drains 27,500 square miles (71,000 km), including nearly half of the land area of Pennsylvania. In New York it is the outlet for most of the rivers and streams in the Southern Tier where its watershed is over 4,500 square miles. The tributaries flowing into the Susquehanna in the Town of Union,

including the headwaters of Nanticoke Creek, Little Choconut Creek, and Brixius Creek, are steeply elevated and in flood events carry large volumes at significant velocity. As the tributaries hit the swollen river a backflow condition is created that limits their ability to discharge their water and drain the watershed above.

The Susquehanna River Basin Commission calls the Susquehanna “one of the most flood prone watersheds in the nation.” Hurricane Sandy, in October 2012, was predicted to bring heavy rain and flooding to the upstate area, including the Town of Union, before it veered eastward and dropped only moderate



Backwater flooding inundated the lower level of Town Hall in Endwell.



The Susquehanna River overtopped the levee in Westover neighborhood.

rainfall in the upper Susquehanna basin. Until Tropical Storm Lee, the flooding produced by the rain from Hurricane Agnes in 1972 was the benchmark for flooding in the Susquehanna Basin.

Tropical Storm Lee is now established as the worst flood of record for the Southern Tier of New York and portions of northeast Pennsylvania. Twelve river forecast point records were broken. Many people and properties in the Town of Union remain in harm's way today. This Town of Union Long-Term Community Recovery Plan charts a course to safety and prosperity for a more resilient future. It reflects difficult choices the town is making about relocating some residences and businesses out of the floodplain permanently and replacing those with uses that are designed to flood periodically and bounce back without serious damage.

FLOODING IN THE TOWN OF UNION

According to the Broome County Hazard Mitigation Plan, flooding presents the most serious hazard to property and public safety in the Town of Union. Not only is the town located on the floodprone Susquehanna, but the steeply sloping streams in the hills above the river basin are subject to recurrent flash flooding. Federal disaster declarations have been made for flood events affecting the Town of Union three times in the last eight years: the river flood of June 2006, the flash flooding of November 2006, and the combined flash flooding and river flood of September 2011.

The town's flood of record before 2006 was the flood of 1936, which reached 30.5' on the nearest river gauge, located in the Susquehanna between the Towns of Union and Vestal. The extent of the 1936 flood became the 100-year flood zone (Zone A) on the Flood Insurance Rate Maps (FIRMs) that remained in effect until a new flood study and updated FIRMs were prompted by the flood of 2006. The federal Flood Control Act of 1936





Flood waters undermined foundations in several neighborhoods.



Temporary flood measures were breached along Watson Blvd.

led to the construction of many of the flood control measures that help reduce flooding on the Susquehanna today: the Whitney Point and East Sidney reservoirs, pumping stations, levees, and flood walls. Other flood control measures have been added over the years since.

These protections were enough to prevent serious flooding in most of the Town of Union for seventy years, except in the lower parts of South Endwell and Fairmont Park, Argonne Avenue, Scarborough Drive, Chaumont Drive, River Road, Davis Avenue, Shady Drive, Verdun Avenue, and Fairmont Avenue in South Endwell, and the lower end of Fairmont Park, which have all experienced flooding many times between 1936 and 2006.

THE FLOOD OF 2006

In 2006, local residents and officials were stunned by flooding that surpassed the record flood of 1936. Between June 24th and 29th, 6" to 7" of rain fell on the Town of Union, but amounts up to 12" fell on the Susquehanna

basin upstream. The 2006 flood was largely a river flooding event, driven by the heavy rains upstream, though the Nanticoke Creek corridor flooded, backed up by the swollen river. There was localized flash flooding and some damage to roads and culverts along smaller streams. The river reached a height of 33.7', more than 3' higher than the record set in 1936. This level was estimated because the floodwaters exceeded the 33' maximum measuring height of the gauge.

Emergency command centers were set up on June 27th, when it became clear that the flooding would be severe and evacuations necessary. By the evening of the 27th, Broome County had declared a county-wide state of emergency and mandatory evacuations were underway. The river rose so fast that residents in Conklin and Binghamton were awakened in their beds by the water and had to escape from windows on the downstream side of their houses when doors could not be opened against the force of the current.



FLOOD IMPACT STATEMENTS FOR VESTAL GAUGE ON SUSQUEHANNA RIVER	
Gauge Height - Severity of Impact	
18.0 Feet	River overflows banks and lowland flooding begins within the floodplain.
20.5 Feet	Cellars on Argonne Avenue in Endwell flood.
21.0 Feet	River reaches moderate flood stage.
22.0 Feet	Flooding begins at the low ends of Davis Avenue, Shady Drive, and Fairmont Avenue in Endwell.
24.5 Feet	Flood waters approach Boland Park in Johnson City.
25.5 Feet	April 1993 - Kent Avenue Mobile Home Park floods to four feet and properties on Kent, Verdun, Fairmont, Chaumont, and Scarborough Drive are inundated.
26.5 Feet	March 1979 - Severe inundation affects Argonne Avenue and Shady Drive to Verdun Avenue; Route 17 to Harry L Drive; and the West end of River Road.
27.0 Feet	December 1979 - Severe inundation affects the area from Orman Street, Ardmore Avenue, and River Drive in West Corners. From Johnson City to Endwell, flooding affects Poplar, Oak, Birch, Woodland, and River Roads.
27.3 Feet	January 1983 - Flooding intensifies south of Main Street in Endwell.
33.7 Feet	June 2006 - Flood brings extensive and severe flooding in Endwell, Westover, West Corners, Johnson City, and Fairmont Park.
35.2 Feet	September 2011 - Tropical Storm Lee becomes flood of record, causing widespread and catastrophic devastation in Johnson City, Westover, Endwell, Endicott, and West Corners.

The Town of Union Annex to the Broome County Hazard Mitigation Plan states:

“Evacuations occurred in South Endwell, Fairmont Park, West Corners, and parts of NYS Routes 17 and 17C were closed due to flooding. Many roads, pump stations, lift stations, and culverts were damaged. Public facility damage occurred at the Town Hall, State Police Barracks, Scarborough Drive Refuse Facility, and William Hill Park. Private commercial and residential properties were also damaged. According to the Small Business Administration, private property damage in the Town totaled \$7,317,400.00. Public assistance requests totaled \$1,037,443.65.”

Water and wastewater treatment plants in Endicott and Johnson City were inundated and

shut down, resulting in a shortage of clean water and the discharge of untreated wastewater into the floodwaters. The entire town, except for Johnson City and the Fairmont Park area, was under a boil-water advisory at least until June 30th, when the order was rescinded in a county press release. Sanitary sewers in South Endwell backed up and affected more than 500 homes beyond the inundated area. Residents in otherwise dry areas saw their basements flooded by water coming up out of their floor drains. The Endicott Municipal Power service was shut down for just 24 hours, but 16,000 NYSEG customers lost power in Broome County, some for many days.

Evacuees were sent to the Binghamton University Events Center. Low-lying parts of Johnson City near the river and near



Backwater flooding led to overtopping of levee around Fairmont Park.

Little Choconut Creek flooded, including the village's public works facility on Brown Street and nearby businesses. Also flooded were Greenfield Park, nearby homes and the businesses east of the Route 201/NYS 17 interchange such as Toys R US and Gander Mountain. Homes and businesses west of the 201 flyover flooded as well. An emergency dam placed across Main Street just east of BAE held back the creek waters and kept BAE dry. George F Highway and the businesses along it between Hooper Road and the NYS 17 flyover flooded.

In South Endwell, multiple businesses and residences were complete losses. As of August 2011, just before the 2011 flood, 41 FEMA property buyouts prompted by the 2006 flood were completed or underway. There was also extensive damage to homes in Fairmont Park, and a few buyouts took place. The flood of 2006 led officials to plan to pursue more buyouts, with the goal of turning the recurring flood areas of South Endwell into permanent open space.

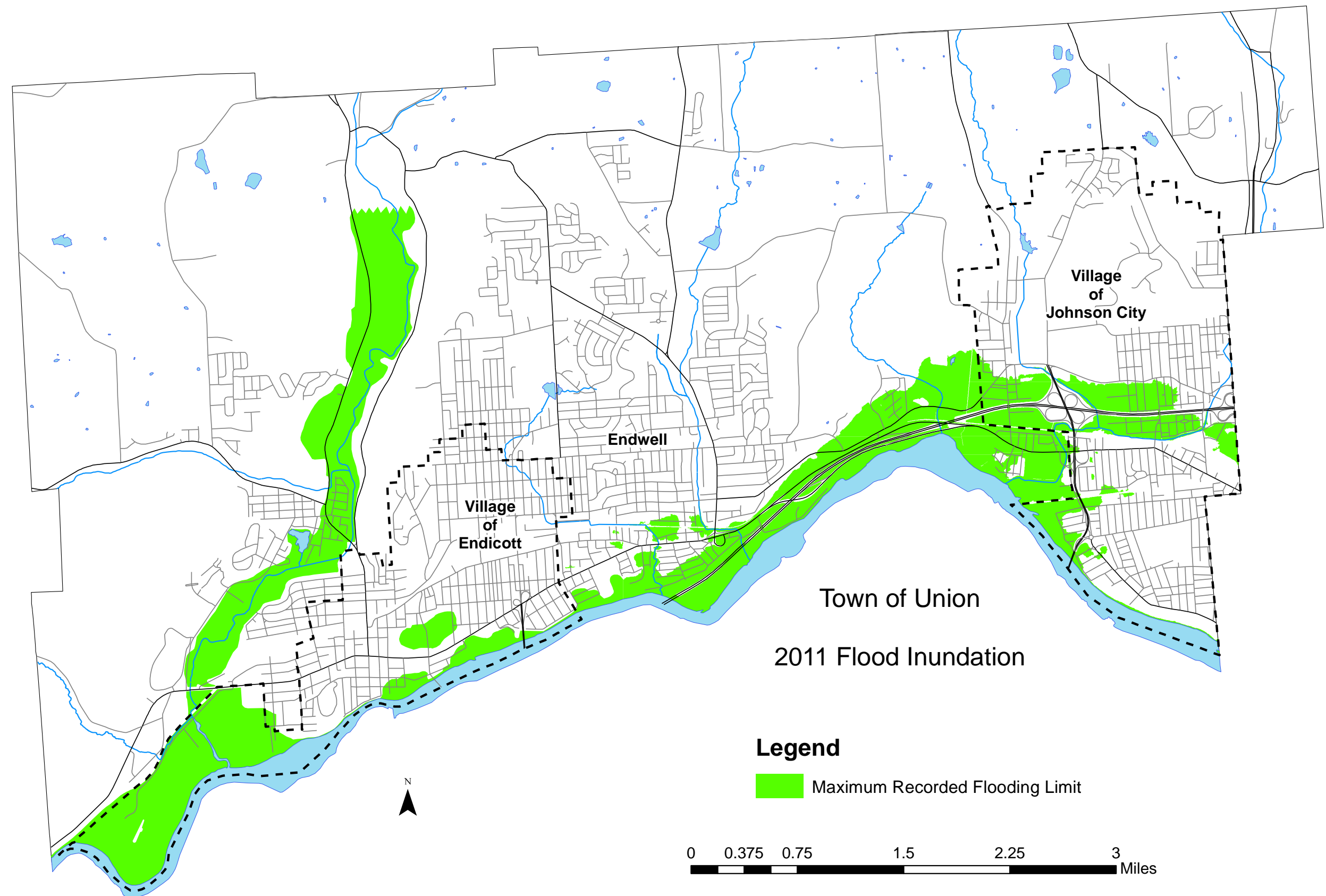


Flood-related household debris impacted landfill space.

THE FLOODS OF 2011

In late August of 2011, Hurricane Irene passed over the Town of Union, dropping about 4" of rain but sparing Broome County the devastation visited upon towns further east in the Catskills. Broome County opened an Emergency Operations Center (EOC) on August 28th and closed it again that evening when the National Weather Service river crest forecast was lowered from 20.9 feet to less than 17 feet. Then County Executive Brennan was quoted as saying the storm had turned out to be a "well-carried out drill" for the county rather than the feared emergency, and ordered the EOC to turn to coordinating assistance to hard-hit Delaware County.

Just one week later, Tropical Storm Lee stalled over the area and another 9" of rain fell in two days, September 7th- 8th. So much rain fell so fast on ground already saturated by Hurricane Irene that unprecedented flash flooding occurred in streams throughout the town. Pavements and guiderrails were eaten away, culverts washed away, and bridges destroyed



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Backwater effect flooding caused overtopping of the levee around Fairmont Park in several locations.

in minutes as shocked residents watched. Route 26 in the town, Twist Run Road, Oakdale Road, and Airport Road were closed due to water in the road, debris, and washouts.

The Nanticoke Creek corridor and West Corners neighborhood were the first areas of the town to flood, around noon on Monday the 7th. Soon afterward, North Street and Kmart Plaza in Endicott filled with water, as did Pratt, Olive, Burns, and Field Streets in Johnson City. A State of Emergency was declared for the Town of Union, followed by one for the whole county. A mandatory evacuation order was issued for NYS 26 from West Corners north to the town line, and then, as the river rose, for all areas that had flooded in 2006.

Shelters were opened at Central Methodist United Church on Nanticoke Avenue, at Endwell Fire Station #1 on Country Club Road, and at Johnson City High School. The Broome County Executive declared a county-wide state of emergency and issued a “no unnecessary

travel” order by mid-afternoon. On the evening of Sept. 7th, the Binghamton Press & Sun Bulletin headline was- “Fearing the Worst – Flooding Could Surpass 2006.” At 7:13 PM a mandatory evacuation order was issued by the county for 26 streets in Johnson City, as the rising Susquehanna backwashed into the Little Choconut Creek basin.

The rain continued on Tuesday, September 8th. The rate of rainfall was slower and flash flooding on the smaller streams had subsided but the larger streams and the river were continuing to rise into the neighborhoods of South Endwell, Fairmont Park, and even Westover, which had not flooded in 2006. The river crested in the early hours of September 9th. A boil-water order was issued that day for those served by municipal water in Johnson City, and for residents in the West Corners area. The areas under mandatory evacuation in the Town of Union, as given in a 10:30 AM press release from the County Executive, were:



Fast moving runoff undermined roads and prevented clearing of debris from drainage structures.

VILLAGE OF ENDICOTT

- North Street south to Hannah Street from South Oak Avenue east to Vestal Avenue
- Main Street south to Susquehanna River from Booth Ave. east to Davis Street (*sic; probably Davis Avenue*)
- East and West Main Street south to the Susquehanna River from Badger Avenue east to Vestal Avenue
- June Street From Nanticoke Avenue to Page Avenue

VILLAGE OF JOHNSON CITY

- Chrisfield Avenue
- Cenacle Plaza
- Banks Avenue
- River Terrace
- Theron Street
- Boland Drive
- Thomas Street
- Bernice Street
- Grand Avenue
- Riverside Drive
- Olive Street
- Brown Street
- Burns Street
- Taber Street
- Pratt Avenue
- Plymouth Street
- Diment Street
- Harry L Drive
- North Hudson Street
- Overbrook Road (low lying areas)
- Cindy Street
- Jerry Street
- Victory Street West of Oakdale Road
- Banks Avenue from Boland Road to Riverside Drive
- Eldridge Street from Boland Road to Riverside Drive
- Oakdale Road from Robinson Hill south to Main Street
- Nelson Road
- North Road



Levees overtopped in multiple locations.

TOWN OF UNION

Westover Area (including but not limited to):

- Avon Street
- Elbon Street
- Berwin Street
- Onondaga Street
- Dayton Street
- Camden Street
- Endwell Street
- Donald Street
- Frederick Street
- Evelyn Street
- George Street
- Riverside Drive
- Fifth Street
- Irving Place
- Oakdale Road from Main St
north to Johnson City Village line.
- Main St from Johnson City Village line
west to the George F Highway.

Fairmont Park Area (including but not limited to):

- Beech Street
- Oak Street
- Sycamore Street
- Poplar Street
- Woodland Avenue
- Birch Street
- Barton Avenue
- Watson Blvd. between Country Club Road
and Johnson City line.

West Corners Area

- Route 26 from Day Hollow Road north to
Maine town line.
- Glendale Drive from Carl Street south to
Western Heights Blvd.
- Valley Road

The broad travel ban for the county was lifted the afternoon of the 9th, but many damaged roads remained closed, as did all streets in the mandatory evacuation areas. The first shelters

began to close on the 11th, and the boil water order was lifted for the last remaining area, West Corners, on the 13th. The immediate emergency was over, and the long and difficult cleanup and recovery effort began.

The Broome County Hazard Mitigation Plan (2/2013) on the flood of 2011:

“Up to seven neighborhoods in town were evacuated and local shelters established. Many flooded neighborhoods lost electricity. Road closures included NYS Route 26, NYS Route 17C, Glendale Drive, NYS Route 17, Watson Blvd, Struble Rd. and Carrie Ann Dr. Various small businesses, commercial enterprises and retail establishments were affected by either water or road closures for several days.”

“Numerous roads, culverts, pump stations, lift stations, floodwalls and other infrastructure was (sic) reported damaged. Public facility damage occurred at the State Police substation, Town Hall, Town Courts, Public Works facility, and more. A 50-unit mobile home park was destroyed, and another 262 housing units were damaged, 26 of which were damaged severely.”

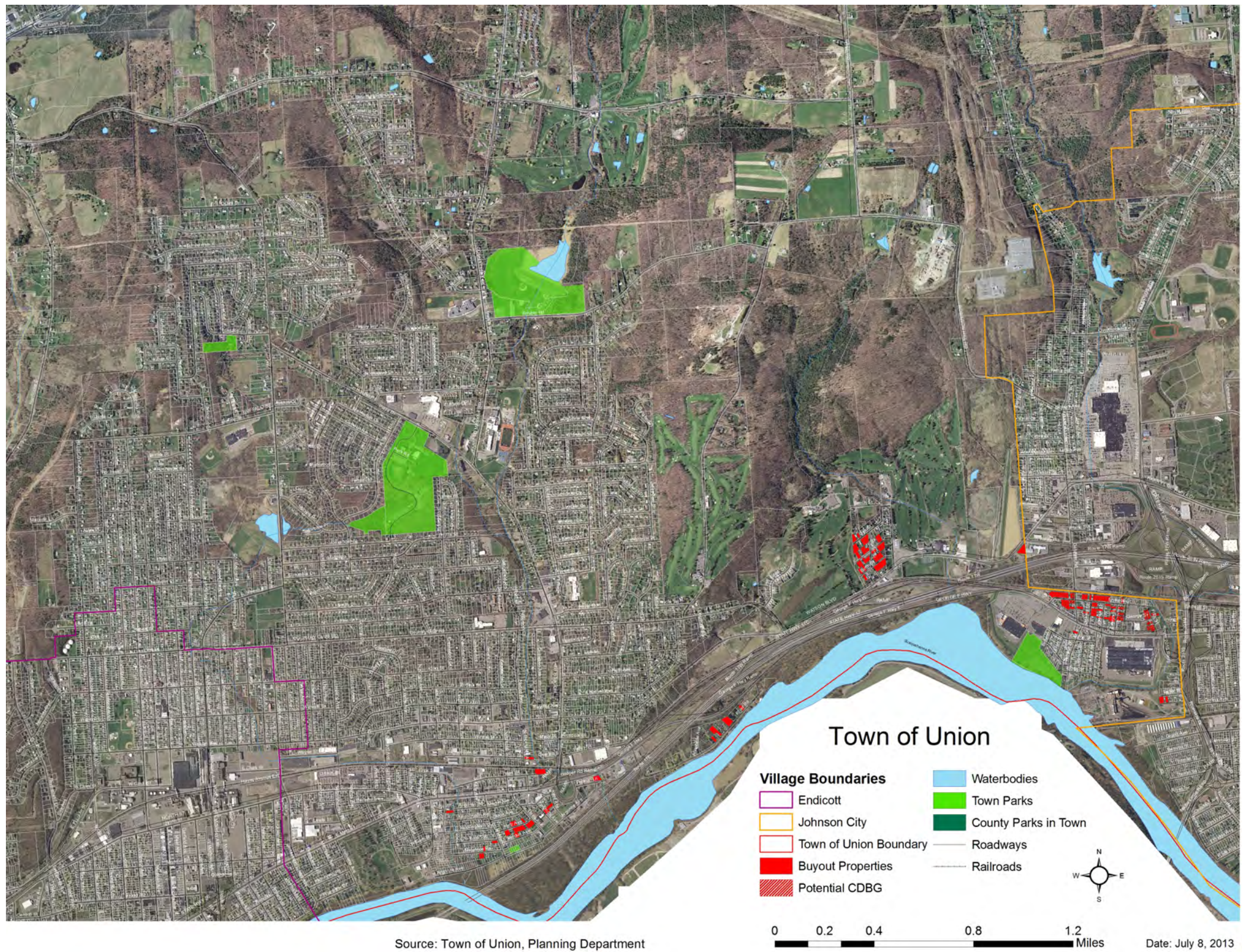
The Federal Emergency Management Agency (FEMA) provides communities with the opportunity to buy out properties in high hazard locations and those that have had repetitive losses. The benefit of this process to move people out of harm’s way is obvious. The downside of this process is that HMGP requires that all structures be removed and the land generally cannot be used, other than for parks or gardens. Ownership of the land reverts to the town or villages and they must upkeep the

Year	# HMGP Buyouts	# CDBG-DR Buyouts
Fairmont Park		
1988-2007	3	
2013		15
2014	9	5
South Endwell		
1988-2003	31	
2006	15	
2007	29	
2008-2011	10	
2014	15	
West Corners		
2013	11	
2014	11	
Westover		
2013	11	
2014	21	12
Total	166	32

parcels, provide and maintain infrastructure and roads even though a critical mass of homes may have been removed. Using the FEMA Hazard Mitigation Grant Program (HMGP) the town and villages have bought out numerous properties over the past two decades. The current buyout areas are:

- The area north of Endicott along Route 26 where Nanticoke Dr., north of the Village of Endicott.
- The area between Endicott and Johnson City north of Route 17 but south of the rail road tracks.
- The area between Johnson City and Endicott, north of the rail road tracks off Watson Boulevard.
- The area just to the west of Johnson City between the rail road tracks and Route 17 near William Hill Park.

Figure 2: Town of Union



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ECONOMIC IMPACTS OF THE FLOOD

The Town of Union Action Plan for Disaster Recovery states: “The flooding that occurred September 7th- 9th, 2011 severely affected five neighborhoods in the Town of Union and caused considerable damage in twelve others. The flooding that occurred both in 2005 and 2006 were confined to two major areas in the Town, those being the South Endwell area and the Fairmont Park subdivision.” The 2011 flood not only damaged more properties overall, but flooded two significant business clusters that had been unaffected in 2006: West Corners and Westover. It also destroyed the hope that properties could be rebuilt and that kind of devastation would not have to be faced again in the owner’s lifetime.

The July 2012 Town of Union Action Plan for Disaster Recovery reported that almost 10% of the properties in West Corners were severely damaged, including the CVS Pharmacy, a local restaurant, and a number of other businesses. They have since reopened. More than 7% of properties in South Endwell suffered damage, including the Town Hall. A levee protecting the Fairmont Park neighborhood was overtopped and 6.6% of properties suffered substantial damage including a number for the second time in 5 years.

Other neighborhoods in the town that suffered substantial damage to properties are Northside, Southside, and Central Johnson City, Riverhurst in Endwell, Northeast Endwell, Union Center, the Oakdale/Reynolds area, Airport Heights, and Roundtop in Endicott. A number of businesses along Harry L Drive both east and west of the Oakdale Mall were flooded, some for the second time, and a few,

including the large Gander Mountain store, took months to reopen. Municipal facilities damaged include the Johnson City Public Works garage, a fire station, the Village of Endicott sewage treatment plant, the Maine Endwell School District Facilities garage, multiple parks, and the EnJoie golf course.

The Westover neighborhood was hit hardest, with substantial damage to more than 14% of its properties. Its largest store, Home Depot, was closed for several months for repairs but has since reopened. Some of the flooded businesses, such as Junction Equipment, have failed to reopen. The huge BAE plant, one of the town’s largest employers with 1,300 workers, did not reopen and is to be demolished by its owner, the US Air Force, due to flood damages. Fortunately, appropriate space was found at the HURON Campus (formerly IBM) in Endicott for BAE and it has resumed operations in the town. This was initially described as a temporary move, while the company decided whether to move its Westover operations to one of their other plants or build a new facility somewhere in the Greater Binghamton area. The company announced its intention to make the HURON location permanent in April 2012. The infusion of their 1,300 workers to downtown Endicott has brought new life there, but at a loss to Westover’s neighborhood businesses that had served the BAE employees. The Air Force has announced its intention to demolish the damaged plant, remediate the 27-acre site as necessary, and turn it over to the Broome County IDA for future land uses to be determined by the Town of Union.

*Communities need to plan
for and adapt to climate change
impacts in a range of sectors.*



Fairmont Park homes during flooding.



IV. Risk Assessment

The Broome County Hazard Mitigation Plan of February 2013 offers estimates of the losses that may be expected from various hazards based on the value of properties at risk, given by municipality. Estimates are given for the damage to be expected from a 1% annual chance flood, what is often misleadingly referred to as the “100-year” flood. But the climate is becoming more extreme, heavy storms are more likely, and it’s not known what the 1% annual chance storm will become in the future. We do know that the following properties and infrastructure remain at risk of serious damage from flooding of the kind that has been seen twice in the last five years.

VILLAGE OF ENDICOTT

The Village of Endicott is given a High Hazard ranking for flooding. A lengthy and detailed list of vulnerabilities are identified, including the Ranney well substation (Endicott Municipal Light plant), undersized storm and sanitary sewers, pumping stations, the lighting department, the water department, the wastewater treatment plant, the EnJoie golf course, and Tri Cities Airport.

The HMP states that “for a 1% annual chance flood, \$129,070,399 (4.7%) of the municipality’s general building stock replacement cost value (structure and contents) will be damaged, 2,254 people may be displaced, 2,079 people may seek short-term sheltering, and an estimated

18,565 tons of debris could be generated.”

Critical facilities that may be damaged include the Union Volunteer Emergency Squad facility, Jennie F. Snapp Middle School, four churches (two shelters, two polling places), three village water wells (#5, #28, #32), the village wastewater treatment facility, and the historic Square Deal Arch.

VILLAGE OF JOHNSON CITY

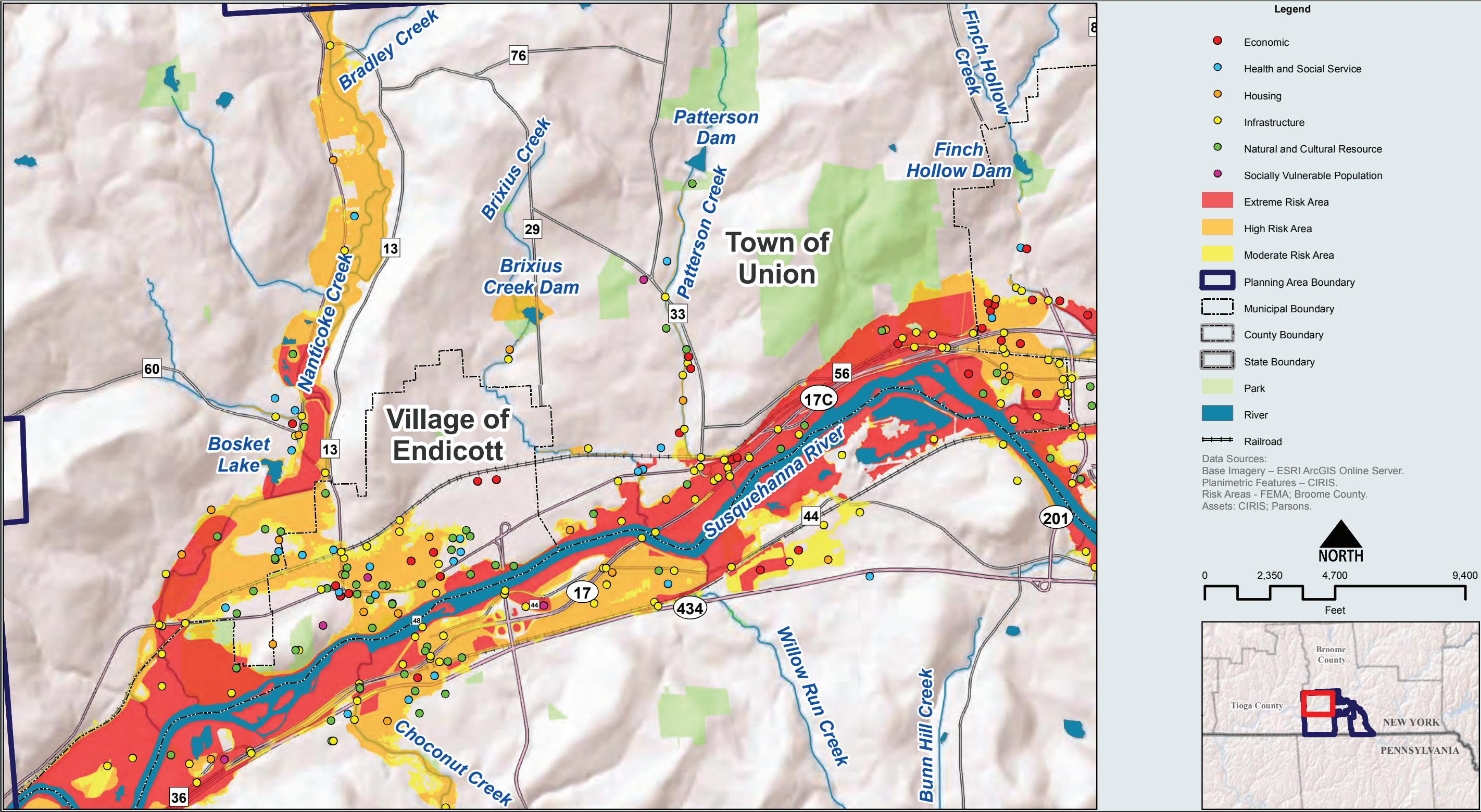
The Village of Johnson City is also given a High hazard ranking for flooding. Risks for other types of natural disasters are rated medium to low. A number of hazard vulnerabilities are listed. These problem areas include:

- Area bounded by NYS Route 17, 528 Harry L Drive (Gander Mountain), Harry L Drive and N. Broad Street, which includes Northside Park and Northside Fire Station.
- Area bounded by NYS Route 17, NYS Route 201, Little Choconut Creek and N. Broad Street, which includes the village’s Public Works facility and fuel filling station.
- The Johnson City Water Department, 44 Camden Street located in the Westover area of the Town of Union.
- Area that includes Boland Drive, Chrisfield Drive, River Terrace, Theron Street, Thomas Street, Bernice Street, and Grand Avenue between the Susquehanna River and Grand Avenue.
- The Johnson City Combined Sewer Overflow Facilities (CSOs) located at 720 Riverside Drive, the AES Westover power generating plant (formerly known as the Goudey Station).

- Area that includes Valley Plaza Drive, Oakdale Road, Azon Road, Field Street, Frank Street, and Marie Street.
- Unnamed drainage ditch between 500 Reynolds Road (Warehouse Carpet Outlet) and 553 Harry L Drive (Calvary Cemetery).
- Unnamed drainage ditch between Reynolds Road and Anna Maria Drive, beginning at Penna Drive and discharging into Broome County Finch Hollow Site #1.
- Unnamed drainage ditch that is located with 821 Robinson Hill Road.
- Implement DMA 2000 Hazard Mitigation Plan Update – Broome County, New York.
- Roadside drainage ditch in front of 114 Deyo Road and storm sewer between 103 Deyo Hill Road and 107 Deyo Hill Road.
- The discharge area below Broome County Finch Hollow Site #1, including the west side of the Oakdale Mall parking lot and Arthur Avenue.

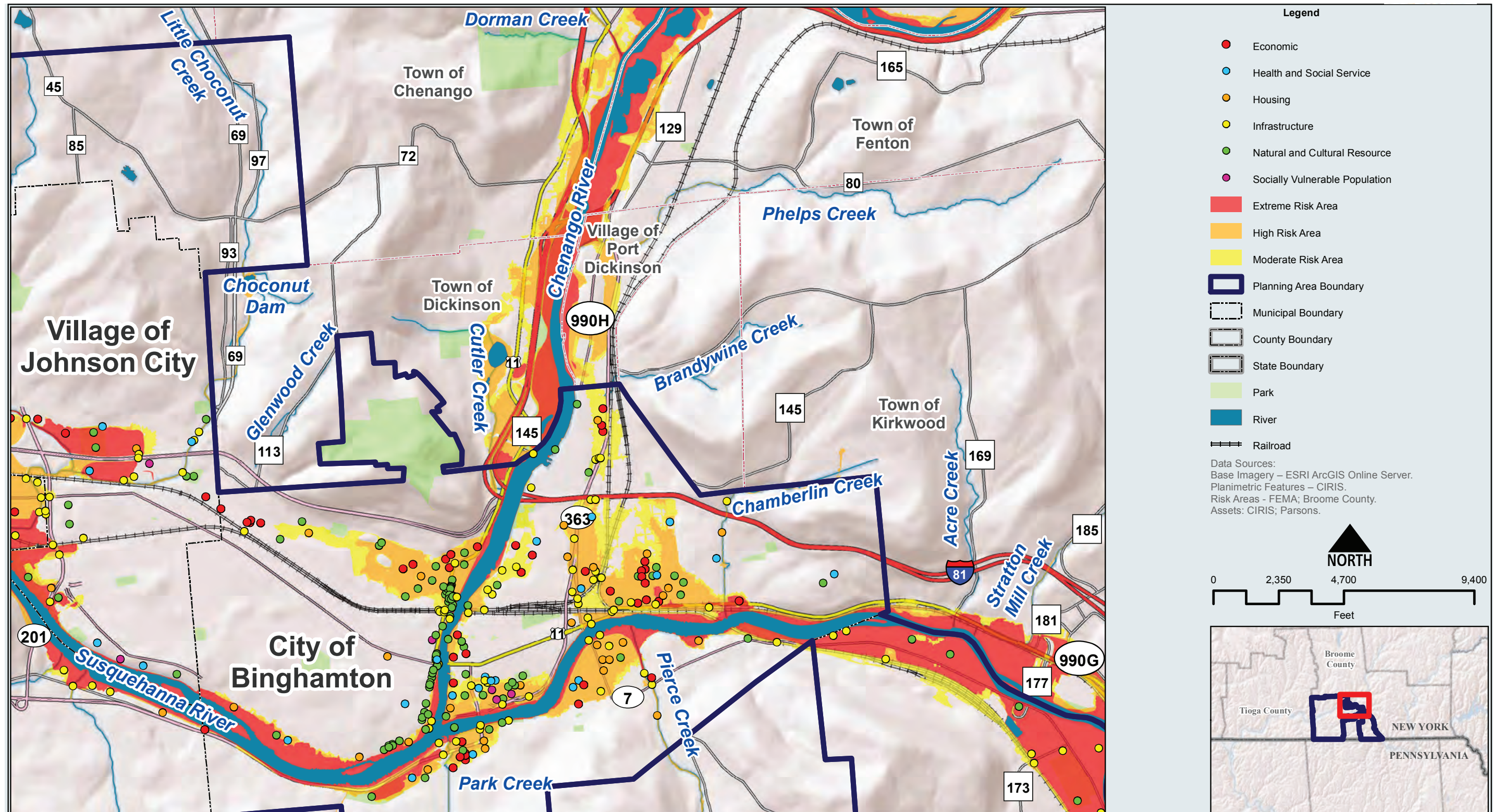
The HMP estimates that *“for a 1% annual chance flood, \$75,118,689 (2.5%) of the municipality’s general building stock replacement cost value (structure and contents) will be damaged, 631 people may be displaced, 466 people may seek short-term sheltering, and an estimated 2,914 tons of debris could be generated.”* Critical facilities that may be damaged include two village water wells (36 and #7), the water plant on Camden Street, and the Department of Public Works facility on Brown Street.

Figure 3: Assets and Risks Areas - Northwest Detail, from Broome NY Rising Community Reconstruction Plan



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Figure 4: Assets and Risks Areas - Northeast Detail, from Broome NY Rising Community Reconstruction Plan



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TOWN OF UNION

Annex Volume 2, Broome County Hazard Mitigation Plan

The Town of Union is given a High hazard ranking for flooding as well. Risks for other types of natural disasters are rated medium to low. The HMP states: *“The town identified a number of problem areas vulnerable to future natural hazards, many of which have sustained damage from past events. Flood hazard areas include Fairmont Park, West Corners, Westover, and South Endwell. Carrie Ann Drive and Struble Road were noted as vulnerable until the completion of new drainage structures at these locations. The flood wall at Fairmount Park was also noted as vulnerable.”*

“It is estimated that in the Town of Union, 9,569 residents live within the 1% annual chance flood area (NFIP Special Flood Hazard Area). Of the municipality’s total land area, 10.5% is located within the 1% annual chance flood area. \$545,281,586 (10.1%) of the municipality’s general building stock replacement cost value (structure and contents) is located within the 1% annual chance flood area.”

Critical facilities that may be damaged include a NYS Police Barracks in Endwell, the Town of Union office complex, the YMCA (polling place), three water wells (#2, #3, #5), the Public Works facility on Scarborough Drive, the Union Volunteer Emergency Squad facility, Washingtonian Hall, (a historic house severely damaged in 2011), and a historic carousel.

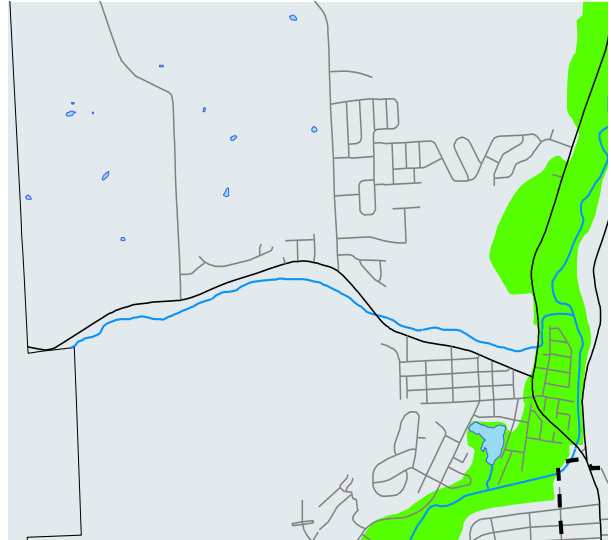
NEW YORK STATE CLIMATE CHANGE PROJECTIONS

“ClimAID: The Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State” was undertaken to provide decision-makers with cutting-edge information on the state’s vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge. This assessment of impacts acknowledges the need to plan for and adapt to climate change impacts in a range of sectors: Water Resources, Coastal Zones, Ecosystems, Agriculture, Energy, Transportation, Telecommunications, and Public Health. The general conclusions of the report that are relevant to the Southern Tier include:

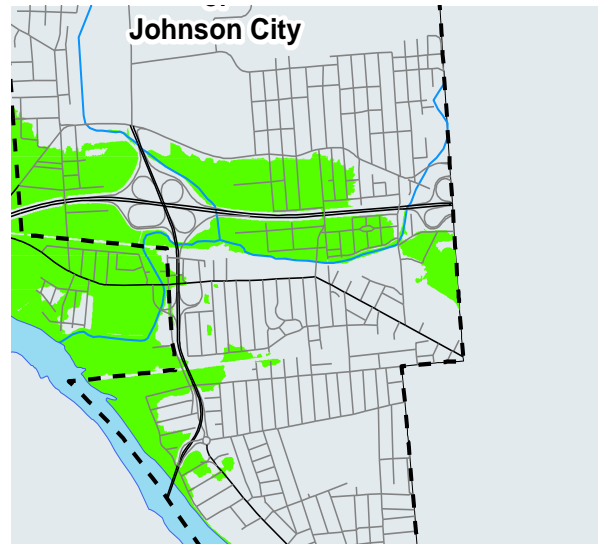
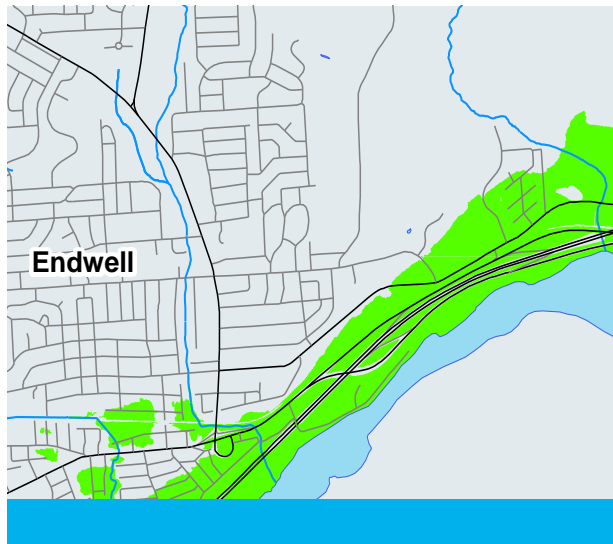
Heat waves will become more frequent and intense, increasing heat-related illness and death and posing new challenges to the energy system, air quality, and agriculture. Temperatures are expected to rise across the state, by 1.5 to 3°F by the 2020s, 3 to 5.5°F by the 2050s, and 4 to 9°F by the 2080s. Summer drought is projected to increase, affecting water supply, agriculture, ecosystems, and energy production.

Heavy downpours are increasing, leading to flooding and other impacts on water quality, infrastructure, and agriculture. Annual average precipitation is projected to increase by up to 5% by the 2020s, up to 10 percent by the 2050s, and up to 15 percent by the 2080s. Much of this additional precipitation is likely to occur during the winter months as rain, with the possibility of slightly reduced precipitation projected for the late summer and early fall.

The LTCR Plan builds on and advances other recent initiatives, including the town-wide master plan.



Excerpt from Town of Union 2011 Flood Inundation Map.



V. Review of Plans and Studies

BROOME COUNTY HAZARD MITIGATION PLAN



In 2013, Broome County worked jointly and cooperatively with its towns and villages to prepare a FEMA-approved, multi-jurisdictional Hazard Mitigation Plan. The plan, which was a comprehensive integration of separate county and municipal studies, focused primarily on severe storms, flooding, and severe winter storms. The plan's vision statement noted that through its partnerships and careful planning, Broome County will identify and reduce its vulnerability to natural hazards in order to protect the general health,

safety, welfare, quality of life, environment, and economy of the residents, businesses, institutions, and communities. The plan is designed to improve response to and recovery from disasters, and prioritize projects and resources. It is also meant to be a guide and resource when communities seek federal and other funds for necessary improvements.

BROOME COMMUNITY NY RISING COMMUNITY RECONSTRUCTION PLAN

As this Long Term Community Recovery Plan was being developed in 2014, the town and villages were also participating in the

development of the Broome Communities NY Rising Community Reconstruction Program. The NYRCR Broome Community is composed of six municipalities located in Broome County, NY: the City of Binghamton, Town of Vestal, Town of Union, Town of Conklin, Village of Johnson City, and Village of Endicott.

The Town of Union and Village of Johnson City were included in the first round of NYRCR Community designations and the Village of Endicott was added in round two. The communities all received allocations of Community Development Block Grant Disaster Recovery (CDBG-DR) funds to implement identified community projects. The NYRCR process catalogued assets, evaluated risk, engaged the public, identified critical issues, crafted strategies, and identified priority, featured, and other projects.

The Broome Community Plan identified a number of critical issues for the region. Communication between public agencies, local residents, and business owners was insufficient to plan for flooding and to aid in storm response and recovery. Shelters must be able to accommodate displaced persons and their pets. Best management practices should be implemented to control flooding in stream corridors adjacent to the Susquehanna River's tributaries. Critical health and safety infrastructure, including utility systems, flood protection measures, and medical service providers, require increased resiliency to protect people and property and ensure continuous operation in a disaster. Each community must attract new development to flood-safe areas, and increase the tax base and stability of its neighborhoods. The 2011

disaster also illustrated the need for more collaborative regional planning to maximize capacity, capabilities, and resources to address regional watershed issues.

The public engagement process included a series of seven NYRCR Planning Committee meetings that were highly publicized and open to the public, numerous Committee work sessions, interviews with key stakeholders, and three public engagement events, including the Regional Resiliency Summit. These events provided the opportunity for public input and comment at key milestones throughout the planning process. The Regional Resiliency Summit was held on November 18, 2013 and brought together almost 140 stakeholders from Broome County, Tioga County, and the Village of Sidney in Delaware County to share information on regional mitigation and floodplain management. Leading experts shared presentations on storm preparedness, changing weather patterns, recovery, and resiliency. This collaboration also resulted in the Broome Community receiving one of eight state-wide "Rising to the Top" awards for best regional collaboration and an additional allocation of \$3.0 million in CDBG-DR funds.

The plan also identified a dozen strategies and other projects (described in this plan) for each community. The strategies include:

- Expanding educational efforts so that people, businesses, and social service providers know beforehand what to expect and how to access assistance during and after a flood or other catastrophic storm event.
- Incorporating an educational component



related to understanding flooding, including its causes and implications, starting with students at the elementary grade level and including all ages to senior citizens.

- Prior to storm events, establishing neighborhood evacuation routes, and providing information during storms (e.g., extent of flooding, road closures, alternate routes, available shelters) to local residents and businesses.
- Encouraging participation in the National Flood Insurance Program's Community Rating System.
- Creating flood-safe developments outside the floodplain.
- Expanding flood protection of underdeveloped parcels to spur economic development.
- Improving stormwater management to mitigate flash flooding.
- Increasing resiliency of sewer and water supply systems to ensure continued operation of essential health and social services facilities during emergencies.
- Providing adequate emergency shelters north and south of the Susquehanna River to house displaced residents and their pets.
- Ensuring the resiliency of operational locations used by public works departments, first responders, and emergency management service providers.
- Improving the resiliency of residential and non-residential development in flood-prone areas.
- Ensuring reliability and resiliency of critical public works infrastructure.

CLEANER GREENER SOUTHERN TIER SUSTAINABILITY PLAN

The plan's implementation strategy discusses 65 actions that together have the potential to reduce regional greenhouse gas (GHG) emissions by over 32 percent within 20 years.

SUSQUEHANNA – CHEMUNG ACTION PLAN

This plan for the Susquehanna and Chemung River basins was a water quality management planning project of Southern Tier Central (STC) and Southern Tier East (STE) Regional Planning and Development Boards. The plan used an ecosystem-based management approach to conserving and protecting water resources that integrated human needs, economic issues, and environmental concerns to improve the way that natural and human systems work together. Although the project focuses on regional water resources, it includes goals and analysis related to flooding.

SOUTHERN TIER REGIONAL ECONOMIC DEVELOPMENT COUNCIL STRATEGIC PLAN

The strategic plan is a comprehensive blueprint for economic growth that focuses on five significant themes designed to spur job growth in the Southern Tier. The plan, along with subsequent progress reports and programs established by the Southern Tier REDC, place an emphasis on revitalization of flood-impacted and other distressed communities. It analyzes the region's core strengths and opportunities to leverage its assets and identifies tactics to deal effectively with the barriers to change. The plan's strategies are designed to increase employment, facilitate the growth and expansion of industry and business, improve the quality of life of all residents, grow the tax

base, further promote and develop the region, and position the Southern Tier as a great place to live, work, and increase economic growth.

UNITED STATES DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT CDBG CONSOLIDATED PLAN

As a CDBG Entitlement Community the Town of Union is required to prepare a Consolidated Plan every five years. This very comprehensive and in-depth assessment addresses a wide variety of housing, community development, economic development, and other health and human services. The Consolidated Plan identifies needs and strategies and outlines how CDBG and other resources will be programmed to meet the needs of vulnerable people including seniors, disabled individuals, non-English speakers, racial minorities, and poor residents. The Town of Union Consolidated Plan for 2010-2014 established the following priorities:

- **PRIORITY 1** - Provide extremely low, very low, and low-income renters with rental assistance to alleviate rent cost burden (paying more than 30% of gross income for rent) and excessive rent cost burden (paying more than 50% of gross income for rent) and provide renters with a choice of affordable decent, safe, and sanitary rental units.
- **PRIORITY 2** - Promote homeownership as the preferred form of housing tenure by maintaining the existing affordable housing stock and by providing financial assistance for the purchase and/or rehabilitation of existing housing.

- **PRIORITY 3** - Preserve and enhance the existing housing stock by providing financial assistance for rehabilitation of existing housing.
- **PRIORITY 4** - Provide the elderly with housing opportunities and support services necessary to maintain their independence.
- **PRIORITY 5** - Provide additional affordable housing units and support services for persons with a wide range of special needs.
- **PRIORITY 6** - Promote the provision of additional outreach services, supportive housing, and permanent housing for the homeless and those at-risk of becoming homeless.
- **PRIORITY 7** - Preserve and enhance the quality of life in older neighborhoods by providing high quality public amenities such as parks, public facilities, and infrastructure to eliminate blight, reduce the number of deteriorated and deteriorating housing units, and create an environment conducive to attracting additional public and private investment.
- **PRIORITY 8** - Provide services and support for the elderly, youth, disabled, and other extremely low-, very low-, and low-income people in a manner that encourages public, private, and non-profit sector collaboration and reduces program duplication.
- **PRIORITY 9** - Promote accessibility to public facilities and places by removal of architectural barriers.
- **PRIORITY 10** - Preserve buildings and neighborhoods of local, state, and national historic importance and/or architectural significance.



- **PRIORITY 11** - Enhance job creation/retention for low and moderate income persons by improving the viability of target area neighborhood business districts, promoting the rehabilitation of commercial/industrial structures, improving target area infrastructure such as street amenities and parking facilities in order to stimulate private investment, and providing technical assistance to new and established businesses.
- **PRIORITY 12** - Provide Fair Housing education and referral services to promote equal opportunity for housing choice.
- **PRIORITY 13** - Provide education and referral services for testing and potential abatement to reduce lead paint hazards.
- **PRIORITY 14** - Provide administrative, planning activities, and monitoring necessary for the successful implementation of the objectives, actions, and programs outlined in the Consolidated Plan and Annual Action Plans.

DEPARTMENT OF THE AIR FORCE FINAL DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES FOR THE PROPOSED DEMOLITION OF AIR FORCE PLANT 59 IN JOHNSON CITY

Air Force Plant 59 is known locally as BAE (the USAF contractor/tenant) and is in the Westover neighborhood of the Town of Union. It is a large wooden structure and was flooded to a height of 109" in 2011. The Air Force had already determined it surplus to their requirements, and given the severe damage it incurred, intends to demolish it. The 27-acre

site is to be turned over to the Broome County IDA to be used as the town recommends which may include commercial, residential, mitigation areas/flood detention, green space, and recreation.

FOUR RIVERS: AN INTERMUNICIPAL WATERFRONT ACCESS PLAN FOR BROOME COUNTY *(Prepared by Peter J. Smith & Co, Inc., December 2011)*

This plan, completed in 2011, is intended to guide development along the rivers of Broome County. The Town of Union and the Villages of Endicott and Johnson City are 3 of the 22 communities included because of their frontage on the Susquehanna River. The plan prioritizes projects for funding, aimed in particular at the New York State Department of State Division of Coastal Resources, and is intended to be used in place of a formal Local Waterfront Revitalization Plan (LWRP). The plan suggests that a full LWRP might be done as a next step toward implementation, and to put in place a cohesive set of planning policies across the waterfront municipalities.

The Four Rivers plan proposes new river access points, riverside trails, scenic overlooks, and fishing piers to fill in and reinforce existing amenities along what they call the Riverway, defined in the plan as *"a comprehensive waterfront system that provides a regional identity and embraces the dual notion of economic development and environmental protection."*

A number of planning principles are laid out for the Riverway zone:

- Promote compatible land uses in the Riverway as a model for community development.
- Protect natural heritage features and environmentally significant lands within the Riverway.
- Promote biodiversity, clean water, and healthy habitats in the Riverway.
- Provide a sound basis for sustainable ecological, agricultural, and heritage based tourism.
- Provide ecologically sensitive public access to the riverfront while protecting and enhancing the Riverway system.
- Revitalize Broome County's riverfront communities.

The report defines six 'Character Areas' in the Riverway. The portion of Riverway in the Town of Union' is almost entirely in the "Working Waterway" Character Area:

"The Working Waterway is defined by a suburban pattern of development that integrates a variety of mixed land uses, including residential, commercial and industrial. Most development occurs in a linear manner along the Vestal Parkway. Much of the river's edge is treed with occasional points of access. The water depth in this section of the Susquehanna accommodates more active use of the river. Sections of the river are dammed, which limits the extent of boating on the river."

At its eastern end, the town extends a short distance into the "Urban Confluence"

Character Area, which covers most of the City of Binghamton, in which urban development overlooks and adjoins the river.

A number of riverfront enhancement projects are proposed in the Four Rivers plan. The projects were chosen on the basis of the following Goals and Objectives:

- **Access** - improve public access to all riverfronts.

- **Objectives**

- Enable residents and visitors to interact with the rivers of Broome County.
- Provide un-obscured views of the rivers where feasible.

- **Economic Development** – to stimulate economic revitalization.

- **Objectives**

- Sensitively develop the riverfronts and generate tourism revenue.
- Use riverfront development to revitalize small "downtowns" located nearby.
- Promote opportunities for small business development along the riverfronts.

- **Community Health** – to enhance health and quality of life for all residents and visitors.

- **Objectives**

- Enable residents to improve their physical and mental health through interaction with regional water features.



- *Raise the region's quality of life and encourage new residents by offering a diversity of riverfront experience.*
 - **Ecology and Environment** – to enhance the biodiversity of the region.
 - **Objectives**
 - *Establish a Riverway system in Broome County.*
 - *Become a continuous wildlife corridor to preserve land where appropriate to save riparian communities*
 - **Flood Control** – to sensitively reuse lands prone to flooding.
 - **Objectives**
 - *Encourage the municipal purchase of flood buyout properties where feasible.*
 - *Minimize the intensity of usage on lands prone to flooding.*
 - **Connectivity** - to connect communities through their riverfront.
 - **Objectives**
 - *Promote active participation of all Broome County riverfront communities.*
 - *Encourage all riverfront communities to embrace regionalism and consider their individual development as part of a larger Riverway corridor.*
 - **Transportation** - Intermodal transportation - trail system.
 - **Objectives**
 - *Relieve gaps in the existing trails systems.*
 - *Create multi-modal trails that will accommodate a variety of users.*
 - *Promote alternatives to automobile transportation wherever feasible.*
- The projects proposed within the Town of Union are:
- **Boat Launches:** Hand carry-in access at William Hill Park and paved ramps at Boland Park in the Village of Johnson City and Riverhurst Cemetery in the part-town area.
 - **Parks:** Improvements to Roundtop and Mersereau Parks (Village of Endicott) and Boland Park (Village of Johnson City).
 - **Riverfront Trails:** A “Big Loop” trail, intended to incorporate and connect the existing Vestal RailTrail and Chugnut Trail (Village of Endicott), with river crossings at the old Lackawanna rail road bridge on the east and Bridge St. on the west. Includes a western spur to Glendale Park and a loop trail around Tri-Cities Airport. Also a “Little Loop” from the Lackawanna rail road bridge to South Washington Street in Binghamton.
 - **Scenic Overlooks:** At the east end of Boland Park (Village of Johnson City).

The Four Rivers Plan also includes sections on implementation strategies and funding, a tourism study with market analysis, and a waterfront resources inventory.

TOWN OF UNION ACTION PLAN FOR DISASTER RECOVERY (APDR)

In November 2011, Congress authorized a supplemental appropriation of \$400 million in aid for areas across the nation that had recently experienced natural disasters. This appropriation came through HUD's Community Development Block Grant-Disaster Recovery program (CDBG-DR). New York received \$71.6 million to help with recovery from Hurricane Irene and Tropical Storm Lee. The Town of Union received a direct appropriation of \$10.1 million.

These funds may be used for unmet needs for "disaster relief, long-term recovery, restoration of infrastructure and housing, and economic revitalization" in the hardest hit areas. Because the supplemental appropriation money is intended to help with needs not taken care of by other programs, the town had to assess the dollar amounts of aid already received by individuals, households, and municipalities, and determine what needs remain unmet. The Action Plan for Disaster Recovery includes a concise description of the effects of the 2011 flood on housing, businesses, and infrastructure for each affected neighborhood.

The CDBG-DR program requires that a minimum of 50% of the funds be spent in ways that directly benefit low and moderate-income persons or neighborhoods. The Town of Union requested, and received, a waiver to reduce

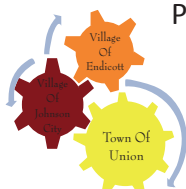
that requirement to 38%, because so much damage was done to critical infrastructure such as levees, roads, sewers, and water treatment facilities that serve areas where income levels are not more than 51% low or moderate.

Homeowners in the Town of Union estimated their unmet needs at about \$4.5 million, and businesses at \$3 million. The town determined it had an unmet need of \$2.7 million for repairs and improvement to public infrastructure that would help prevent damage from future floods. The dollar amounts to be allocated are given by activity category: planning, neighborhood facility repairs, park repairs, housing buyouts and rehabilitation, small business repairs and floodproofing, infrastructure, and utility repairs.

The APDR proposes to use the funds for the following activities:

- Owner Occupied Home Repair Program
- Homeowner Assistance Closing Costs/ Down Payment Assistance for homeowners displaced by the flood
- Rental Rehabilitation Program
- FEMA Buyout Program prioritized by level of damage and location
- Acquisition for future redevelopment (Westover initially, after expanded to include Fairmont Park and parts of South Endwell)
- Neighborhood Facilities Repairs
- Small Business Grant Program
- Business Floodproofing Matching Grant Program

TOWN OF UNION UNIFIED COMPREHENSIVE PLAN



Prepared by the Town of Union Planning Department with assistance from the Village of Johnson City Planning Department, the Planning Boards of the Town of Union and the Villages of Endicott and Johnson City, and the Endicott Fire Department.

Goals and Objectives

The following Goals and Objectives guide the Unified Comprehensive Plan:

- Implement the Action Plan to improve the quality of life.
- Expand the integration of the arts into the social environment, and provide affordable family entertainment.
- Provide employment opportunities in safe, well maintained attractive locations.
- Protect and maintain agricultural activities as a land use option in order to preserve open space.
- Provide a variety of living environments for all socioeconomic groups.
- Provide a variety of recreational opportunities for all age groups in a secure environment
- Promote an innovative technological environment.
- Promote a balance between the need to use and the need to preserve resources.
- Provide a transportation network capable of moving people and goods efficiently.
- Provide municipal services in an efficient and cost effective manner.

- Provide support services for special needs populations and improve their quality of life
- Promote regional cooperation.
- Provide a cost efficient quality education in a safe and secure learning environment.
- Promote historic preservation.
- Provide appropriate levels of police, fire, and EMS services in a cost effective manner.

The goals and objectives listed above are further elaborated in separate chapters.

- The **Infrastructure** section includes clear endorsements of green infrastructure: *“For new development, use the best current technology to minimize off-site storm water runoff, increase on-site infiltration, and minimize off-site discharge of pollutants to ground and surface water.”*
- The **Environmental Setting** section most directly addresses development in floodplains under Goal ENV-1: *“Prevent development on land that is topographically unsuitable”* and ENV-3: *“Assure that future developments are compatible with their surroundings, both natural and manmade.”* Stormwater management practices are promoted under ENV-5: *“Protect the aquifer and water resources (e.g. groundwater and surface water) from contamination.”* ENV-6 promotes the preservation of wetlands: *“Protect wetlands and other critical environmental areas from pollution and the negative effects of development.”*
- In the **Economic Development** section, Goal COM-3 provides support for clustering commercial development in

areas safe from flooding: “Commercial areas should be compact, grouped, and consolidated into functional areas to provide for their continued viability.”

Community Survey

Neighborhood meetings were held to identify issues of importance and areas of concern to residents. An eight-page survey was sent to 1,500 randomly selected registered voters in the town, and 574 responded. Their responses are summarized in the plan:

“What is also clear is that the respondents have very definite opinions about how to improve the quality of life in the community.” These opinions can be summed up in two phrases:

- Appearance matters.
- Consider consolidation/shared services.

Majorities “strongly agreed” that the Town should:

- Encourage high-quality mixed-use development.
- Require that commercial/industrial development be compatible with the scale and character of surrounding areas and that design standards should be implemented to ensure more attractive signage, landscaping and building facades.
- Require existing businesses to comply with newly adopted standards within a specific amount of time.
- Maintain public facilities to the same standards as imposed on businesses.
- Be proactive and aggressive in enforcing code compliance.

A majority of survey respondents also strongly agreed that the appearance of the building, parking lots, landscaping, cleanliness of premises, etc. are factors in selecting where they buy goods or services.

Neighborhood Profiles

The Unified Comprehensive Plan divided the municipality into 25 neighborhoods, and there are sections addressing each. The future development proposed for some are no longer viable after the floods of 2006 and 2011, and must be revisited. In many of these areas the plan acknowledges the presence of the floodplain, but advocates that in some of these areas, the base flood elevation has been raised in the new FIRMs and the degree of elevation required to be above it enough to make elevating properties not viable; and we now know that the floodplain areas may be necessary to maintain as floodwater storage areas to prevent future floodwaters from reaching previously never flooded areas.

- The [Fairmont Park](#) section of the Unified Comprehensive Plan calls for maintaining the existing blocks of medium density residential development and building out the open space surrounding it with mixed-use development, requiring that the first floors be above the flood elevation.
- At [West Corners](#), the area map shows full build-out, with no space shown for the neighborhood-scale stormwater management practices which may be necessary to protect the area from flash flooding, or for a development – free floodplain for Nanticoke Creek.



- In the **Riverhurst**, **Southside Riverview**, and **South Endwell** neighborhoods the plan allows for limited development and recreational areas where repeat flooding and buyouts had occurred, but these areas will likely have to be increased in size to respond to the 2006 and 2011 floods.
- **Westover** was hit hard by flooding for the first time in 2011, and future development patterns will have to be shaped according to the extent and effectiveness of flood mitigation measures that have yet to be planned, designed, or funded.
- In **Choconut Center**, future development will have to adjust to allow for the floodplain of Little Choconut Creek, and ensure enough space for green infrastructure to prevent adding to runoff volumes downstream in Johnson City.

Historic Resources

Sites of historic interest in the town are listed as:

- US Post Office, Endicott
- Endicott Square Deal Arch
- Riverside Cemetery, Endicott
- George W. Johnson Park Carousel, Endicott
- West Endicott Park Carousel, Endicott
- Highland Park Carousel, Endwell
- US Post Office, Johnson City
- Fred C. Johnson Park Carousel, Johnson City
- Goodwill Theater, Johnson City
- Your Home Library, Johnson City
- Johnson City Square Deal Arch
- Washingtonian Hall, Town of Union (flooded in 2011)

TOWN OF UNION FLOODPLAIN MANAGEMENT PLAN (FMP)

Approved November 2, 2005, and updated multiple times; latest update 8/2011. (Note: last update was before the flood of record in 9/2011.) Prepared by Town of Union Planning Department.

Residents of flood hazard areas are eligible for reduced rates under the National Flood Insurance Program (NFIP) if their municipality prepares and keeps updated a Floodplain Management Plan, and implements its recommendations. This FMP outlines the flood hazards and delineates strategies to minimize hazards and losses.

The FMP provides a detailed report of past floods from 1936 to 2006. The current flood of record, 2011, is not included in the FMP as it occurred just a month after the update was completed. It maps and describes the streets and neighborhoods that flood at the different flood stages, and to what depths they have flooded. The history of the levee system is given and their locations mapped.

Flood history by area:

- **Southwest Endwell:** (Argonne Avenue/River Road/Scarborough Drive/Chaumont Drive/Davis Ave/Shady Drive/Verdun Avenue/Fairmont Avenue)

(Note: Fairmont Ave is not in Fairmont Park) Flooded in 1936, 1983, 1996, 2004, 2005, and 2006. The area has some levee protection, but the cost of a complete and effective levee for this area has been deemed exorbitant. Mostly

residential, some commercial structures on Chaumont and Scarborough Drives. Businesses in this area have been lost to flooding. Flooding here has caused sewer backups well beyond the flooded area, affecting 500+ homes. Buyout numbers as of August 2011; 41 properties were involved.

Part of River Road is in the floodway. All development here must be elevated or flood proofed. Required base elevation for residential development is 8' above existing grade. The area was previously designated for conservation in 1979 Town of Union Future Land Use and Transportation Plan.

■ **Fairmont Park:**

This neighborhood is protected by a levee, but there are gaps. Despite numerous requests over the past two decades, the Town has been denied FEMA funding to fill in the gap.* The area floods when rising waters in the Susquehanna prevent small drainage ways and Grey Creek from draining, and then backwashes into the area. The area has suffered repetitive losses. New construction must be elevated several feet. The 1979 Town of Union Future Land Use and Transportation Plan previously designated the area for Urban Low Density use – single and double family residences on small lots. Surrounding area (Traditions and golf course) are designated recreational.

■ **Nanticoke Creek Area:** (West Corners/ Glendale Drive/West Endicott):

Flooding typically occurs due to backwash from Susquehanna, ice jams, and flash flooding. All of the area is within the (former) 100-year zone but levee protection for West Corners was considered high enough to protect from (pre 2006) 100-year flood level. Broome County operates several flood control dams upstream to detain water and try to prevent flash floods on the creek itself. There were no FIRMs in this area before 1980, and it is difficult to establish the flood area boundary. The report suggests designating both sides of NY26 as a conservation area as most of the land is subject to flooding.

■ **Little Choconut Creek/Choconut Center area:**

This area has experienced some flooding, mostly to roads, due to flash flooding and ice jams on the creek. Dams built upstream in the 1970s have reduced the risk. Concern was expressed about future industrial development at Airport Corporate Center possibly exacerbating flooding downstream.

■ **Westover:** (Home Depot, BAE/USAF factory, JC Waterworks, the former Goudey Power Plant, and residential neighborhood):

Flooded by backwash from the Susquehanna coming up Little Choconut Creek. System of levees, floodwalls and closures built in 1958-1960. There had been no flood damage since 1950s, including in 2006 (until the area was hit hard in 2011).



Recommended floodplain management actions include:

- **River Road/Argonne Avenue Buyout Program** – Pursue more buyouts, in addition to those already purchased and demolished since 1988. The area is to be maintained as open space.
- **Open Space** – Pursue waterfront trails.
- **Watershed Management Plan** – Work with the Towns of Maine and Chenango to discuss appropriate land uses for the Little Choconut Creek watershed.
- **Flood Warning Dissemination System** – Details the system and sequence of events and trail of responsibility for warning residents, notifying utilities, closing floodgates, activating pump stations and beginning evacuations. The town will work with Broome OES, NWS, and NYSDEC to improve dissemination and expand the river gauge program to cover Little Choconut and Nanticoke Creeks.
- **Property Owner Protection System** – Conduct outreach and education pamphlets are sent to property owners in flood zone, and a Flood Protection Library, reference materials, are available at GFJ Memorial Library (Endicott) and Your Home Public Library (Johnson City).
- **Drainage System Maintenance** – Check for and remove debris that hinders proper flow through drainage structures and small streams. Broome County is responsible for similar maintenance on dams and ponding areas, and NYSDEC handles the levees

system through an agreement with the US Army Corps of Engineers.

- **Storm Water Management** – The town code is in compliance with the National Pollutant Discharge Elimination System (NPDES) Program, and operates as a regulated MS4.

Flood Preparedness Plans are reviewed and some deficiencies identified. The Flood Response protocol is laid out, linking roles and responsibilities of officials to river flood elevation stages. Evacuation routes are given. The Town Highway Garage will be used as the Emergency Control Center.

Floodplain Regulations are reviewed. As of January 2008, new structures in the floodplain must have first floors a minimum of 2' above the base flood elevation. The Town of Union Building Official is maintaining elevation certificates developed by the town. *"In flood prone areas protected by levees such as West Corners and Fairmont Park, new building construction is allowed only when an amendment has been made to the Flood Insurance Rate Map from Zone A to Zone B."*

Development along NYS 26 (Nanticoke Creek area) is already limited due to lack of utilities, but the FMP suggests that further restrictions on development be considered.

The plan concludes with a list of recommended activities for 2011 (which were generated before the September flood) and a glossary of flood insurance terms.

TOWN OF UNION LOCAL CODES AND REGULATIONS



Evaluation of Existing Local Laws and Regulations

- **Aquifer Recharge and Watershed Protection Zones Ordinance (TOU Code Chapter 74, Local Law 5-1998; VOJC Code Chapter 272, L.L. VOE Code Chapter 242)**

This ordinance is intended to minimize the potential for contamination of the water supply to the town. Three special Aquifer Districts are identified on a Town of Union Aquifer Protection Map, and the means for determining their boundaries described. They are: Zone III, the Watershed Zone, Zone II, the Aquifer Recharge Zone, and Zone I, the Wellhead Protection Zone.

In Zone III, the following are prohibited:

- Disposal of construction and demolition debris
- Storage of agricultural chemicals, pesticides, herbicides, fungicides and fertilizers, except compost
- Uncovered storage of more than 100 pounds of salt or 500 pounds of manure

In Zone II, along with all the restrictions for Zone III, the following are prohibited:

- Storage of junk vehicles or metal salvage
- Land application or disposal of sewage sludge, and animal remains or wastes
- Uncovered storage of more than 100 pounds of salt or 500 pounds of manure

In Zone I, along with all the restrictions for Zones II and III, the following are prohibited:

- Excavations not subject to the New York State Mineral Resources Act that intersect the water table at its seasonal high level and remain open for a period of time exceeding six months
- Installation of any underground storage facility for toxic or hazardous materials or petroleum products
- Establishment of any solid waste management or waste treatment facility that would require a permit under 6 NYCRR 360, Chapter 10

The ordinance includes permit requirements, the application procedure, a public hearing requirement, designates the Building Code Official as the enforcement officer, and establishes a Town of Union Wellhead Advisory Committee to review applications and make a recommendation to the Planning Board, the permitting body. Penalties, a variance procedure, and the permitting consequences of changes in ownership are included.

- **Filling and Grading Ordinance (TOU Code Chapter 114, Local Law 11-2010; TOJC Code Chapter 134, L.L. 8-2012)**

This ordinance is intended to regulate filling and grading of more than 3 cubic yards annually on public and private lands to protect public safety and welfare, and prevent damage to drainage construction of Class 5 injection wells and watercourses in the town. It provides a permit system and regulations controlling how and where filling and earthwork may take place. Adoption of



a SWPPP or Erosion Control Plan protects against damage and erosion.

- **Flood Damage Prevention Ordinance** (Town Code Chapter 121, Local Law 6-1987 amended in its entirety by Local Law 5-2011; VOJC Code Chapter 156, L.L. 3-2011)

This ordinance is intended to minimize losses due to flooding. It puts in place a permit system and standards regulating design and construction of new structures, substantial improvements to existing structures, excavation or fill, and other land development that occur in the 1% annual chance flood zone and in areas of shallow flooding designated as AO or VO zones on the Flood Insurance Rate Map. The ordinance qualifies the town for continued participation in the National Flood Insurance Program.

To be permitted in the designated flood prone areas, uses must have low flood damage potential and not obstruct flood flows. Permitted are agricultural and recreational uses that do not require development in the floodplain, and paved parking lots. All other uses require a Special Permit issued by the Town Planning Board. Applicants must satisfy requirements according to what area their development occurs in (i.e., floodway, flood fringe, or flood hazard) along with any other reasonable conditions imposed by the Planning Board.

In the regulatory **floodway**, all uses including materials storage and fill as well as structures are by Special Permit only, and may not result in any increase in the base flood level. Any fill or structures not

expected to cause an increase in the base flood level must be protected against erosion and flood damage. In the **flood fringe** (inside the 1% flood hazard zone but outside the floodway, where base flood elevations have been determined), all uses are by Special Permit only as for the floodway, but there is no requirement that they not result in an increase of the base flood level. New or substantially improved residential structures must be elevated such that their lowest floor is 2 feet higher than the base flood elevation. For non-residential structures, the lowest floor must be a minimum of 1 foot higher than the base flood elevation, or they must be floodproofed to at least that elevation. Standards are given for filling to elevate buildings, and for storage of hazardous chemicals.

For **flood hazard areas** (inside the 1% flood hazard zone but outside the floodway, where base flood elevations are not given on the FIRM), uses are permitted as for the flood fringe area, but using base flood elevations as determined by several named agencies, or as certified by a Professional Engineer or Land Surveyor licensed in New York State.

The ordinance sets out the permit application requirements and process; the responsibilities of the local administrator, and the process for certification of elevation and floodproofing during construction. Standards are given for floodproofing, anchoring, utility design and location according to flood hazard area. An appeals process and conditions for variances are set forth.

■ Erosion and Sediment Control Ordinance
(Code Chapter 171, Local Law 1-2007)

This ordinance is intended to establish minimum stormwater management requirements and controls in order to minimize increases in stormwater runoff from land development activities and reduce stormwater runoff rates and volumes in order to reduce flooding, pollution and soil erosion, among other hazards. It requires land development activities to conform to the requirements of the NYS Department of Environmental Conservation State Pollutant Discharge Elimination System (SPDES) General Permit for Construction Activities, Permit No. GP-02-01.

All land development activities subject to review and approval by the Planning Department, Planning Board, Zoning Board of Appeals or Town Board of the Town of Union under subdivision, zoning, site plan, and/or Special Permit regulations are subject to the standards contained in this chapter, and must submit a SWPPP to the Stormwater Management Officer, except for exempted activities such as: agricultural and silvicultural activities; routine maintenance that disturbs less than 5 acres (note: NY State law requires a SWPPP for activities that disturb more than one acre, including maintenance activities); graves in cemeteries; installation of fences, signs and utility poles; and landscaping or gardening activities associated with an existing structure.

■ Subdivision Ordinance (Code Chapter 181,
Local Law 3-1990)

This ordinance applies to all subdivision of lots within the town. One of its stated objectives is that “subdivision design shall avoid or minimize natural hazards.” The ordinance states that that all land development shall be in accordance with the Future Land Use and Transportation Plan and the Zoning and related land management codes.

Procedures for sketch plan, preliminary plan, and final plan submissions and review are laid out, as well as the procedure for street acceptance after construction. Under General Standards, the ordinance specifically states: “Land subject to severe topographic limitations for development and/or deemed to be unsuitable for human habitation because of health, safety or sanitary problems shall not be platted for residential occupancy, nor for such other uses as may involve danger to health, life or property or as may aggravate a flood hazard.”

Guiding principles for stormwater management design are given which echo and reinforce the requirements of the NYS Department of Environmental Conservation State Pollutant Discharge Elimination System (SPDES) General Permit for Construction Activities, Permit No. GP-02-01. Very specific standards are laid out for stormwater drainage utilities and practices and the control and prevention of erosion. These standards should be reviewed on a regular schedule by engineering staff or consultants to ensure they are kept up with evolving best practice.



It is noted that “all structures or uses in the floodplain are subject to the floodplain provisions of Chapter 121, Flood Damage Prevention.”

■ **Consolidated Zoning Ordinance of the Town of Union, Village of Johnson City, and Village of Endicott, New York, FINAL DRAFT 2-8-2011.**

This ordinance applies to all land development within the Town of Union and the Villages of Endicott and Johnson City. It refers to a consolidated Zoning Map covering all three municipalities. It creates Residential, Commercial, and Industrial zoning districts, with sub-categories within each.

There are six residential categories:

- RR – Rural Residential
- SF – Urban Single Family
- SSF – Suburban Single Family
- UTF – Urban Two Family
- UMF – Urban Multi-Family
- SMF – Suburban Multi-Family

There are four commercial categories:

- NC – Neighborhood Commercial
- CB – Central Business
- GC – General Commercial
- CO – Commercial Office

There is one industrial category:

- I – Industrial

There are also five Overlay Districts:

- OO - Office Overlay District
- HRO – Hooper Road Overlay District
- OS – Open Space Overlay District
- MHP – Mobile Home Park Overlay District

- AR – Aquifer Recharge and Watershed Protection Overlay District

- The **Rural Residential District** includes most of the steeper slopes and higher elevations in the town and is concentrated in the sparsely settled northern half of the town. Fingers of the RR District extend south along the steeply sloping east side of the Nanticoke Creek valley and along the west side of Robinson Hill Road. It includes almost none of the mapped flood hazard zones, though many parts of the RR area are subject to flash flooding of small stream corridors in the hills.

Single and two-family homes are the only residential types allowed in the RR District. In areas with municipal water and sewer service, minimum lot size is 15,000 sf (just under 3/acre) for single-family homes and 4,000 sf /du for two-family homes (just under 11 du/acre, or 5.4 buildings). In areas with no municipal water and sewer, minimum lot sizes are 40,000 sf (just under 1/acre) for a single family home and 20,000 sf/du (2/acre) for a two-family home. Setbacks and bulk requirements are given as well.

Non-residential uses allowed by right in the RR District are educational and religious institutions and public or municipal facilities, kennels, nurseries or greenhouses, and open-field agriculture. Uses that may be allowed by Special Permit are health care and telecommunications facilities, public utilities, nursery schools and daycare centers, parks, cemeteries, camps, stables, animal husbandry, and agribusiness facilities. In areas with municipal water and

sewer service, minimum lot size for non-residential uses is 15,000 sf, and where no services are present, 40,000 sf.

- The **Suburban Single Family District** extends over the existing suburban style neighborhoods on the hillsides above and north of the flatter valleys. The Zoning Map extends the SSF District a bit outward into what is now undeveloped land, and provides for some future infill of undeveloped “island” areas within the current suburban neighborhoods, but largely confirms the existing pattern of development. The SSF District includes very little of the mapped flood hazard zones, though parts are subject to flash flooding of small stream corridors.

The code states “The SSF District is intended for areas with access to public water and sanitary sewer service.” Single-family detached homes are the only type of residences permitted by right in the SSF District. Minimum lot size is set at 9,000 sf (just under 5/acre) where water and sewer are present, and matched the RR District at 40,000 sf where they are not. Minimum lot size for non-residential uses is 10,000 sf (4.3/acre) with water and sewer, and 40,000 sf without. Religious institutions and municipal facilities are the only non-residential uses allowed by right. Uses allowable by Special Permit are educational and telecommunications facilities, public utilities, parks, and nursery schools.

- The **Suburban Multi-Family District** is made up of scattered areas where multifamily residences already exist: along Reynolds Road, in the Western Heights/Dallas Court neighborhood off Glendale Dr., the low-

lying Oxford St./River Drive/Rockwell St. neighborhood east of Nanticoke Drive, and a few smaller parcels in Endwell and Endicott. The Oxford St./River Drive/Rockwell St. neighborhood flooded in both 2006 and 2011 and is in the 1% flood hazard zone, while the other SMF areas are out of the floodplain, though still subject in places to flash flooding of small stream corridors.

Residential types allowed in the SMF District are single-family detached and attached, two-family and multi-family homes. Group-care homes and boarding houses are allowable by Special Permit. Non-residential uses allowed by right are educational, religious, and public institutions only. Special Permits may be issued for healthcare facilities, utilities and telecommunications facilities, professional and medical offices, nursery and daycare centers, private clubs, parks, and cemeteries.

With water and sewer service, the minimum lot size for single family detached homes and non-residential uses are both 7,000 sf (6.2/acre) and for all other residential uses, 3,000 sf/du (14.5 du/acre). Setbacks and bulk requirements are given as well.

- The **Urban Single Family District** occupies the outer edges of the older residential parts of Endicott and Johnson City. These neighborhoods have a rectangular street grid and lot layout and generally surround the denser urban core and commercial districts. There are a few scattered areas of USF designated around the Hooper Road shopping center and at the Fairmont Park neighborhood in Endwell, around the intersection of East Maine Road and Airport



Road (Choconut Center) in Johnson City, and covering the smaller-lot-sized neighborhood around Schuyler St. in the western part of the town. The USF District includes most of the neighborhoods that have seen recurrent serious flooding, and in which buyouts are taking place: Southwest Endwell, Fairmont Park, Riverview, Choconut Center, and Westover.

Single-family detached and attached homes are allowed in the USF District, with two-family homes allowed by Special Permit. Religious institutions are the only non-residential use by right. Educational and municipal facilities, utilities and telecommunications facilities, nursery schools, and parks are allowed by Special Permit. The Urban Single Family District occurs only where there is municipal water and sewer, and minimum lots sizes are 4,000 sf (10.9/acre) for single family detached homes, 3,000 sf/du (4.5 du/acre) for all other types of homes, and 10,000 sf (4.4/acre) for non-residential uses.

- The **Urban Two-Family District** falls within the Village of Endicott, and occupies the Little Italy neighborhood and surroundings north of Watson Boulevard, the homes around Roundtop Park, and the neighborhood surrounding the old Union downtown area at Main and Nanticoke Avenue. This last area is mostly within the 0.2% flood hazard zone on both the existing and preliminary updated FEMA maps, but did not flood in either 2006 or 2011. Single-family detached, attached, and two-family homes are allowed by right, as are religious and municipal institutions. Special Permits are needed for educational and municipal

facilities, utilities and telecommunications facilities, nursery schools, daycare centers, and parks.

The Urban Two-Family District occurs only where there is municipal water and sewer, and minimum lots sizes are 4,000 sf (10.9/acre) for single family detached homes, 2,500 sf/du (17.4 du/acre) for single family attached homes, 3,000 sf/du (4.5 du/acre) for two-family homes, and 7,000 sf (6.2/acre) for non-residential uses.

- The **Urban Multi-Family District** occupies parts of the older urban cores of Endicott and Johnson City. In JC, it runs south from Main Street, on the east side of NY Rte 201, to encompass the neighborhoods north and south of the railroad tracks and east to the City of Binghamton line. In Endicott, it covers the neighborhood between the commercial center of Washington Avenue to Vestal Avenue. With a large gap for the former Kmart shopping center and Jennie F Snapp School, it takes in a cluster of apartments and multi-family homes either side of Vestal Avenue near the river. Scattered smaller areas occur in other parts of the town and villages where apartments are centered. This district, like most of them in the zoning code, appears to have been laid out in response to already existing uses, without much allowance for future growth and reorganizations.

Most of the UMF District did not flood in 2006 or 2011. However, the preliminary FEMA maps have placed much of the area near Vestal Avenue, Harrison, and Broad Streets in Endicott in the 1% annual chance flood hazard zone.

The UMF District is intended to offer a broad mix of housing types, from one and two family homes to apartments and townhouses. Residential types allowed in the UMF District are the same as those in the Suburban Multi Family District: single-family detached and attached, two-family and multi-family homes, with group-care homes and boarding houses allowable by Special Permit. Non-residential uses allowed by right are educational, religious and public institutions only. Special Permits may be issued for healthcare facilities, utilities and telecommunications facilities, professional and medical offices, nursery and daycare centers, private clubs, parks, and cemeteries.

With water and sewer service, the minimum lot size for single-family detached homes and non-residential uses are both 7,000 sf (6.2/acre) and for all other residential uses, 3,000 sf/du (14.5 du/acre). Setbacks and bulk requirements are given as well.

The Urban Multi-Family District occurs only where there is municipal water and sewer, and minimum lots sizes are 4,000 sf (10.9/acre) for single family detached homes and 2,500 sf/du (17.4 du/acre) for all other types of housing. The minimum lot size for non-residential uses is 7,000 sf (6.2/acre).

- The **Neighborhood Commercial District** is intended to encourage small neighborhood-scale commercial uses that offer convenient retail and services for nearby residential areas. It comprises the outer edges of the central business districts of Johnson City

and Endicott; the former Kmart Plaza east of Vestal Avenue; and various commercial clusters along Nanticoke Avenue, Hooper Road, Watson Boulevard, Harry L Drive, and George F Highway.

The NC areas along Nanticoke Avenue and George F Highway are in the current 0.2% flood hazard zones as is the old Kmart Plaza. In the new FEMA maps, most of those areas are placed in the 1% hazard zone.

Uses permitted by right include professional offices; dance, art, and music studios; and individual retail or service shops. Nursery schools, religious institutions, public facilities, and single- or multi-family housing are also allowed by right. Uses that may be allowed by Special Permit are veterinary clinics, funeral homes, taverns, restaurants (other than fast food), theaters, gas stations, and auto repair shops. Institutional uses allowed by Special Permit are the same as for all four commercial districts: educational, municipal, telecommunication or healthcare facilities. Minimum lot sizes are 7,000 sf (6.2 acre) for all uses.

- The **Central Business District** is intended to maintain the traditional mix of uses in a compact pedestrian-oriented downtown at the core of the villages. There are three clusters: the Union District, for a few blocks around Nanticoke Avenue and Main Street; downtown Endicott, for a block either side of Washington Avenue; and downtown Johnson City, a five block stretch along Main Street near Arch and Broad Streets. None of these areas are within a flood hazard zone.



Uses permitted by right include professional offices; dance, art, and music studios; individual retail or service shops; veterinary clinics; laundromats and dry cleaning outlets; restaurants (including fast food); taverns; bowling alleys; theaters; and lodgings. Nursery schools, religious institutions, public facilities, and apartments, multi-family homes, and boarding houses are also allowed by right, but single-family houses are prohibited.

Uses that may be allowed by Special Permit are shopping centers, funeral homes, and conference centers. Outdoor sales and display are allowed. Institutional uses allowed by Special Permit are the same as for all four commercial districts: educational, municipal, telecommunication, or healthcare facilities.

No minimum lot size is set for the Central Business District; acceptance of the lot will be made as part of the Site Plan Review process.

- The **General Commercial District** provides areas for more intensive commercial uses that depend on high-volume vehicular traffic. It lines the larger road arteries and is distributed widely across the town and villages. A large area on either side of Nanticoke Avenue at the northern end of the town is designated GC; much of it there is in the 1% flood hazard zone, especially along the east side of the road. The GC District lines the North Street corridor from Page Avenue east to Oak Hill, and the Main Street corridor from Page Avenue east to the RT. 17/I86 overpass. Where the GC

District extends south from Main Street all the way to the river, the lower half is in the 1% flood hazard zone.

A large area north of the RT. 17/I86 interchange at Airport Road in Johnson City is designated GC, as is the western end of Westover, around Home Depot. This area flooded badly in 2011 and is in the 1% flood hazard zone. Smaller clusters of GC occur at the western edge of the town along 17c, at the Park Manor Plaza shopping center on Hooper Road, and at the eastern edge of Johnson City near Main Street.

Uses allowed by right are professional offices; dance, art, and music studios; banks and individual retail or service shops and shopping centers; veterinary clinics; laundromats and dry-cleaning outlets; restaurants (including fast food); taverns; bowling alleys; theaters; conference centers and lodgings; and stand-alone drive-through establishments. Nursery schools, religious and educational institutions, public facilities, and utilities are also allowed by right, as are apartments over retail establishments and multi-family dwellings.

Uses that may be allowed by Special Permit are kennels, funeral homes, "adult uses," gas stations and car washes, auto sales and repair, health care facilities, telecommunications facilities, and group care homes.

Minimum lot sizes for all uses are 15,000 sf (2.9/acre) where there is water and sewer service, and 40,000 sf (1.1/acre) where there is not.

- The **Commercial Office District** permits a mix of residential and office or non-retail commercial uses along primary and secondary roads with traffic volumes becoming too high for comfortable single-family living. CO occurs in only a few small and widely scattered locations: A few parcels on Oakdale Road just north of the railroad overpass in Westover, which are in the 1% flood hazard zone; scattered parcels along Hooper and Country Club Roads; the intersection of Park and Jefferson Streets in Endicott, and at Carl Street and West Avenue, just out of the flood hazard zone in West Corners.

Uses by right in the CO District are professional offices, banks, nursery schools, religious institutions, public utilities or facilities, and single- and multi-family dwellings. Allowed by Special Permit are veterinary clinics, funeral homes, schools, and healthcare and telecommunication facilities. Minimum lot sizes where water and sewer are provided are 10,000 sf (4.4 du/acre) for residential uses and 20,000 sf (2.2/acre) for non-residential uses. Where no water and sewer service are present the minimum lot size for all uses is 40,000 sf (1.1/acre).

- The **Industrial District** permits a wide range of industrial, manufacturing, and distribution activities. Residential uses are not permitted. It covers extensive areas of formerly active manufacturing complexes now partially or completely inactive. On the western edge of the town north of 17C the former IBM Glendale Technology Park complex is just out of the flood hazard zone. The large area south of 17C designated as

Industrial District (the Tri-Cities Airport, open to small planes only) is not only in the 1% flood hazard zone, but partially in the floodway. A large area designated ID which is out of the flood hazard zone covers the former IBM Endicott complex, extending along North Street all the way from Vestal Avenue east to Avenue B.

A smaller cluster of parcels in Southwest Endwell around Scarborough Dr. and Chaumont Dr. have been subject to repetitive flood damage and most of the small industrial properties there have been or are being bought out, along with many residences in the area. Another small cluster of ID at the northeast corner of Hooper Road and George F Highway is subject to flooding.

The area designated ID between the railroad tracks and RT. 17/186 in Johnson City is in the 1% flood hazard zone and flooded badly in 2006 and 2011. The ID area in Westover was protected by a temporary floodwall in 2006, but flooded so badly in 2011 that the former large BAE plant there is to be demolished. Additional parcels designated ID extend along both railroad tracks, those north of Main Street and those south of it that cross the river into Vestal. Most of these east of NYS 201 are outside the flood hazard zone.

A wide range of industrial, manufacturing, and commercial uses are permitted either by states that additional uses not specifically named may be allowed by Special Permit at the discretion of the Planning Board. Minimum lot sizes are 10,000 sf (4.4/acre) where water and sewer services are



present, and 40,000 sf (1.1 acre) where they are not.

Five **Overlay and Special Purpose Districts** are included in the Zoning Code. They are:

- OO- Office Overlay District
 - HRO – Hooper Road Overlay District
 - OS – Open Space District
 - MHP - Mobile Home Park District
 - Aquifer Recharge and Watershed Protection District
- The **Office Overlay District** allows professional, medical, and dental offices within existing buildings in a residentially zoned district. Lot, area, and setback requirements remain the same. The **Hooper Road Overlay District** allows for the conversion of residential properties along Hooper Road to neighborhood commercial ones. They must conform to the bulk requirements of the NC District, and the following additional restrictions: there will be no parking between the building and the street, internally lit signs are prohibited, and the building design must be residential in scale and character.
 - The **Open Space District** limits uses that may be made of areas zoned OS to uses deemed more compatible with and respectful of their special character. Parks, cemeteries, arboretums and gardens, marinas, and trails are allowed by right. Uses that may be allowed by Special Permit are active recreation facilities and sports fields, outdoor theaters and bandshells, cultural facilities, golf courses, zoos, schools, and public utilities. Maximum building heights are prescribed.
 - The **Mobile Home Park Overlay District** allows for rezoning for mobile home parks under the same procedures as set out for a Planned Unit Development. It includes specific requirements for utility services.
 - The **Aquifer Recharge and Watershed Protection Overlay District** description refers the reader to the Aquifer Recharge and Watershed Protection Ordinance. It establishes zones of protection to limit the potential contamination of the municipal water supply.
 - A **Planned Unit Development District** option is also provided in the Zoning Code, which can promote resiliency by offering the ability to cluster development in suitable areas while leaving flood prone or environmentally sensitive areas as protected green space. Properties to be zoned PUD in the town must be 10 acres or more in size, and 2 acres or more in the villages. A minimum of 25% must be set aside as common open space. The only uses specifically prohibited in the PUD are adult entertainment; auto-related businesses such as dealers, repair shops, and car washes; cemeteries; junkyards; dry cleaning plants; and a number of heavy industrial uses.
- Finally, supplementary use requirements are included for a number of specific uses. Typical development standards are laid out, addressing noise, parking, signage, lighting, landscaping, screening, etc. There are some design standards given for non-residential development. Review, approval, variance, amendment, and appeal procedures are set out.

*Understanding community demographics
is central to rebuilding with resiliency.*



The Town of Union has a wide range of housing options.



VI. Demographic Impacts

Resilience in the face of natural disasters is largely the result of the physical scale of the disaster and the socioeconomic conditions of the impacted community. Understanding Union's demographics is central to rebuilding in a resilient way.

- Union's **significant percentage of low and moderate income residents (54.1%)** and residents living below the poverty line (10% town-wide and much higher in the villages) limits the town's ability to absorb losses and enhance recovery efforts. Wealth allows communities to recover more quickly due to the availability of insurance, savings, and social safety nets. In some measure, this is a function of the fact that many households

are living on retirement, disability or Social Security incomes. These low-income figures make it difficult to attract additional retail outlets to the town, given the limited spending potential and may make it more difficult for existing business to recover quickly after disasters.

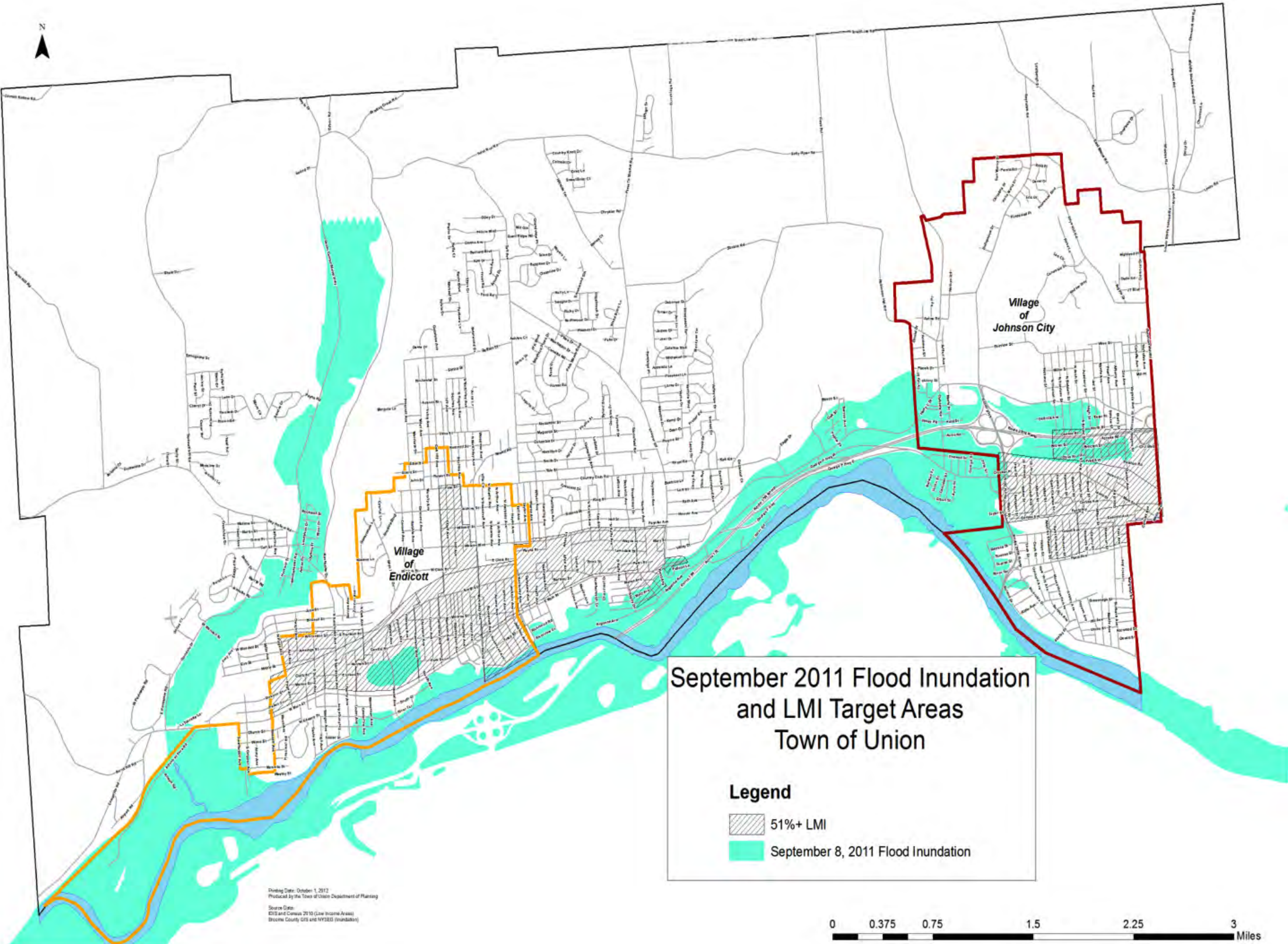
- The town's **percentage of single headed households (17%)** can challenge the recovery effort, often due to lower wages and family care responsibilities of these households. These households are particularly vulnerable to losing time and money caring for children when daycare facilities are adversely affected by natural disasters.



The value, quality, density, and age of Union's housing affect the recovery effort and the likelihood that owners will rebuild.

- While housing is inexpensive relative to other parts of the nation, the **housing stock is older (66% built before 1940)** and may require upgrades to meet current needs, as well as needing on-going maintenance and repairs. The value, quality, density, and age of Union's residential construction affect potential losses, the recovery effort, and the likelihood that owners will rebuild from the damage. The location of some of the most affordable housing and related services in the 100 year floodplain make this population more at risk for personal and financial loss and isolation from community services and health care during immediate relief efforts. Losses of affordable housing in the town's only older manufactured home parks in Union has occurred in the past two floods suggesting that there is a need for affordable housing, although clearly in a more resilient form.
- A **high percentage of town renters who are cost burdened (40% town-wide, though much higher in the villages)** may lack access to information about financial aid during recovery. In some cases renters may lack sufficient shelter options when housing becomes uninhabitable or too costly to afford, forcing them to look for temporary shelter outside of the town and increasing the likelihood that existing multi-family structures will remain vacant and underutilized.

Figure 5: September 2011 Flood Inundation and LMI Target Areas

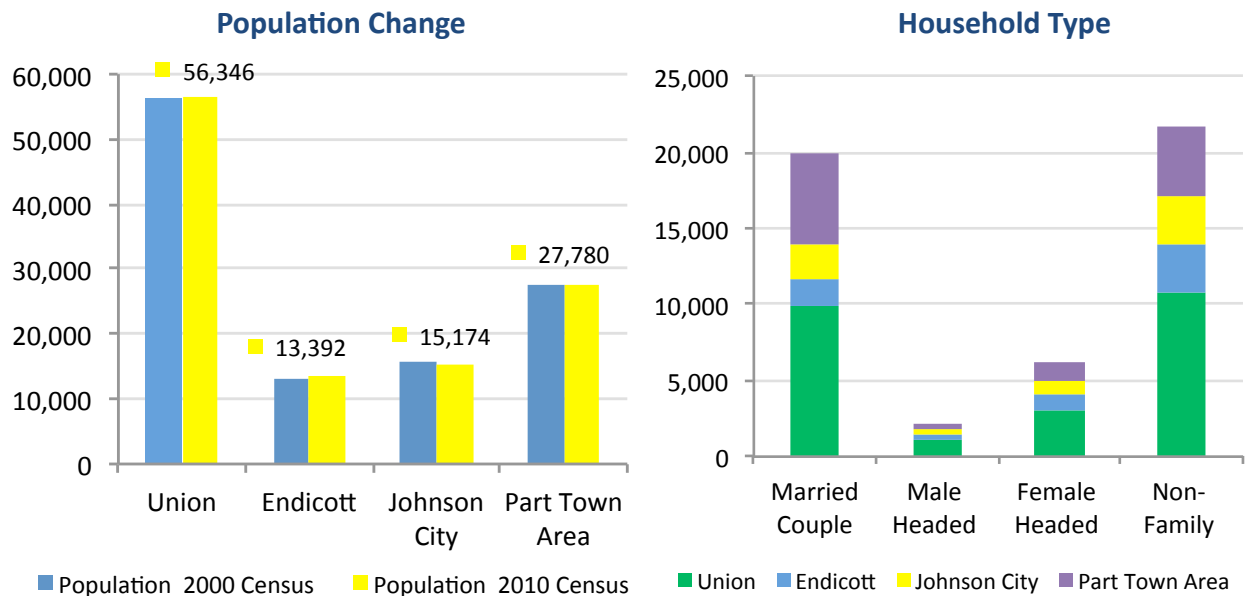


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The local unemployment rate is affected by a company's ability to maintain production following a disaster.

- Those **people living in poverty (17% of Union's population)** who are dependent on social services are already economically and socially marginalized and require additional support in the post-disaster period. Special needs populations (infirm, mentally or physically disabled, homeless) are disproportionately affected during disasters.
- **Growing numbers of vulnerable seniors, (18% town-wide)** some with physical or mental impairments and many lacking private transportation, are especially vulnerable and require a higher level of care during recovery. In light of the number of senior residents, the age of the housing stock, and the high cost of housing, the development of affordable senior housing would benefit the community.
- The town population is fairly well-educated, but **only 23% of residents hold a bachelor's degree or higher** which is low compared to state and national figures. A well-educated population often has the skills and resources to recovery more quickly from natural disasters.
- The potential loss of employment, days of operation lost, and lack of access to facilities all threaten the ability of companies to maintain production following a disaster. This exacerbates Union's already **high unemployment rate (7.5% in August 2013)**, contributing to a slower recovery from the disaster.



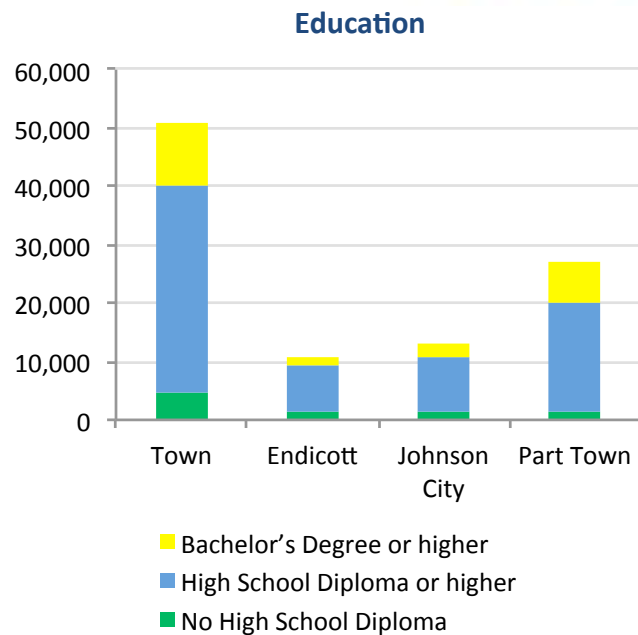
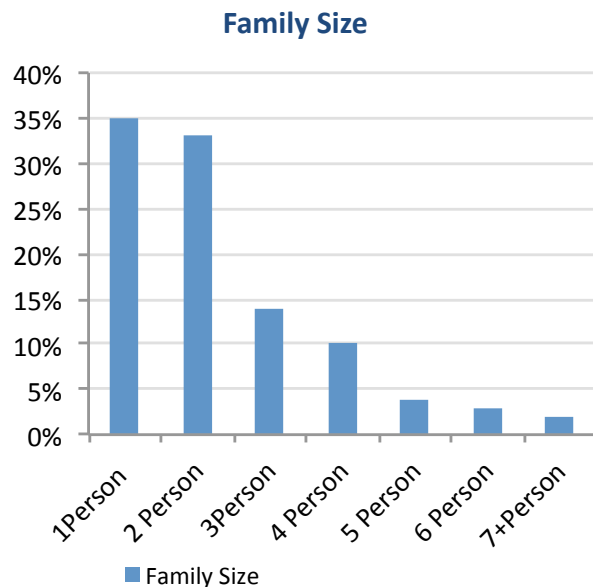
- The Town of Union is an employment and commercial center for the area.** Union does have strong manufacturing and public administration components although major retail took a hit during the recent storm events. In some locations property owners report that unresolved flooding concerns put a damper on recruitment of tenants, including some poised to bring hundreds of jobs to the town. Given low incomes of local residents, new businesses attracted to town should cater to a more diverse regional customer base.
- Union's increasing racial and ethnic diversity** can pose language and cultural barriers that affect access to preparedness and post-disaster information, funding, and social services.

UNION'S DEMOGRAPHIC BACKGROUND

The Demographic Background section of the Long Term Community Recovery Plan (LTCRP) analyzes 2000 and 2010 Census data and estimated 2010 American Community Survey Data (ACS) for the Town of Union as a whole, Village of Endicott, Village of Johnson City, and the "Part Town" area (outside the villages). The additional demographic impact of the flood events (temporary or permanent population loss, business disruption, and lack of discretionary spending, among others) is not reflected in the census statistics that form the basis for this demographic profile.

Population and Households

Union is a nearly thirty square mile town located in the Southern Tier region of upstate New York in the western portion of Broome County along the Susquehanna River. Union encompasses the Villages of Endicott and Johnson City, and several hamlets including



Westover, Fairmont Park, West Corners, and Choconut Center.

According to the 2010 Census, the town's population was 56,346. The Village of Endicott's population was 13,392 and the Village of Johnson City had a population of 15,174. Union is bordered by the Town of Maine to the north, the Town of Vestal to the south, the Towns of Chenango and Dickinson and the City of Binghamton to the east, and the Town of Owego (Tioga County) to the west. Between 2000 and 2010, the population of the region was relatively stable. The part town area (outside the villages) and the Village of Endicott experienced slow growth, less than 1% in the town and 2.7% in the village. The Village of Johnson City experienced a decline of 2.3%. In 2010, Broome County's population was 200,600, a slight increase of only sixty-four persons from 2000. The Town of Union accounts for 26.6% of Broome County's overall population base.

During the same period, the State of New York experienced a 2.1% increase in population.

Examining census data at the household level presents a complete picture of current trends. Persons occupying a household (a single housing unit) may be a single family, one person living alone, two or more persons living together, or any other group of related or unrelated individuals who share living arrangements. The number of households increased modestly in all communities except Johnson City.

In 2010, nearly 40% of the households in Union were considered traditional nuclear families, with a husband, wife, and related children under age eighteen. Family households are groups in which at least one other person is related to the householder. A family could be a married couple, or a single mother and a child, or two adult brothers. A family with children has at least one person under age 18 related

Table 1. Population and Households

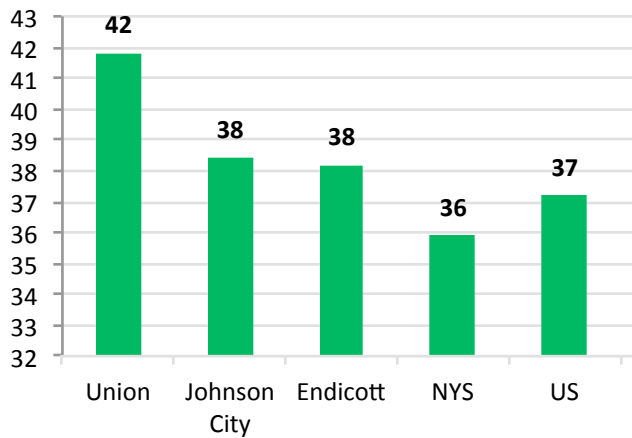
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
POPULATION AND HOUSEHOLD CHANGE				
<i>Population Change</i>				
2000 Census	56,298	13,038	15,535	27,725
2010 Census	56,346	13,392	15,174	27,780
% change	0.1%	2.7%	-2.3%	0.2%
<i>Household Change</i>				
2000 Census	24,538	5,996	6,981	11,561
2010 Census	24,918	6,058	6,732	12,128
% change	1.5%	1.0%	-3.6%	4.9%
HOUSEHOLDS BY TYPE				
<i>Average Household Size</i>				
2000 Census	2.24	2.09	2.12	2.40
2010 Census	2.21	2.14	2.19	2.27
% change	-1.3%	2.4%	3.3%	-5.4%
<i>Married Couple Families</i>				
2000 Census	11,052 (45.0%)	1,941 (32.4%)	2,587 (37.1%)	6,524 (56.4%)
2010 Census	9,926 (39.8%)	1,701 (28.1%)	2,283 (33.9%)	5,942 (49.0%)
% change	-10.2%	-12.4%	-11.8%	-8.9%
<i>Male Headed Households</i>				
2000 Census	830 (3.4%)	280 (4.7%)	229 (3.3%)	321 (2.8%)
2010 Census	1,110 (4.5%)	342 (5.6%)	306 (4.5%)	462 (3.8%)
% change	33.7%	22.1%	33.6%	43.9%
<i>Female Headed Households</i>				
2000 Census	2,674 (10.9%)	796 (13.3%)	837 (12.0%)	1,041 (9.0%)
2010 Census	3,074 (12.3%)	951 (15.7%)	913 (13.6%)	1,210 (10.0%)
% change	15.0%	19.5%	9.1%	16.2%
<i>Non-Family Households</i>				
2000 Census	9,982 (40.7%)	2,979 (49.7%)	3,328 (47.7%)	3,675 (31.8%)
2010 Census	10,808 (43.4%)	3,064 (50.6%)	3,230 (48.0%)	4,514 (37.2%)
% change	8.3%	2.9%	-2.9%	22.8%)



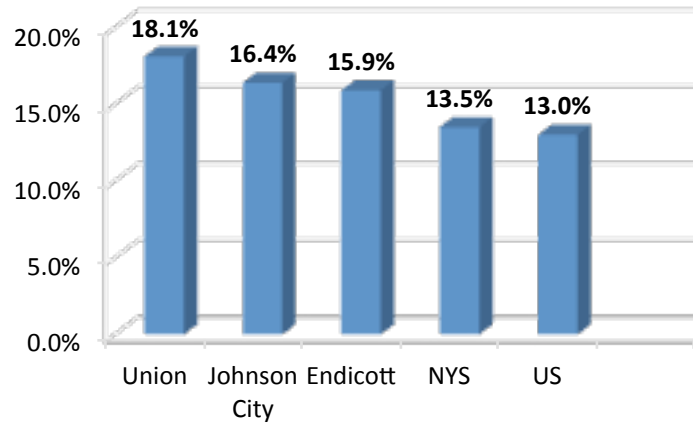
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
HOUSEHOLD SIZE				
1 Person				
2000 Census	34.5%	41.6%	40.3%	27.2%
2010 Census	35.7%	41.1%	38.4%	31.5%
% change	5.2%	-0.3%	-8.1%	21.3%
2 Person				
2000 Census	33.2%	30.3%	30.8%	36.2%
2010 Census	33.5%	29.7%	31.8%	36.3%
% change	2.4%	-1.0%	-0.3%	5.2%
3 Person				
2000 Census	14.7%	13.3%	13.9%	15.8%
2010 Census	14.4%	13.7%	13.8%	15.1%
% change	-0.1%	4.0%	-4.1%	0.3%
4 Person				
2000 Census	11.4%	9.0%	9.3%	13.9%
2010 Census	10.1%	9.0%	9.0%	11.3%
% change	-9.7%	1.1%	-7.1%	-14.4%
5 Person				
2000 Census	4.4%	4.1%	3.9%	4.9%
2010 Census	4.1%	4.0%	4.3%	4.0%
% change	-6.5%	0.0%	5.9%	-15.3%
6 Person				
2000 Census	1.4%	1.3%	1.2%	1.5%
2010 Census	1.4%	1.6%	1.6%	1.1%
% change	1.8%	26.9%	28.0%	-21.8%
7+ Person				
2000 Census	0.5%	0.4%	0.7%	0.4%
2010 Census	0.9%	0.9%	1.2%	0.7%
% change	75.2%	116.0%	66.0%	63.3%

Source: 2000 and 2010 Census

Median Age



Percent Senior Population



by birth or adoption to the householder. Non-family households including single-person households and households of unrelated persons (such as roommates or domestic partners) account for just over 40% of the households in the Town of Union.

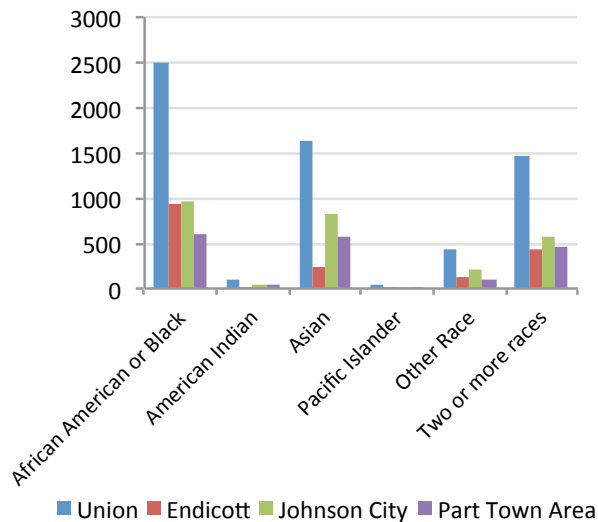
Fewer households in the town match the conventional notion of the nuclear family. Similar to national trends, nearly 17% were headed by a single parent. The number of larger households (6+ persons) also increased, reflecting the growing number of multigenerational households consisting of related families living together that include a grandparent, parent, and children as well as other family members. Though a relatively small percentage of overall populations, the number of male-headed households increased significantly, thought to reflect the relatively high divorce rate nationwide.

Age

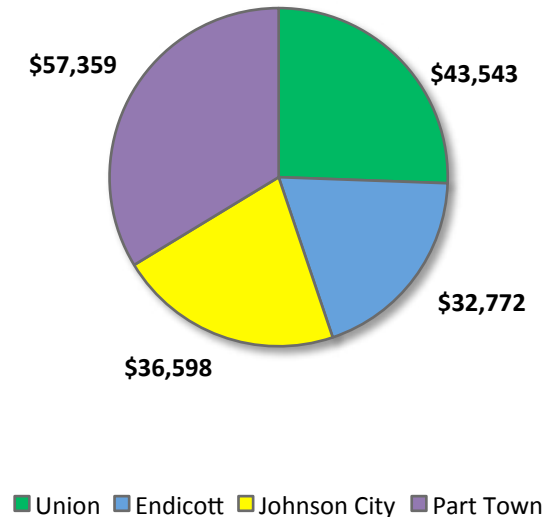
Like the rest of the world, the United States is an aging society. The protection of vulnerable populations, including seniors, is an important concern for long term recovery planning. In 2010 the median age of Union residents was 41.8 years. This compares to 39.5 in 2000, showing an aging of the town's population of 2.3 years in ten years' time. In comparison, the median age of NYS residents is 35.9 and for the US resident it is 37.2. The villages had a slightly lower median age of 38.2 in Endicott and 38.4 in Johnson City.

Like the nation and the state, the town and village's adult population in their peak earning years (45-64) grew significantly at a double digit pace. Growth in the number of seniors over age 65 was uneven, for example growing by 16% in the part town area, while declining 26% in Johnson City. This shift reflects, in part, a census district map correction that properly relocated an existing senior housing

Race: Minority Population



Median Household Income



development from the Village of Johnson City to the part-town.

Only Johnson City saw an increase in pre-school children, and all municipalities reporting a decrease in school age children. New York State data shows declining school enrollment in all Broome County communities between 2009 and 2011. The Union-Endicott Central School district reported enrollment decline of almost 7%, with a decrease in staff of 1.5%. Maine-Endwell reported a slower rate of decline at 1%, but reported a loss of just over 6% of staff. Although the Johnson City school district reported a decline of just over 2% of students they saw an increase of 5.5% in the number of staff. Declining enrollment, elimination of enrichment programs (art, music, theater), and rising school taxes have a number of potential consequences including negative impacts on the local housing market.

Educational Attainment

Educational attainment in the Town of Union in 2010 grew in all municipalities in the categories for High School Diploma and Bachelor's Degree or Higher. All of the town's municipalities surpassed the state average at both levels.

Race

Racial composition of Union's population is in flux. Just over 7,000 town residents are minority (almost 13%), with the African American population representing 32.7% of all minorities and 4.1% of the town's population. The minority population increased in nearly every community and in every category with the exception of Native Americans, which decreased or remained unchanged across the board. Though still the vast majority of the population (over 81% percent in all communities), the percentage of white residents declined in all municipalities.

Table 2. Age, Education, and Race

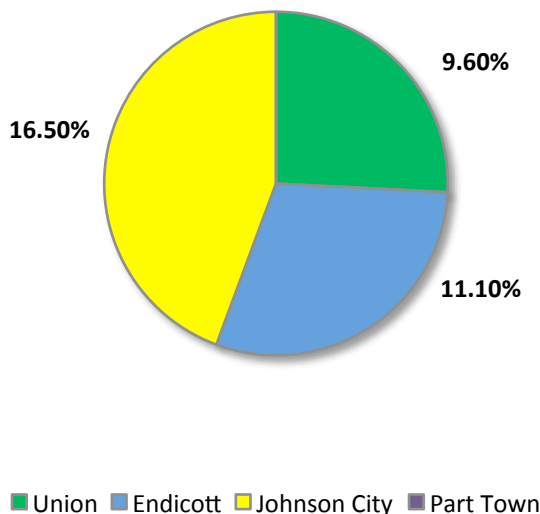
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
AGE CHARACTERISTICS				
<i>0-4 Years</i>				
2000 Census	3,278 (5.8%)	812 (6.2%)	897 (5.8%)	1,569 (5.7%)
2010 Census	3,116 (5.5%)	875 (6.5%)	881 (5.8%)	1,360 (4.9%)
% change	-4.9%	7.8%	-1.8%	-13.3%
<i>5-20 Years</i>				
2000 Census	11,019 (19.6%)	2,519 (19.3%)	2,878 (18.5%)	5,622 (20.3%)
2010 Census	10,271 (18.2%)	2,441 (18.2%)	2,798 (18.4%)	5,032 (18.1%)
% change	-6.8%	-3.1%	-2.8%	-10.5%
<i>21-44 Years</i>				
2000 Census	18,775 (33.3%)	4,741 (36.4%)	5,266 (33.9%)	8,768 (31.6%)
2010 Census	16,969 (30.1%)	4,455 (33.3%)	5,051 (33.3%)	7,463 (26.9%)
% change	-9.6%	-6.0%	-4.1%	-14.9%
<i>45-64 Years</i>				
2000 Census	12,604 (22.4%)	2,519 (19.3%)	3,136 (20.2%)	6,949 (25.1%)
2010 Census	15,794 (28.0%)	3,491 (26.1%)	3,960 (26.1%)	8,343 (30.0%)
% change	25.3%	38.6%	26.3%	20.1%
<i>65 Years+</i>				
2000 Census	10,622 (18.9%)	2,447 (18.8%)	3,358 (21.6%)	4,817 (17.4%)
2010 Census	10,196 (18.1%)	2,130 (15.9%)	2,484 (16.4%)	5,582 (20.1%)
% change	-4.0%	13.0%	-26.0%	15.9%
<i>Median</i>				
2000 Census	39.5	37.4	39.3	39.1
2010 Census	41.8	38.2	38.4	44.1
% change	5.8%	2.1%	-2.3%	12.8%
EDUCATIONAL ATTAINMENT				
<i>No High School Diploma</i>				
2000 Census	5,974 (15.2%)	1,831 (20.3%)	1,977 (18.3%)	2,166 (11.1%)
2010 Estimate	4,685 (11.6%)	1,490 (16.0%)	1,561 (14.5%)	1,634 (8.1%)
<i>High School Diploma or Higher</i>				
2000 Census	33,416 (84.8%)	7,179 (79.7%)	8,838 (81.7%)	17,399 (88.9%)
2010 Estimate	35,542 (88.4%)	7,830 (84.0%)	9,239 (85.5%)	18,473 (91.9%)



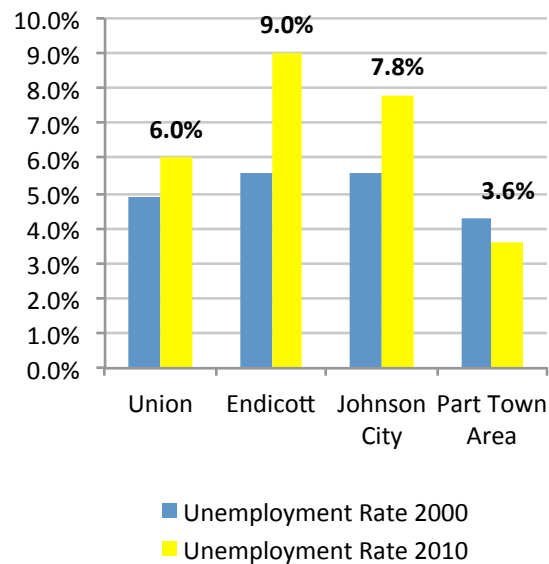
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
EDUCATIONAL ATTAINMENT continued...				
<i>Bachelor's Degree or Higher</i>				
2000 Census	9,264 (23.5%)	1,521 (16.9%)	2,175 (20.1%)	5,568 (28.5%)
2010 Estimate	10,748 (26.7%)	1,640 (17.6%)	2,351 (21.8%)	6,757 (33.6%)
RACE				
<i>White</i>				
2000 Census	52,198 (92.7%)	11,949 (91.6%)	13,805 (88.9%)	26,444 (95.4%)
2010 Census	50,181 (89.1%)	11,603 (86.6%)	12,582 (82.9%)	25,996 (93.6%)
% change	-3.9%	-2.9%	-8.9%	-1.7%
<i>African American or Black</i>				
2000 Census	1,377 (2.4%)	489 (3.8%)	480 (3.1%)	408 (1.5%)
2010 Census	2,499 (4.4%)	932 (7.0%)	959 (6.3%)	608 (2.2%)
% change	81.5%	90.6%	99.8%	49.0%
<i>American Indian</i>				
2000 Census	96 (0.2%)	33 (0.3%)	29 (0.2%)	34 (0.1%)
2010 Census	96 (0.1%)	28 (0.2%)	36 (0.2%)	32 (0.1%)
% change	0.0%	-15.2%	24.1%	-5.9%
<i>Asian</i>				
2000 Census	1,509 (2.7%)	255 (2.0%)	7686(4.9%)	488 (1.8%)
2010 Census	1,625 (2.9%)	235 (1.8%)	810 (5.3%)	580 (2.1%)
% change	7.7%	-7.8%	5.7%	18.9%
<i>Pacific Islander</i>				
2000 Census	19 (0.03%)	9 (0.1%)	8 (0.1%)	2 (0.01%)
2010 Census	41 (0.1%)	18 (0.1%)	8 (0.1%)	15 (0.1%)
% change	115.8%	100.0%	0.0%	650.0%
<i>Other Race</i>				
2000 Census	324 (0.6%)	87 (0.7%)	131 (0.8%)	106 (0.4%)
2010 Census	446 (0.8%)	131 (1.0%)	216 (1.4%)	99 (0.4%)
% change	37.7%	50.6%	64.9%	-6.6%
<i>Two or More Races</i>				
2000 Census	775 (1.4%)	216 (1.7%)	316 (2.0%)	243 (0.9%)
2010 Census	1,458 (2.6%)	445 (3.3%)	563 (3.7%)	450 (1.6%)
% change	88.1%	106.0%	78.2%	85.2%

Source: 2000 and 2010 Census

Families Below Poverty Level



Unemployment Rate



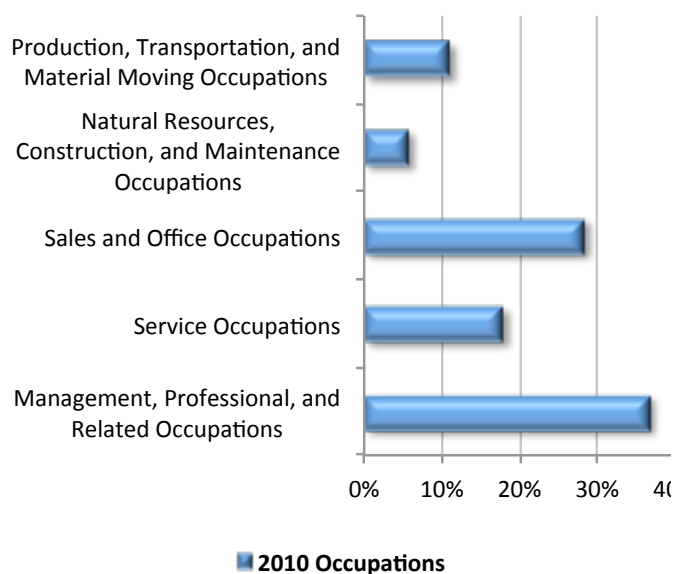
Income

Union's median income lags behind the state considerably by an estimated \$11,600. The town's median income in 2010 was \$43,543, considerably higher than both the Village of Endicott (\$32,772) and Village of Johnson City (\$36,598). Approximately 54.1% of residents have low or moderate incomes (earning less than 80% of the Binghamton MSA.) The villages had the highest percentages of low and moderate income residents with Endicott at 66.5% and Johnson City at nearly 63%. More than 10% of individuals and families in Union live below the poverty level with the lowest incomes reported in Endicott at 16.8% and almost 21% in Johnson City. These lower income households will continue to face difficulties in finding housing that is affordable and will often spend in excess of 30% of their income for housing.

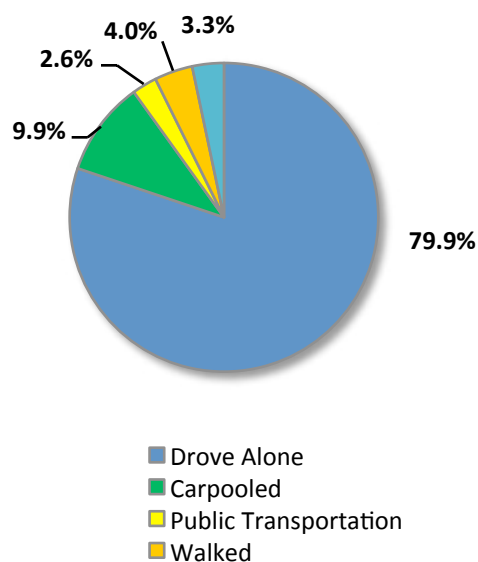
Labor Force Characteristics

The civilian labor force consists of residents (aged 16 and older) who are employed or who are actively seeking employment, other than those enrolled in the armed forces. Recent New York State Department of Labor data shows that private sector employment in the Southern Tier fell over the year by 600, or 0.3 percent, to 234,000 in April 2014. Job gains were largest in leisure and hospitality (+1,000). Job losses were centered in educational and health services (-1,500). Government employment declined (-400) over the year. According to the ACS estimates, almost 64% (29,399 residents) of the town's working age population participated in the civilian labor force in 2010. In April 2013, New York State Department of Labor (NYSDOL) reported that Union had 26,000 in the labor force with 24,500 employed. Data for the Villages of Johnson City and Endicott is unavailable because the NYSDOL does not collect statistics for municipalities with populations under 25,000.

Town of Union 2010 Occupations



Town of Union Journey to Work



The town had an average unemployment rate of 5.8% in April 2014, down from a 7.5% unemployment rate one year earlier.

The majority of town residents worked in management, professional and related occupations (36.7%) and sales and office occupations (28.4%).

Journey to Work

In all communities the majority of residents (79.9%) drove alone to work, while another 9.9% carpooled. Reflecting the denser and mixed use character of the village, almost 8% of Endicott residents walked to work.

Housing Characteristics

In 2010, the Town of Union had 27,054 housing units, 92.1% of which were occupied. Owners make up 60.3% of the occupied housing and renters make up 39.7%. Among the municipal areas, the part town area has the highest rate

of homeownership at 73.5%, while Endicott has the highest rate of renters at 58.4%.

A healthy housing market should provide sufficient opportunities to its residents to secure good quality units that address their particular needs in terms of number of bedrooms, location, price, and other considerations. The generally accepted standards for measuring availability in a healthy housing market are vacancy rates in the area of 5% for rental units and 1% for purchase housing. Vacancy rates for rental housing (2010) among the municipalities ranged from 3.8% in the part town area to 9.6% in the Village of Johnson City. The for-sale vacancy rates ranged from 0.7% in the part town area to 3.4% in Endicott. In comparison, New York State's vacancy rates were 2.4% (for-sale) and 9.2% (rental).

Table 3. Income and Work

Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
HOUSEHOLD INCOME AND POVERTY RATE COMPARISON				
<i>Median Household Income</i>				
2000	\$34,101	\$26,032	\$27,438	\$43,841
Adjusted 2000	\$43,182	\$32,964	\$34,745	\$55,516
2010 Estimate	\$43,543	\$32,772	\$36,598	\$57,359
<i>Per Capita Income</i>				
2000	\$20,077	\$17,274	\$17,511	\$22,705
Adjusted 2000	\$25,423	\$21,874	\$22,174	\$28,751
2010 Estimate	\$25,732	\$20,712	\$21,049	\$30,250
<i>Families Below Poverty Level</i>				
2000	8.3%	15.4%	11.6%	4.1%
Adjusted 2000	-	-	-	Data not available
2010 Estimate	9.6%	11.1%	16.5%	Data not available
<i>Individuals Below Poverty Level</i>				
2000	11.3%	18.7%	16.0%	5.4%
Adjusted 2000	-	-	-	Data not available
2010 Estimate	13.7%	16.8%	20.9%	Data not available
LABOR FORCE DATA				
<i>Total Civilian Labor Force</i>				
2000	28,340	6,343	7,716	14,281
2010	29,399	7,078	7,540	14,781
<i>Civilian Labor Force Rate</i>				
2000	62.5%	60.3%	60.4%	64.8%
2010	63.9%	64.6%	61.0%	65.1%
<i>Unemployment Rate</i>				
2000	4.9%	5.6%	5.6%	4.3%
2010	6.0%	9.0%	7.8%	3.6%
OCCUPATIONS				
<i>Management, Professional, and Related Occupations</i>				
2000 Census	9,522 (35.3%)	1,642 (27.4%)	2,367 (32.5%)	5,513 (40.3%)
2010 Estimate	10,152 (36.7%)	1,702 (26.4%)	2,215 (31.9%)	6,235 (43.8%)
% change	6.6%	3.7%	-6.4%	13.1%



Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
OCCUPATIONS continued...				
<i>Service Occupations</i>				
2000 Census	3,999 (14.8%)	1,136 (19.0%)	1,375 (18.9%)	1,488 (10.9%)
2010 Estimate	4,967 (18.0%)	1,481 (23.0%)	1,444 (20.8%)	2,042 (14.3%)
% change	24.2%	30.4%	5.0%	37.2%
<i>Sales and Office Occupations</i>				
2000 Census	7,780 (28.9%)	1,753 (29.3%)	1,910 (26.2%)	4,117 (30.1%)
2010 Estimate	7,847 (28.4%)	1,952 (30.3%)	2,123 (30.6%)	3,772 (26.5%)
% change	0.9%	11.4%	11.2%	-8.4%
<i>Natural Resources, Construction, and Maintenance Occupations</i>				
2000 Census	1,748 (6.5%)	353 (5.9%)	527 (7.2%)	868 (6.3%)
2010 Estimate	1,608 (5.8%)	429 (6.7%)	449 (6.5%)	730 (5.1%)
% change	-8.1%	21.5%	-14.8%	-15.9%
<i>Production, Transportation, and Material Moving Operations</i>				
2000 Census	3,893 (14.4%)	1,102 (18.4%)	1,106 (15.2%)	1,685 (12.3%)
2010 Estimate	3,068 (11.1%)	878 (13.6%)	718 (10.3%)	1,472 (10.3%)
% change	-21.2%	-20.3%	-35.1%	-12.6%
JOURNEY TO WORK				
<i>Drove Alone</i>				
2009 Estimate	21,668 (79.9%)	4,655 (73.4%)	5,145 (76.3%)	11,868 (84.2%)
<i>Carpooled</i>				
2009 Estimate	2,691 (9.9%)	795 (12.5%)	839 (12.4%)	1,057 (7.5%)
<i>Public Transportation</i>				
2009 Estimate	697 (2.6%)	130 (2.0%)	283 (4.2%)	284 (2.0%)
<i>Walked</i>				
2009 Estimate	1,092 (4.0%)	486 (7.7%)	265 (3.9%)	341 (2.4%)
<i>Work at Home</i>				
2009 Estimate	902 (3.3%)	227 (3.6%)	190 (2.8%)	485 (3.4%)

Source: 2000 Census and 2010 American Community Survey Data

Table 4. Housing

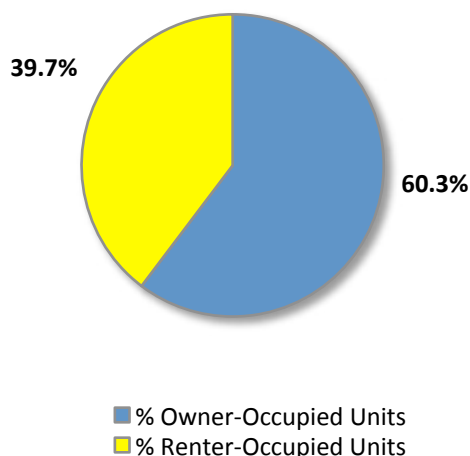
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
HOUSING CHARACTERISTICS				
<i>Total Housing Units</i>				
2000	26,507	6,686	7,650	12,171
2010	27,054	6,719	7,443	12,892
% change	2.1%	0.5%	-2.7%	5.9%
<i>% Total Occupied Units</i>				
2000	24,538 (92.6%)	5,996 (89.7%)	6,981 (91.3%)	11,561 (95.0%)
2010	24,918 (92.1%)	6,058 (90.2%)	6,732 (90.4%)	12,128 (94.1%)
% change	1.5%	1.0%	-3.6%	4.9%
<i>% Owner-Occupied Units</i>				
2000	14,747 (60.1%)	2,452 (40.9%)	3,569 (51.1%)	8,726 (75.5%)
2010	15,019 (60.3%)	2,523 (41.6%)	3,586 (53.3%)	8,910 (73.5%)
% change	1.8%	2.9%	0.5%	2.1%
<i>% Renter-Occupied Units</i>				
2000	9,791 (39.9%)	3,544 (59.1%)	3,412 (48.9%)	2,835 (24.5%)
2010	9,899 (39.7%)	3,535 (58.4%)	3,146 (46.7%)	3,218 (26.5%)
% change	1.1%	-0.3%	-7.8%	13.5%
GENERAL HOUSING CHARACTERISTICS				
<i>Single Family</i>				
2000	16,010 (60.4%)	2,579 (38.6%)	4,068 (53.2%)	9,363 (76.9%)
2010 Estimate	16,928 (61.2%)	3,086 (43.1%)	4,133 (52.4%)	9,709 (76.9%)
% change	5.7%	19.7%	1.6%	3.7%
<i>Two Family</i>				
2000	3,988 (15.0%)	1,661 (24.8%)	1,078 (14.1%)	1,249 (10.3%)
2010 Estimate	3,881 (14.0%)	1,482 (20.7%)	1,346 (17.1%)	1,053 (8.3%)
% change	-2.7%	-10.8%	24.9%	-15.7%
<i>Multi-Family (3+ Units)</i>				
2000	6,314 (23.8%)	2,424 (36.3%)	2,497 (32.6%)	1,393 (11.4%)
2010 Estimate	6,668 (24.1%)	2,549 (35.6%)	2,408 (30.5%)	1,711 (13.6%)
% change	5.6%	5.2%	-3.6%	22.8%



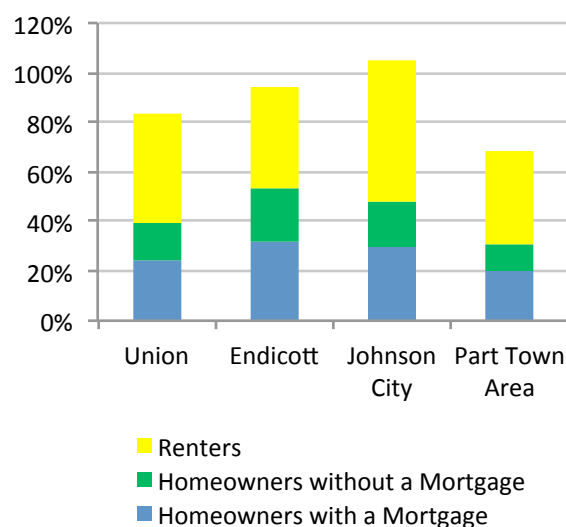
Town of Union's Demographic Background				
	Union	Endicott	Johnson City	Part Town Area
GENERAL HOUSING CHARACTERISTICS continued...				
<i>Mobile Homes</i>				
2000	183 (0.7%)	16 (0.2%)	8 (0.1%)	159 (1.3%)
2010 Estimate	198 (0.7%)	47 (0.7%)	0 (0.0%)	151 (1.2%)
% change	8.2%	193.8%	-100.0%	5.0%
<i>Other</i>				
2000	12 (0.05%)	6 (0.1%)	0 (0.0%)	6 (0.05%)
2010 Estimate	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
% change	-100.0%	-100.0%	0.0%	-100.0%
HOUSING UNITS BY AGE OF STRUCTURE				
<i>1939 or earlier</i>				
2010 Estimate	8,789 (31.8%)	3,442 (48.0%)	3,421 (43.4%)	1,926 (15.3%)
<i>1940 to 1949</i>				
2010 Estimate	3,676 (13.3%)	1,152 (16.1%)	1,205 (15.3%)	1,319 (10.4%)
<i>1950 to 1959</i>				
2010 Estimate	4,941 (17.9%)	946 (13.2%)	1,112 (14.1%)	2,883 (22.8%)
<i>1960 to 1969</i>				
2010 Estimate	3,912 (14.1%)	571 (8.0%)	919 (11.7%)	2,422 (19.2%)
<i>1970 to 1979</i>				
2010 Estimate	2,909 (10.5%)	457 (6.4%)	582 (7.4%)	1,870 (14.8%)
<i>1980 to 1989</i>				
2010 Estimate	1,995 (7.2%)	368 (5.1%)	334 (4.2%)	1,293 (10.2%)
<i>1990 to 1999</i>				
2010 Estimate	939 (3.4%)	186 (2.6%)	274 (3.5%)	479 (3.8%)
<i>2000 to 2010</i>				
2010 Estimate	514 (1.9%)	42 (0.6%)	40 (0.5%)	432 (3.4%)
COST BURDENED HOUSEHOLDS				
<i>Homeowners with a Mortgage</i>				
2010 Estimate	24.0%	32.4%	29.3%	19.6%
<i>Homeowners without a Mortgage</i>				
2010 Estimate	15.0%	21.0%	18.6%	11.6%
<i>Renters</i>				
2010 Estimate	44.7%	40.7%	56.7%	37.2%

Source: 2000 Census and 2006-2010 American Community Survey Data

Housing Type 2010



Cost Burdened Households



Cost Burden

The increasing cost of housing may make it difficult for lower-income households to maintain homeownership. Residents in the villages and renters across the town are considerably cost burdened. Cost burden is defined as the extent to which gross housing costs (shelter, utilities, and other housing-related expenses) exceed 30% of gross income.

Nearly one quarter of all owner-occupied households (with mortgages) reported housing costs in excess of 30% of income, while over one-third of similar Village of Endicott owner households are cost burdened as well.

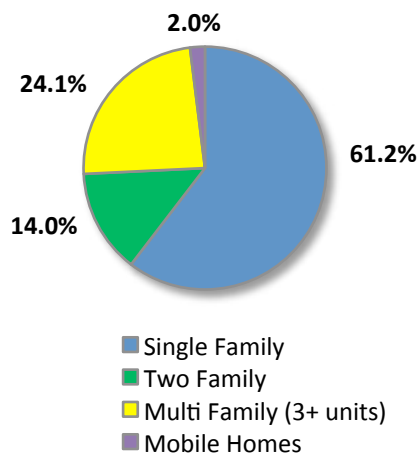
The impact of rental cost burden is greatest for low-income families, especially those with children, who are more likely than more affluent families to rent than own housing and have fewer resources available to devote to rent. Nearly 45% of renter households

town-wide were rent burdened, compared to nearly 57% of Village of Johnson City renter households and 37% of part-town area renters. Not surprisingly, the extent of cost burden was significantly greater for lower income households.

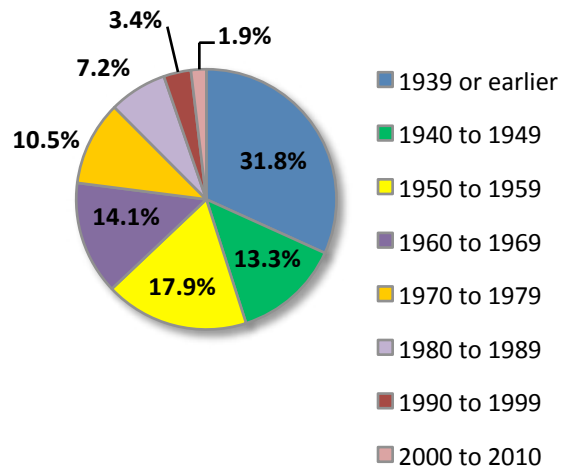
Housing Types

A large percentage of Union residents (61%) live in single-family structures, but the rate varies considerably between municipalities from 43% in the Village of Endicott to 77% in the part-town area. Multi-family units (3+ units) account for 24% of the housing stock in the town, while two-family buildings comprise an estimated 14%. Each community also has a significant amount of two-family and multi-family homes. The rate of new housing construction was moderate with nearly 2% of units (an estimated 514 housing units) being built between 2000 and 2009.

Town of Union Housing Size 2010



Age of Housing



Age of Housing

Town-wide nearly one third of all units were built before 1940 with higher percentages of older units (43%) in the Village of Endicott and 43.4% in Johnson City.)

VULNERABLE POPULATIONS

In addition to the vulnerabilities identified above, other sources including the ClimAID report of climate change projections for New York State raise other concerns for vulnerable populations during natural disasters that must be considered.

The ClimAID Report suggests that:

- Elderly, disabled, and health-compromised individuals are more vulnerable to climate hazards, including floods and heat waves.
- Low-income groups have limited ability to meet higher energy costs, making them more vulnerable to the effects of heat waves.

- Those who lack affordable health care are more vulnerable to climate-related illnesses such as asthma due to decline in air quality during heat waves.
- Those who depend on public transportation to get to work, and lack private cars for evacuating during emergencies are vulnerable.
- Farm workers may be exposed to more chemicals if pesticide use increases in response to climate change.

Key stakeholders and public participants directly engaged with designers to explore ideas for rebuilding.



Climate Change Workshop.



VII. PUBLIC ENGAGEMENT

In November of 2011, the NYS Department of State announced funding for the Long Term Community Recovery program. The program, which provides financial and technical assistance to those towns and villages hardest hit by Tropical Storms Irene and Lee, offers communities the tools they need to develop a vision and strategies to reestablish themselves as vibrant communities that are less vulnerable to future disaster. The Town of Union applied for and received \$49,883 in Long Term Community Recovery grant funding.

On November 18, 2011 Congress enacted Public Law 112-5 relative to Section 239 of the Department of Housing and Urban Development Appropriations Act, 2012. The

Act authorized a nationwide supplemental appropriation of \$400,000,000 to address the impacts of natural disasters. New York State received an appropriation of \$71,654,116 to address the impacts of Hurricane Irene and the remnants of Tropical Storm Lee. The state appropriation includes a requirement that at least \$53,011,323 of the grant award be spent in Schoharie, Tioga, Broome, Greene, and Orange counties. Orange County received a direct appropriation of \$11,422,029 and the Town of Union received a direct appropriation of \$10,137,818 million. The town allocated \$125,000 in CDBG-DR funding for the Long Term Community Recovery Plan.

During the initial phases of the development of the plan, municipal representatives from the Public Works and Planning disciplines were appointed to the Steering Committee and were responsible for preliminary data gathering, project identification, and coordination with state and federal agencies. The Steering Committee was subsequently expanded to include representation from the town's Planning Board, Community Development Advisory Committee, and Conservation Advisory Council. As a whole, the Steering Committee represented a wide range of interests from all three municipalities including one member who is a resident of the flood impacted Fairmont Park neighborhood.

As the first step in the planning process local leaders who had served as the town's recovery committee became the Project Advisory Committee for the Long Term Community Recovery planning process. This group met five times during the planning process.

The Steering Committee understands that the purpose of the grant is to develop a Long-Term Community Recover (LTCRS) Strategy to rebuild in a resilient way that strengthens the vitality of the community, reduces risk to life and property, and is sustainable over time. Additional assistance was provided by Julie Sweet of the New York State Department of State Division of Coastal Resources. Once funding was available to the town they issued a Request for Proposals and selected a planning team led by River Street Planning & Development (planners, facilitators and economic developers from Troy, NY). The team included Synthesis, LLP (landscape architects from Schenectady, NY), New England

Environmental (environmental scientists and landscape architects from Amherst, MA), Madeleine Cotts (a Binghamton area planner and landscape architect), and Christina Snyder (a planner and graphic designer from Blenheim, NY).

MINDMIXER WEB SITE

The town developed TheReUnionProject2020.com, an interactive web site through the Mind Mixer service. This site provided an opportunity for community residents to participate in the planning process, even if they could not attend meetings. To date the web page has received 8,243 page views from 1,474 unique visitors. Participants submitted 41 ideas for consideration.



The town identified topics and asked questions of the public which included:

■ Topic: Recover.

Question: What else can be done to continue to move recovery efforts forward?

Before answering, consider that hundreds of families were impacted by the flood. How have those experiences affected the views of residents for the future? In thinking about housing, business revitalization, infrastructure, and parks how far along in recovery is your neighborhood? What is left to do? Where are the gaps?



■ **Topic: RelImagine.**

Question: What is your vision for the neighborhoods that were impacted by the flood?

Before answering, in thinking about the areas that were flooded, how were things going in these neighborhoods before the flood? What did residents love about their neighborhoods? What needs to change in the future? Is there a word or phrase that expresses your future vision for these areas?

■ **Topic: ReInvest.**

Question: If you had a magic wand, what one change or improvement would you make to make the Town of Union more flood resilient?

Before answering, the Town's Action Plan for Disaster Recovery (view it here: [Town of Union Disaster Recovery Plan](#)) outlined a number of projects and activities to aid recovery efforts and lay the foundation for capital improvements that will make the community more resistant to future flood events. What other opportunities do you see? Are there challenges to new investment such as regulations and lending practices?

■ **Topic: Rebuild.**

Question: If new development is built to FEMA flood standards, where should rebuilding take place? As the rebuilding process moves forward, are there any projects or places that you are familiar

with that you would use as an example for the Town of Union to consider?

Before answering, consider that the former BAE plant on Main Street in Westover will be demolished and the 27-acre property would then be transferred to the Broome County Industrial Development Agency. Is this an area where mixed-use development including housing, commercial, and recreational might be appropriate? Additional properties in the South Endwell area are being purchased through the FEMA buyout program and must remain as open space, which could include passive recreational uses. Are there areas that should not be rebuilt? Should rebuilding look a certain way? Should the Town of Union offer incentives to encourage rebuilding in a safe and flood resistant manner?

■ **Topic: Revitalize.**

Question: As recovery efforts continue, what should expectations be for improving the quality of life in the Town of Union by the year 2020?

Before answering, consider that since the flood expectations for quality of life may have changed. What does quality of life mean to you in terms of housing, business development, infrastructure, parks and recreation or other relevant topics?



A series of four visioning sessions were held across the town.



Climate Change Workshop

STAKEHOLDER INTERVIEWS

The consultant team and Planning Director met with several key stakeholders in the community to gain a better understanding of the impacts of the storms and flooding. Stakeholders included representatives from the Johnson City and Endicott Public Works Departments, the Town of Union Planning Department, the Town of Union Economic Development Director and various elected officials. A meeting was also conducted with key nonprofit organizations.

VISIONING SESSIONS

The town scheduled four visioning sessions across the town. Although the meetings focused on discussion of issues and needs associated with flood recovery, participants were also asked to consider overall community needs. In addition to discussion of the key topic, each meeting discussed the recovery strategy process, an overview of the Community Reconstruction Program, findings of the New York State ClimAID report, recent flood events

and provided an update on the HUD Disaster Recovery Grant implementation.

Each meeting focused on a different topic:

- **Housing** - The meeting discussed housing demographics, damage, and needs associated with the flooding, and the significant impact that buyouts will have on neighborhood quality and sustainability.
- **Economic Development** - The meeting discussed economic data and the impact of commercial losses in key locations including the Gander Mountain area and the BAE site.
- **Recreation** - The meeting evaluated the town's existing recreation resources, reviewed projects proposed and discussed the potential opportunity that lands being bought out could play in the development of future passive recreation areas if the lots could be assembled.



The BAE site was a highly discussed area at visioning sessions.



Residents provided feedback on a range of recovery topics.

- **Infrastructure** - The meeting presented information on the status of various storm damages, discussed plans to protect infrastructure and future infrastructure needs for hazard mitigation.

Residents provided feedback at each session summarized as follows by recovery topic:

Community Planning and Capacity Building

Issues

- Communication between various local, state, and federal organizations needs to improve.
- Flood recovery progress is perceived as being too slow (i.e. buyout program), too complex, and seemingly ever changing with too many restrictions.
- Various municipal and other agencies are not responsive. There are inconsistent messages from different federal and state agencies.
- Communication needs to improve.

- Need answers to questions like “Would it work to dredge the Susquehanna as a flood mitigation measure?”
- Residents do not have enough information to make decisions.

Ideas

- Pre-plan and designate FEMA trailer sites that are safe and accessible.
- Use the ReUnion website to make suggestions.
- Residents should contact their state and federal level representatives to change restrictive funding policies.
- A multitude of government agencies are involved and written recovery plans are required in order to access funds from various agencies and to coordinate long-term planning with other agencies.
- Provide portable phone charging stations for flood neighborhoods where power is out.
- Prepare contact lists for government representatives.

Health and Social Services

Issues

- There is a lack of recreational facilities for children and youth.

Ideas

- Build an ice rink.
- Improve Boland Park boat launch.
- Build an Adult/Senior sports complex at BAE site.

Housing

Issues

- Buyout neighborhoods will lose much of their character, especially since the town is unsure about the final number of abandoned properties that are not being bought out.
- Drainage impacts from future residential development must be minimized.

Ideas

- Replace existing flood damaged and vacant buildings with senior/student housing.
- Utilize old schools for affordable housing.
- Provide homeowner tax benefits (i.e. reduced assessment for flood prone properties).
- Provide government incentives/funding for repairs instead of buyouts.
- Build a mobile home park at BAE site.

Economic Development

Issues

- The BAE property may take years to be demolished/rebuilt.
- Changes to the aquifer from loss of 'wet' industries that draw a lot of water from the water table regularly, may be an issue in regards to flooding due to a rise in the water table.

Ideas

- Mimic aspects of the Oklahoma Red Dirt Ready Plan.
- Retrofit and re-use IBM Buildings.
- Remove buildings east of McKinley Ave.
- Planned community at old BAE site.
- Provide funds to businesses and homeowners that stayed.
- Refit Kmart plaza for ice skating rink, town square/drive in theater.
- Build an outlet mall at BAE site.

Infrastructure

Issues

- There is still quite a bit of confusion about how the flood occurred.
- Has hazard mitigation such as the Lourdes flood wall made flooding worse in Union?
- Has new development upland made flooding worse along the river?

Ideas

- Construct temporary sewer storage at BAE site where main trunk line is located.



- Separate storm and sanitary sewers where connected.
- Provide redundant power for pumping stations (water and sewer).
- Dredge the river.
- Allow flooding in less populated areas (i.e. previous buyout properties).
- Put caps on drainage pipes to prevent river from backing up into neighborhoods.
- Improve the Endwell Street infrastructure.

Natural and Cultural Resources

Issues

- Plant trees at riverbank to reduce erosion.

TOWN OF UNION CLIMATE CHANGE AND RESILIENCY WORKSHOP

On October 18, 2013, the Town of Union hosted a climate change and Resiliency Workshop. During the visioning workshop and interviews a number of questions emerged related to:

- Would dredging the Susquehanna River help to mitigate flooding in the Town of Union?
- How should the town manage its streams and creeks to mitigate flood hazards?
- What is the impact of climate change and extreme precipitation now and in the future?
- What techniques of floodplain management would help in Union?
- What impact have flood mitigation projects in other communities like construction of the flood wall at Lourdes Hospital had on flooding in Union?

The town found that it was difficult to move ahead to discussion of potential realistic solutions until residents and property owners understood some of the science behind climate change and flood mitigation, both in the town and the greater Susquehanna watershed. The Resiliency Workshop also included a presentation of the preliminary design concepts and illustrations for the possible future re-development of the BAE site, and was followed by an opportunity for the community participants to offer their feedback about the conceptual plans.

Speakers at the workshop included:

- **Flooding:** Chip McElwee, Executive Director, Broome County Soil and Water Conservation District;
- **Climate Change:** Jessica Spaccio (Rennells), Climatologist, Department of Earth and Atmospheric Science (EAS) at the Northeast Regional Climate Center (NRCC);
- **Green Flood Mitigation Strategies:** Andrew Bohne, RLA, LEED AP, New England Environmental, Inc., Amherst, MA;
- **State Floodplain Management:** Larry Lepak, PE and CFM, NYSDEC Regional Floodplain Coordinator for Broome, Chenango, Cortland, Tioga, Tompkins Counties (special expertise: local floodwall & levee maintenance, DEC responsibilities); and
- **Impact of Constructed Mitigation Measures:** Rick Woidt, PE, Woidt Engineering (special expertise: floodwall design.)



Community Design Workshop

Many attendees thanked the presenters for clarifying the issues, saying that they felt much better informed, particularly about climate change and able to understand the complexity of the choices and the limitations before the town as it plans to be more resilient. The audience asked for further clarification regarding why dredging the Susquehanna would not work. The presenters clarified that the entire Susquehanna from Otsego to the Chesapeake Bay would need to be dredged to avoid moving Union's problems to down river communities. Even if dredging was feasible the sheer cost would be prohibitive, and the work would need to be repeated regularly, at even greater cost as the river naturally fills itself back in.

MULTI-DAY DESIGN WORKSHOP

For three days, the project team and the community gathered in Union and focused entirely on identifying the basis for a vision statement, goals, actions, and an illustrative master plan. This highly collaborative workshop was an intensive planning, architectural, and



The project team develops concepts for resilient redevelopment.

landscape design effort. During the first day, focus groups were held with local stakeholders.

The second component focused on the design/visualization. The team focused on developing concepts for resilient redevelopment and mitigation for the identified key project areas within the Town of Union. The goal was to generate concept plans that are reflective of the input gathered during the four previously held Public Visioning Forums and the previous night's Resiliency Workshop and stakeholder interviews and discussions throughout the Day 2 design charrette.

At the end of Day 2, the public and key stakeholders were invited to an "Open House" to review the preliminary design concepts of the identified key project areas generated throughout the day. As the design team continued to work, the public participants had the opportunity to directly engage the designers as they explored ideas, allowing for the integration of ideas in "real time" and immediate feedback. The goal of the open house was to provide the opportunity for the



Public participants review preliminary design concepts.

community to provide input at the mid-point of the design charrette and to participate in the actual progression of the designs.

The design team spent Day 3 refining the conceptual plans and graphics, and integrating the ideas and feedback received during the Day 2 Public ‘Open House’ Design Review session. The team visited a few neighborhoods and met with residents to review areas of concerns. By the end of Day 2 the design team had developed color rendered concept plans, cross-sections, and 3D massing models of the identified key project areas in preparation for the evening Public Design Review Meeting to conclude the design charrette.

The final Public Design Review Meeting focused on project visualization and began with a brief overview of the process, key findings of the project areas site analysis, and a presentation of key design considerations, as they apply to the project area, to set the scene for the presentation of visual materials. The team presented the conceptual plans and supported graphics for the identified



Community Design Workshop

key project areas, highlighting the design process and the reasoning behind the designs being presented. Immediately following the presentation of the conceptual plans the team engaged the community participants to gain their input and feedback on the conceptual plans.

The workshop focused on identifying key sites in the town that could be used as part of town-wide mitigation plans. The goal of these project sites was to demonstrate to the town conceptual ideas that could make a significant impact in flood mitigation and resiliency and also to show how potentially they could re-develop resiliently on desirable commercial properties. These areas included the BAE site and surrounding “buyout” neighborhood, the Oakdale Mall, the Gander Mountain commercial area, the Fairmont Park “buyout” neighborhood, the Argonne Avenue “buyout neighborhood,” and the abandoned Kmart site in Endicott.



Community Design Workshop



Community Design Workshop

The approach to these catalyst projects after the workshop was as follows:

- The **BAE Site** is a 27 acre parcel situated along Main Street (Route 17C) and the Rt. 201 interchange. Due to its location and access the Town of Union desired to explore concepts that would bring taxable and job creating uses to the site while also being flood resilient. This site had 5-6' of water in it as levee's were overtopped and this prevented the flood waters from receding so the water had to be pumped out. During the visioning workshops the BAE site was a highly discussed area and viewed by the community as an opportunity to do something significant. Many of the ideas that were generated for the site related to the site's proximity to Binghamton University, just on the other side of the river, and included ideas such as a residential tower, student village, outlet mall, a softball complex to attract tournament play, and a 2-sheet hockey facility/indoor sportsplex. The team developed four concepts that explored the idea of a mixed-use student

village. Due to the site's lack of connectivity, the redevelopment would need to be a "drive to walkable" destination, meaning that there would be very little opportunity to walk to the site but once you were there it would be a very pedestrian friendly vibrant environment.

All of the development would be elevated and provide the opportunity to park beneath or create a situation that the bottom floor could flood without property losses. The central mixed-use core would function like an outdoor mall with shops, eateries, and a new movie theater with the opportunity for outdoor dining and gathering and residential and office space on the upper floors. The mixed-use core is also conceptually anchored by a satellite institutional building (i.e., BU College of Pharmacy, which is rumored to be in development and potentially will locate off campus), which would "activate" the space during the day. A mix of resilient residential buildings connects directly to the core and overlook the recreation/flood storage



Community Design Workshop

area in the rear of the site. Since the water table may be high in this area, the BAE site could also integrate a large elevated tank that would temporarily store excess sewer capacities before being released to the existing sewer treatment facility, which cannot handle the capacity of large events resulting in direct discharge into the Susquehanna.

- The **Oakdale Mall** area was selected to serve as an example of how an existing commercial site could be retro-fitted with green infrastructure so that all storm water could be dealt with on-site and potentially provide opportunities for underground storage areas and bio-retention areas that can mitigate additional off-site run-off. Retro-fitting of these types of existing commercial and industrial sites is an idea that can be duplicated throughout the town and the region as most communities have this condition in a variety of scales.

The team evaluated alternative configurations for the **“buyout**



Community Design Workshop

neighborhoods” that can be presented to state and federal agencies to determine what opportunities actually exist under the Hazard Mitigation Grant Program and other funding sources to allow bought-out properties to contribute to, rather than detract from, neighborhood sustainability and effective flood mitigation.

As demonstrated in the presentation, once the houses that have elected to participate in the FEMA buyout and CDBG-DR programs are demolished and all site infrastructure is removed, the neighborhood that remains will be a shell of itself. The “quilt like” remaining neighborhood will become a maintenance problem for the town as they will be responsible to plow streets with only one or two houses and maintain the grass on the vacant parcels, increasing the likelihood that the parcels could become overgrown and unsightly locations that will attract pests and ticks, for example, and further impact the property values of the remaining homes. In addition, the vacant



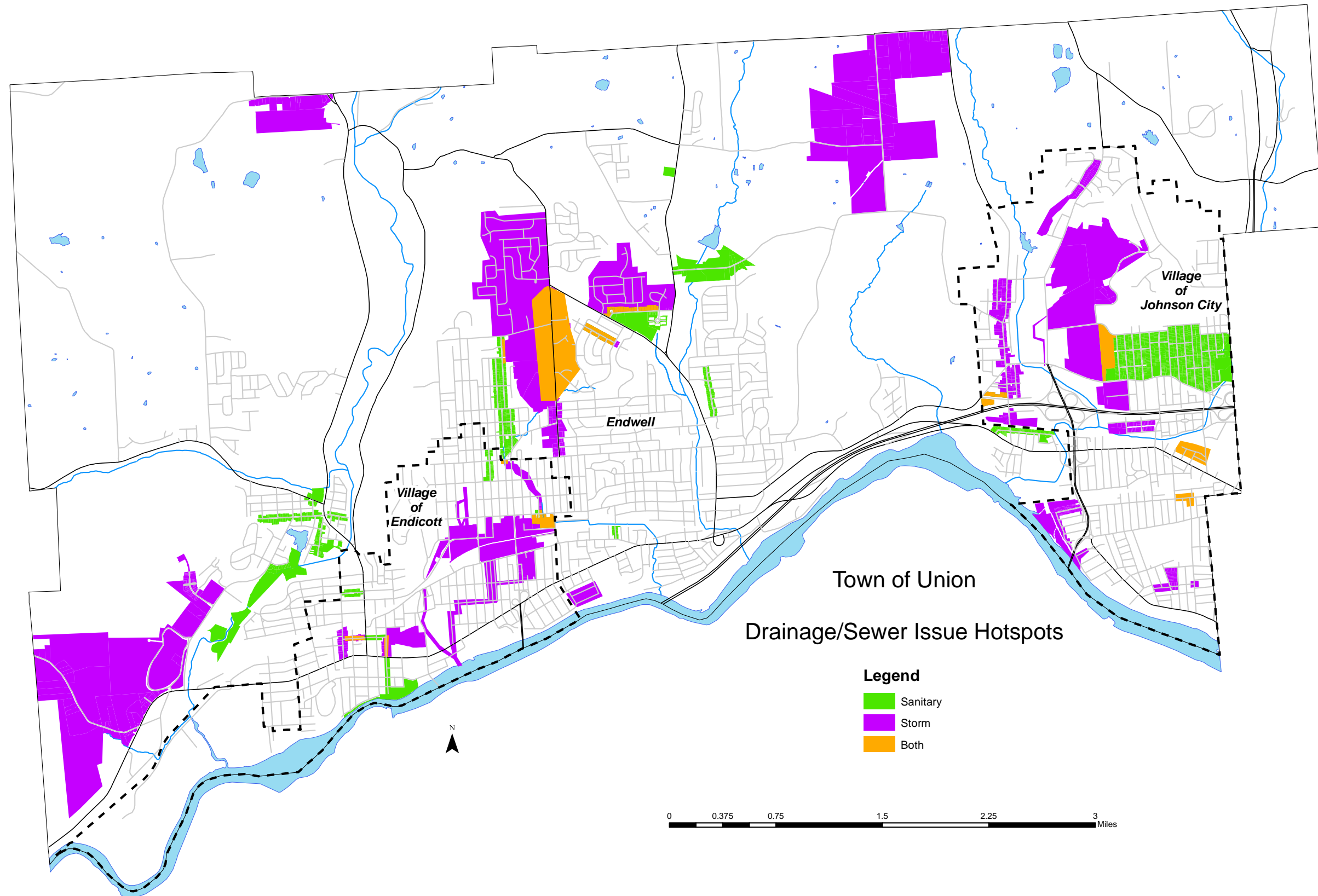
Community Design Workshop

parcels provide inefficient flood mitigation as the “quilt” of disconnected parcels does not enable the efficiency or increased capacity of a connected system.

The emerging concepts address these concerns by “relocating” the remaining homes (either physically or through reconstruction) to “buy out” parcels to create complete neighborhood streets. The “relocated” homes would be elevated so that living quarters were well above base flood elevation. This consolidation of the neighborhood would not only be more sustainable from the standpoint of a healthy neighborhood fabric, but it also creates the opportunity to create much larger contiguous flood mitigation areas that can be connected to other flood mitigation areas resulting in much greater flood capacity. Additionally, these areas can be designed to be naturalized so that they are attractive and a neighborhood asset that would reestablish property values.

- The **Gander Mountain** area potential redesign accomplishes the need for increased flood storage with the desire by the town to maintain the large commercial anchor in the commercial center. The existing Gander Mountain store sits deep in a bowl and had over eight feet of water in the store. Its site is clearly at the low point of all of the surrounding commercial properties, which makes rebuilding in its current footprint not the best idea. However, the commercial plaza to the west, directly adjacent to the Gander Mountain parcel, sits over 10’ above the site separated by a large retaining wall. The team’s concept demonstrates how an anchor building could be built in the same location but elevated and reoriented (flipped) toward the adjacent parcel so that they would share the same parking area. This would keep the finished floor of the new building high and dry and enable the area below the building to flood. Additionally, in this area the team looked to take advantage of as many flood storage opportunities as possible including how the NYS Rt. 17 “clover leaf” area of the adjacent highway system could be developed

Figure 6: Drainage/Sewer Issue Hotspots



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to create a large flood storage and mitigation area. This would greatly expand the flood plain of the local stream and provide many opportunities for the new storage areas to link to one another and “equalize” and distribute the floodwaters. This conceptually provides a large amount of flood storage that would result in a significant positive impact to the area.

- The **Kmart Redevelopment Concept** combines resilient (elevated) commercial buildings with on-site mitigation and green infrastructure.

THE DESIGN CHARRETTE/WORKSHOP CONCEPTS

After the workshops the planners and designers began working as a team to develop concepts for key issues identified by the community. A number of ideas emerged from the discussion and new challenges were identified. The preliminary conclusions reached by the team and the town as a result of the input include:

- The approach to “buy-out areas” should be to consolidate vacated land for onsite green infrastructure by relocating or moving homes to a safer location in the area and elevating them either structurally or by location on higher ground. The feasibility of doing this relies on securing an opinion from regulatory and funding agencies that development of “soft green infrastructure” is allowed in buyout areas.
- The opportunity to design a major green infrastructure and retrofit older commercial

priorities, to “right size” parking lots so that all stormwater is managed onsite, as new developments are now required to do.

- Any property or sites owned by public or state agencies should be retrofitted to provide maximum mitigation benefit and serve as a model for the private sector. For example, this includes property the NYS Department of Transportation owns along roadsides and intersections. Design and rehabilitation of local municipal, state, and federal properties should incorporate cost-effective green infrastructure and detention areas.
- Evaluate opportunities to locate underground flood storage structures throughout the town.
- Evaluate opportunities to locate an above ground wastewater storage structure at the BAE site. This component would allow the town to temporarily store wastewater, releasing it slowly to the treatment plant over time so that the plant is not overstressed in extreme weather resulting in combined sewer overflows directly into the Susquehanna River.
- Use the “hot spot” map the town has developed to evaluate the numerous neighborhood specific infrastructure problems including the need to upsize infrastructure including transmission lines and culverts to remove pinch points and allow the unimpeded flow of stormwater to detention areas.



The hallmark of our response to extreme weather is a comprehensive green infrastructure system.



Design Workshop drawings.



VIII. Vision, Goals, and Strategies

VISION

The recovery and resiliency vision statement outlines the community values, priorities, goals, and strategies that the community will embrace to build back better. It should

be a touchstone by which the community can evaluate priorities and implementation success. The draft vision statement reads:

"The Town of Union and its Villages of Endicott and Johnson City are resilient places. We offer high quality and floodsafe neighborhoods that are accessible to all. We respect our waterways and offer safe public access to them for commerce and recreation. The hallmark of our response to extreme weather is a comprehensive green infrastructure system that protects neighborhoods and allows reuse of valuable commercial sites and Main Street properties. We cooperate with our neighboring communities and regional partners to mitigate hazards, manage our river and streams, and create a prosperous future."

GOALS

The recovery and resiliency goals describe the end state that the town plans to achieve as a result of plan implementation. The draft goals read:

Community Planning and Capacity Building

- Achieve the highest level of preparedness for extreme weather events among all community members.
- Take a leading role in regional resiliency initiatives, piloting strategies to reclaim and reuse property safely and sustainably.
- Employ a creative land, river, and stream management framework that increases resilience in all projects.
- Provide an emergency warning and evacuation system in the event of approaching flooding or extreme weather.

Economic Development

- Enjoy sustainable and resilient commercial areas and Main Streets that foster town-wide growth.

Health and Social Services

- Offer high-quality human services to meet the needs of vulnerable people.
- Provide an emergency warning and evacuation system in the event of approaching flooding or extreme weather.

Housing

- Create and maintain safe residential neighborhoods affordable by a wide range of residents.

Infrastructure

- Model the use of cost-effective green infrastructure techniques as the primary form of hazard mitigation along with repair of existing constructed solutions and levees as appropriate.

Natural and Cultural Resources

- Enjoy the waterways as a safe part of a town wide recreation network.
- Incorporate a plan with neighboring communities and regional partners to clean debris from rivers and streams.

STRATEGIES

Reconstruction strategies are the overarching direction by which a community will achieve rebuilding, resilience, and economic growth. The strategies are based on an inventory of community assets, risk assessment, and evaluation of needs and opportunities. Each strategy is implemented through community projects, programs, and actions to restore and protect assets and aligned with the six FEMA recovery support functions as follows:

- **Community Planning and Capacity Building.** Strategies that present ways to restore or enhance its ability to organize, plan, manage, and implement recovery.
- **Economic Strategies.** Strategies that present ways to return economic and business activities to a state of health, and to develop new economic opportunities.
- **Health and Social Services Strategies.** Strategies that address the restoration

and improvement of essential health and social services, particularly those that serve vulnerable populations.

- **Housing Strategies.** Strategies that promote and address affordable housing, increase access of non-CDBG programs to public and private housing providers, and advocate disaster-resistant housing for all income groups.
- **Infrastructure Strategies.** Strategies that enhance restoration, reparation, and management of essential local government services.
- **Natural and Cultural Resource Strategies.** These strategies will address management of natural and cultural resources from a risk reduction and economic development perspective.

MANAGEMENT MEASURES

The programs, plans, and actions used to implement each strategy are organized into six classes of management measures. The six classes of management measures include:

- **Class 1. Conserve, Restore, and Enhance Natural Protective Features.** Measures that use the landscape to promote safety and livability while reducing disaster recovery costs.
- **Class 2. Resilient Construction.** Measures designed to provide an adequate level of safety for structures. Measures may include elevating buildings, dry flood-proofing, constructing watertight structures, wet flood-proofing, relocating

facilities, and incorporating levees and floodwalls into site design.

- **Class 3. Structural Defenses.** Measures that employ engineered or non-engineered construction techniques designed to resist flooding.
- **Class 4. Land Use Planning and Regulation.** Create new regulatory measures for municipal and site planning, zoning, and subdivision regulation to reduce impacts of storm events on existing and future infrastructure.
- **Class 5. Market-Based Methods.** Measures that reduce vulnerability by incorporating the cost of risk into the carrying cost of land.
- **Class 6. Increased Awareness and Information.** Measures that provide sound information on storms and erosion, environmental services, risk to development, and community costs designed to help decision makers in both the public and private sectors.

Community Planning and Capacity Building Strategies

- Develop specific land use strategies for neighborhoods with significant buyouts to cluster buildings and maximize natural flood storage.
- Develop regulations and incentives to encourage resilient development in residential and commercial rehabilitation and new development.
- Carefully manage upland development to mitigate future river corridor flood hazards.

- Continue to employ a comprehensive set of incentives and programs to prepare, alert, and provide relief to residents, businesses, and social service providers to allow them to respond quickly, bounce back efficiently, and recover more quickly.
- Enhance connections with nearby communities to foster regional cooperation in approaching flooding and related issues.

Economic Strategies

- Retrofit older commercial areas that lack on-site stormwater systems through the use of green building techniques and green infrastructure.
- Provide expanded utility infrastructure to areas where sustainable development is economically viable.

Health and Social Services Strategies

- Ensure the resiliency of sewer and water supply systems so that essential services and facilities are available during and after storms and provide redundant power supplies for critical facilities.
- Provide adequate emergency services.

Housing Strategies

- Work to redevelop neighborhoods that have been impacted by numerous buyouts by concentrating development and creating functional areas for green infrastructure.
- Relocate people from housing that is in locations where protection is not viable.

- Identify locations for replacement housing outside of hazard areas.

Infrastructure Strategies

- Repair and enhance existing flood mitigation structures including levees and stormwater infrastructure and pursue hardening and protection of critical facilities.
- Reduce burdens on stormwater systems through reduction of infiltration and by separation of combined sewer systems.
- Identify locations to provide additional stormwater storage capacity to accommodate storm events.
- Ensure back-up power is available at vital facilities including pump stations.

Natural and Cultural Resource Strategies

- Address the stormwater runoff issues related to erosion and flash flooding of streams and creeks on a regional basis.
- Identify green infrastructure practices that could be implemented to reduce stormwater runoff. This should include promotion and demonstration of small-scale green infrastructure concepts (e.g., rain gardens) that can be implemented on an individual basis by homeowners.
- Identify opportunities to reclaim former residential or commercial lands vacated as a result of flooding for community recreation.



New structures in flood prone areas, such as the new bathroom facility at Glendale Park, must be designed for resiliency.



A structurally unsound cinderblock wall at the Boys and Girls Club has been replaced with a reinforced flood resistant wall.

Each community in the watershed must do its part to achieve regional flood reduction.



Rendering of redeveloped BAE Campus.



IX. Catalyst Projects and Resiliency Actions

CATALYST PROJECTS: INTRODUCTION

As part of the New York Long Term Community Recovery Strategy Program’s planning and design process, the town explored opportunities to reduce the impacts of localized flooding and improve the region’s flood resiliency. First and foremost, these explorations looked to create additional flood storage for the Susquehanna River and its many tributaries. This inter-municipal and regional effort recognized that there is not, given the available data, a “silver bullet” solution to solve flooding on a regional scale. It is expected that the NYS DEC/USACE Watershed Assessment Study will examine

the potential for large-scale infrastructure projects that could provide significant regional impact, but the Town of Union LTCR Plan had to move ahead without the benefit of its results and recommendations. Given the scale and magnitude of the watershed, the town came to the realization that it was unrealistic to expect that an individual town’s projects could achieve significant reductions in the base flood elevations of downstream communities. This sobering recognition forced the town to ask: How can a regional reduction of flooding be achieved? How can resources be coordinated to make a real impact? How can the communities of the Susquehanna River Watershed be brought to



recognize their interdependence and work together to reduce flooding? What can be done by one town that amounts to more than a “drop in the bucket”, when an entire bucket must be addressed?

It is the communities’ interdependence that is the key to the answer. Many “drops-in-the bucket” are needed, and each community in the watershed needs to do its part. The Town of Union, by participating in the NY Long Term Community Recovery Strategy Program and the NYRCR Program, accepted the challenge and its responsibility and worked to identify projects that would contribute toward an overall reduction of flood hazards in the region. The projects identified and conceptually developed will:

- Create additional flood storage
- Reduce stormwater runoff
- Prevent erosion damage
- Stabilize creeks and streambanks
- Create bio-retention areas to naturally store and clean stormwater runoff
- Reduce tributary flooding
- Reduce the transport of sediments and toxins, improving the hydrology and ecology of creeks, streams, and rivers
- Where appropriate, provide additional recreational opportunities and amenities to surrounding neighborhoods and communities
- Provide opportunities for resilient economic development



Alternate one features new multi-family housing.



Alternate two shows mature green space.

Collectively, the projects described below will reduce the impacts of localized flooding by doing their part, adding their “drops in the bucket.” The Town of Union’s projects and case studies are prime examples of the kinds of solutions that need to be implemented by all communities in the Susquehanna Watershed.

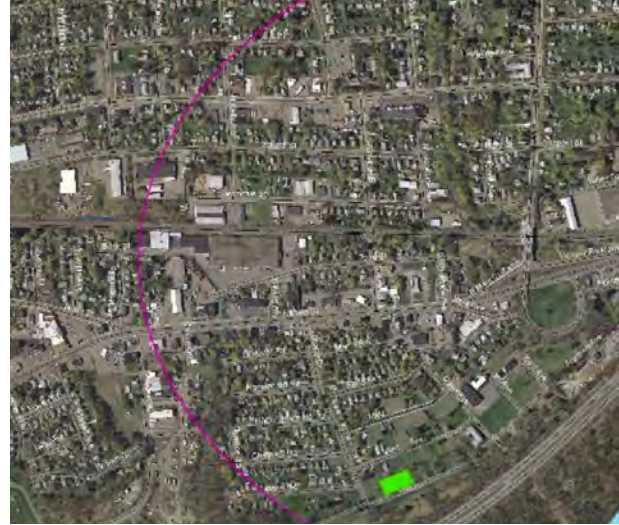
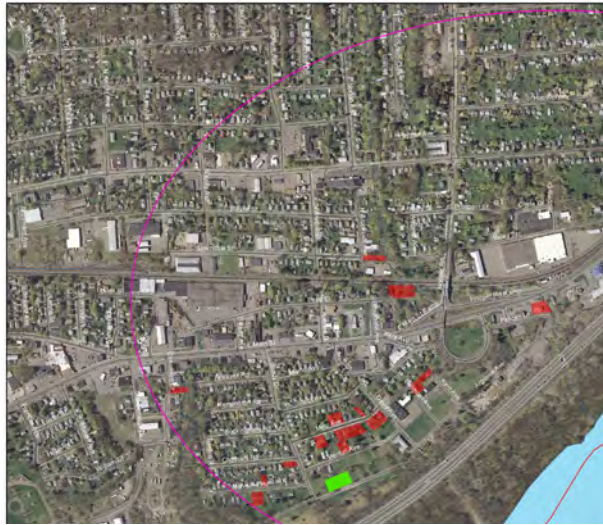
THE TOWN OF UNION, NY: FAIRMONT PARK, WESTOVER, AND ARGONNE AVENUE NEIGHBORHOOD REDEVELOPMENT

The flood of 2006, and Hurricane Irene and Tropical Storm Lee in 2011 severely damaged several town neighborhoods. Negative impacts to the neighborhoods include home abandonment; select home “elevations” to raise dwellings above base flood elevations, and the empty lots that result from participation in the FEMA Buy-out Program. The buy-out program requires that properties be demolished and restored to a porous (grass) condition. Given the significant number of properties in the program across the town these buyouts can leave neighborhoods disjointed and unsustainable.

The Fairmont Park neighborhood, Westover neighborhood, and the Argonne Avenue neighborhood experienced tremendous devastation from flooding. After the buy-out demolitions, these neighborhoods will be only a ghost of what they once were, a patchwork of isolated homes. Many neighborhood streets, once lined with houses, will have only one or two remaining. This creates a significant problem for long-term neighborhood sustainability, and also an ongoing drain on town resources. The vacant properties become the responsibility of the town, requiring mowing of the empty lots, sidewalk, and street snow removal and infrastructure maintenance while potentially only a few viable homes remain in the area. The intent of the FEMA Buyout Program to create incentive for floodprone residents to relocate to safer more flood resilient housing options is appropriate, but has the accompanying consequence of putting neighborhoods into decline.



The Argonne Avenue redevelopment would create storage capacity to manage stormwater overload from nearby neighborhoods.



The Argonne Avenue redevelopment would reconfigure the neighborhood for sustainability and density.

Fairmont Park Neighborhood Redevelopment:

- Reconfigure buyout neighborhood for sustainability and density
- Move residents and elevate existing homes
- Maximize flood mitigation and storage
- Use CDBG-DR for buyout because it allows reuse of property
- Create new elevated row houses for replacement housing

Argonne Avenue Neighborhood Redevelopment:

- Reconfigure buyout neighborhood for sustainability and density
- Move residents and elevate existing homes
- Maximize flood mitigation and storage
- Create enough storage capacity to manage stormwater overload from nearby neighborhoods

Through the planning and design process of the Long Term Recovery Strategy program, neighborhood redevelopment strategies were developed to help make neighborhood remnants sustainable and flood resilient.

These concepts look to consolidate the remaining homes by recommending that residents living on streets where the majority of houses have been bought out or abandoned move their houses or construct new elevated homes on vacant buy-out parcels in areas with a greater potential for traditional density within their neighborhood. The goal is to create “complete” neighborhood streets and a comfortable and appropriate density.

This kind of consolidation would provide a sustainable and resilient neighborhood fabric while also reducing the town’s burden to maintain vacant parcels and underutilized neighborhood streets. Another significant benefit is the creation of a large open space within the lowest and most floodprone areas that can be transformed into a substantial basin for flood mitigation and storage. Interconnected bioretention areas would be seeded and planted with native trees and shrubs, creating a natural, low maintenance amenity that stores, cleans, and reduces sediment transfer from neighborhood runoff and occasional floodwater, improving both



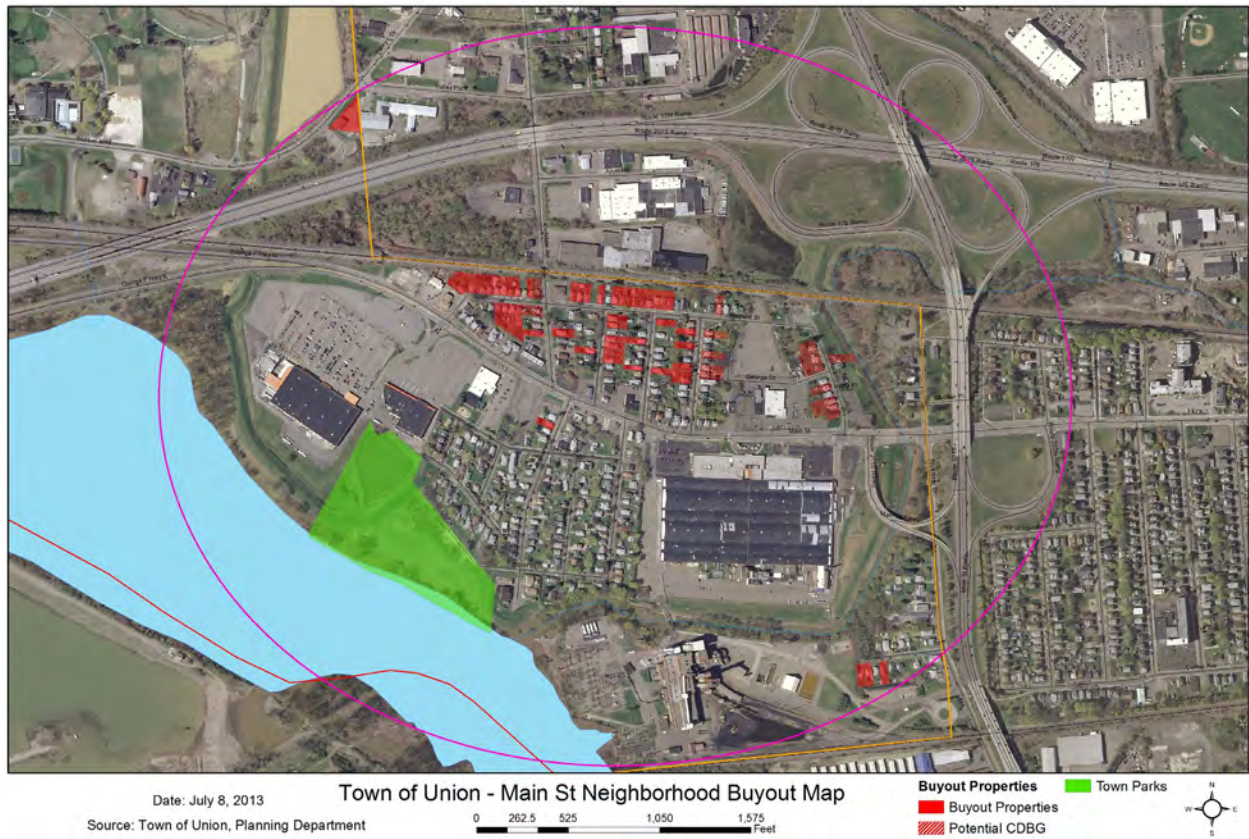
water quantity and water quality. While the relocation or consolidation of homes does not meet the current FEMA buy-out requirements and would require negotiations or exceptions, it is an approach that should be strongly considered. Consolidating the remaining housing lots does not change the amount of greenspace created. In fact, it consolidates the greenspace as well, creating greater potential for manipulating grades and increasing flood storage capacity. Added benefits include retention of some of the neighborhood fabric, retention of local residents, reduced burden on town budgets and maintenance requirements, and long-term community stability.

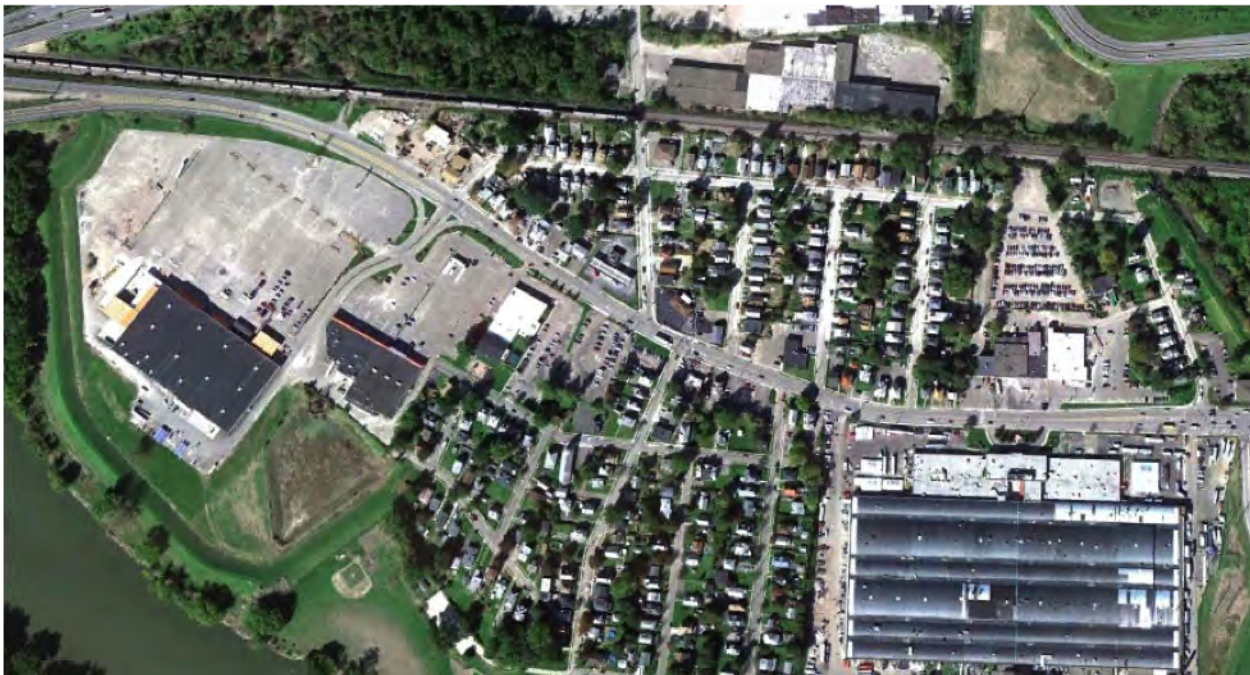
Although these concepts were developed for the Fairmont Park, Westover, and Argonne



Avenue neighborhoods, the problems that they address are common in any floodprone neighborhood, particularly those impacted by FEMA buyouts. The strategies presented here are designed to promote long-term sustainable and resilient neighborhoods despite the necessary loss of useable building lots in areas of high flood hazard.

The negative impacts discussed here are not specific to the Town of Union, the Susquehanna River Watershed, or New York State. It is the goal of the town that these neighborhood redevelopment concepts lead to further discussions that positively address both the short and long term impacts associated with flooding wherever it occurs.





The Town of Union sought resilient redevelopment options for the BAE facility after it incurred severe damage from flooding.

TOWN OF UNION, NY: FORMER BAE SITE REDEVELOPMENT PROJECT

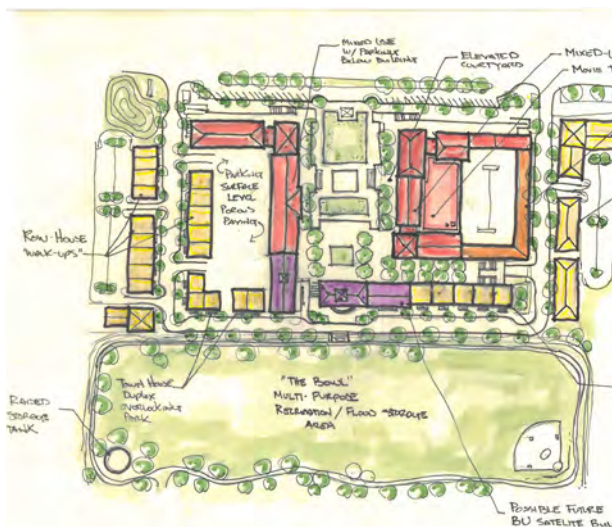
The former BAE site in the Town of Union, NY was flooded in 2011 during Tropical Storm Lee, when the earthen levee that surrounds the site was over-topped at low points where settling had occurred over time. The site filled up like a bathtub with no way for the floodwaters to escape. Water filled the BAE facility and grounds to a depth of five to six feet before it could eventually be pumped out after the storm. The flooding caused tremendous damage to the BAE facility, forcing it to be permanently shut down and it is now slated for demolition.

Fortunately, BAE and its 1,500 employees were able to relocate to the HURON Campus in the neighboring Village of Endicott. The United States Air Force, owner of the property, agreed to demolish the existing building, clean up the

site, and make it shovel-ready for whatever future use the Town of Union identifies. This process will occur after the Air Force sells the property to the Broome County IDA for the purchase price of one dollar (\$1.00). The IDA would in turn develop the shovel-ready site in consultation with the Town of Union.

Based upon this agreement, the Town of Union embarked on a public planning process, through the NY Long Term Recovery Strategy Program (NYLTCSR), to study possible resilient redevelopment options for this important site. The town explored possibilities that recognized the site's unique geophysical location and potential value as a tax generating property, while also considering the important fact that it is prone to flooding during extreme weather events.

The site's location, which includes direct access to State Routes 17C and 201, Binghamton



BAE redevelopment concept sketch.



BAE district drawing.

University on the other side of the Susquehanna River, and a direct connection to Main Street in the Village of Johnson City), offers many opportunities for its redevelopment. The public planning process elicited a wide range of ideas, including an outdoor mall, student housing to take advantage of the site's relationship to Binghamton University, recreational uses such as indoor and outdoor athletic facilities, a site for solar power generation, the possible location of a satellite institutional use, and a variety of housing types to accommodate town residents whose homes had been destroyed by flooding.

Using these ideas as starting points, the town developed a conceptual plan that explores the idea of mixed-use redevelopment on the former BAE site. The concept combines many of the ideas generated during the public planning process and includes a resilient mix of several housing types with retail, office, recreational, and institutional uses. In addition, the plan for redevelopment includes flood storage and conceptually locates a

sewage tank to temporarily store excess flows during major storm events, thereby relieving pressure on the primary sewage treatment facility. It would serve to reduce the risk of the combined sewage flow exceeding the capacity of the plant and raw sewage being discharged into the Susquehanna River, which happens regularly after heavy rainfall.

The design of the resilient mixed-use redevelopment is formally organized around a central common. The common is defined by 3-4 story mixed-use buildings that elevate the first floor retail one full story above existing grade, enabling the site to flood without causing damage to the buildings and allowing the space below the buildings to be utilized for parking. Accessible ramps and stairways would lead from the parking level to an elevated pedestrian friendly "platform" surrounding the central common surrounded by retail shops and restaurants. This raised esplanade would offer shade trees, site amenities, public art, and opportunities for outdoor dining and public gathering, creating a vibrant and



Buildout including the Home Depot Area, a resilient Green Commercial Corridor, restructuring of byout areas to create a sustainable neighborhood, and creation of significant flood storage capacity and areas for mitigation

attractive environment. The lower section of the common could also function as a public space, ideally located for festivals and or civic uses such as a farmers’ market that could benefit surrounding businesses while bringing the community together.

The upper floors of the mixed-use building would be reserved for commercial office space and residential units. Parking for these uses would be located behind the buildings or in the site’s multi-story parking structure. In effort to anchor the commercial aspect of the development, encourage spin-off economics, and activate the space during the evening, the conceptual plan integrates a state-of-the-art movie theater. The entrance to the movie theater would be located on the central

common, but the mass of the large theater structure would be veneered by smaller retail, commercial, and residential buildings overlooking the common.

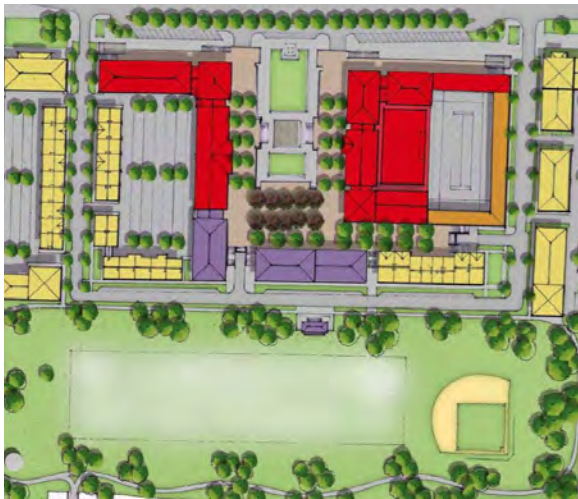
A possible future location for a satellite institutional use terminates the axis of the central common in the conceptual plan. An institutional use in this location would activate the development during the day and complement neighboring uses on the site, which include a resilient mix of housing types, including apartment buildings, “walk-up” row houses, and urban flats that veneer the parking structure and maintain the street wall. Similar to the mixed-use core surrounding the central common, all of the housing options on the site would be elevated above the base flood elevation, enabling the site to flood



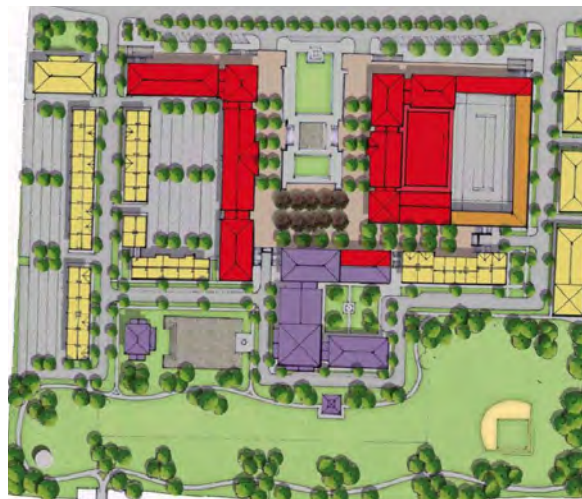
High density mixed-use area



High density with institutional anchor



Larger greenspace and smaller institutional anchor



More buildout of commercial and institutional uses



High density with central paved pavilion area



Exploration of recreational uses of the site



Mixed-use redevelopment of the BAE campus would create a vibrant new public space.

without significant damage to dwellings and creating space for covered parking beneath the buildings.

The proposed design also reflects the community's desire for the site to incorporate opportunities for both passive and active recreation, and creating space for additional flood storage. The southern third of the site is designed to be a sunken recreation area, including a softball field and flexible open space for informal sports, throwing a Frisbee, or having a picnic. This area also includes a perimeter loop trail and a possible future connection to the proposed Riverwalk Multi-use Path. If groundwater conditions allow, this recreation area can be depressed several feet, adding significant flood storage for site's stormwater runoff, allowing it to infiltrate naturally over time. This green infrastructure practice will be an attractive site amenity while greatly reducing or eliminating the site's impact on the Town of Union's stormwater infrastructure. It will, along with the opportunity for the incorporation of green roofs and porous pavers, further exemplify the project's sustainability and resiliency.

In addition to providing the town with a plan that is rooted in public input and focused on resiliency, the plan serves as a case study for similar sites throughout the region and New York State in floodprone communities. This study demonstrates a proactive approach to planning and design when circumstances justify the examination and exploration of redeveloping resiliently within a floodprone area, especially when relocating active uses may not be in the best interest of the community, due to the particular attributes of the site's location, access, and place within the urban and economic fabric of the community.

GREEN INFRASTRUCTURE RETROFITS FOR DATED COMMERCIAL AND INDUSTRIAL SITES

The Village of Johnson City, in the Town of Union, NY is home to the Oakdale Mall, one of the largest commercial sites in Broome County. The 62-acre mall site is essentially 100% covered by impervious surfaces. This is also true for the other large retail parcels located along the commercial corridors of

Figure 7: Redeveloped BAE Campus



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Figure 8: Birds Eye Redeveloped BAE Campus



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Harry L. Drive and Reynolds Road, as well as countless commercial and industrial sites throughout Broome County, the Susquehanna River Watershed, the State of New York, and the nation. These parcels were developed before today's more realistic requirements for on-site stormwater management. These highly impervious commercial and industrial sites are major contributors to stormwater runoff, overburdening infrastructure and leading to increased flooding and erosion while carrying sediments and toxins that damage streams. Today, new construction is required by state and federal law to manage stormwater on-site during normal rainfall events and not allow the quantity, rate and pollution load of stormwater runoff leaving the site after development to exceed pre-development levels. Where site conditions allow, new development is required to utilize green infrastructure methods for stormwater management, storing and cleaning accumulated runoff through natural processes and infiltrating it into the ground to recharge groundwater and reduce flooding. These regulations may prevent new development from adding to existing stormwater management and flooding problems, but cannot ameliorate them. To do that, existing sites must be retrofitted with practices to reduce stormwater runoff below current levels.

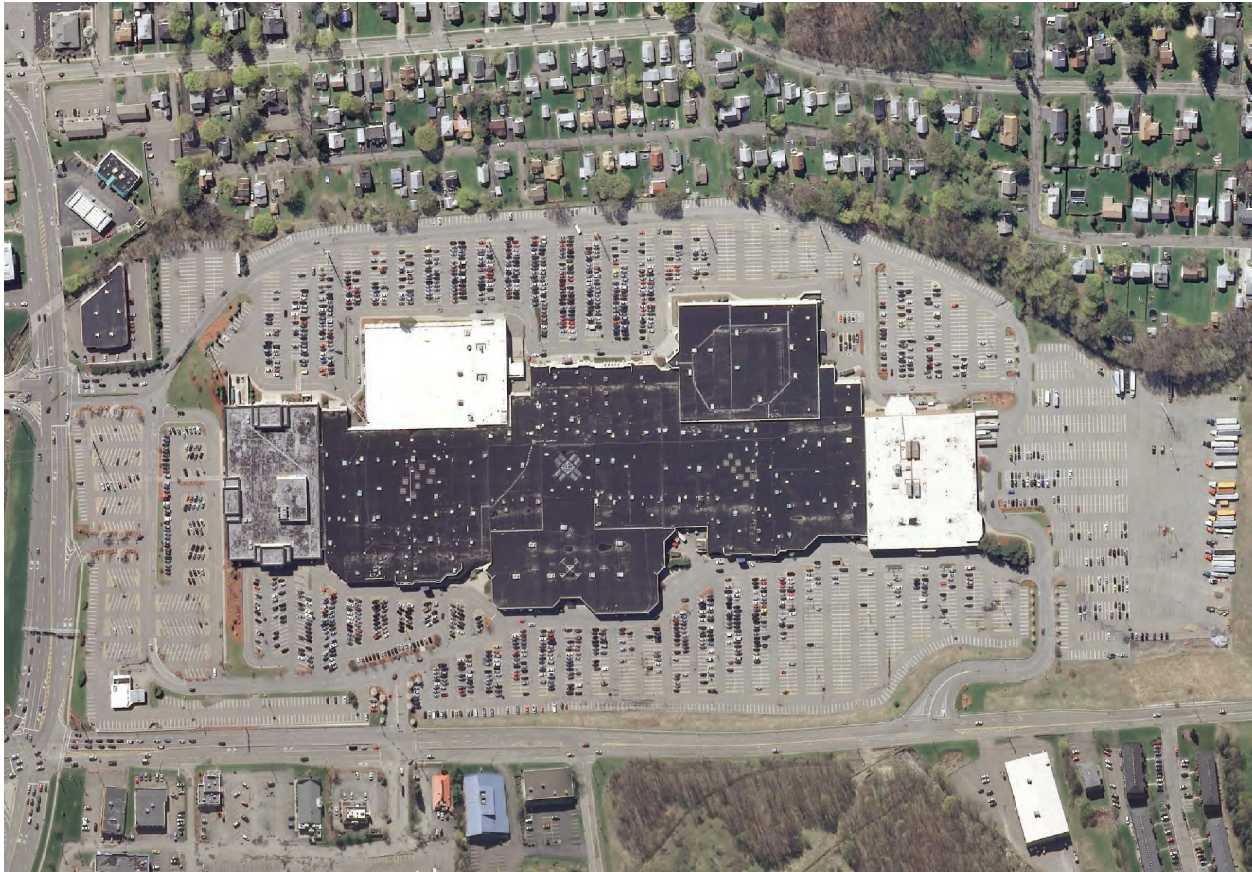
As part of the planning and design process for both the NY Long Term Community Recovery Strategy Program and the NYRCR Program, it was determined that a series of case studies (conceptual design studies) could demonstrate how dated commercial and industrial sites can be retrofitted with green infrastructure methods to help reduce negative stormwater

effects on the community and the region. The three case studies address the Oakdale Mall in the Village of Johnson City, NY; the Town Square Mall in the Town of Vestal, NY; and the HURON Campus in the Village of Endicott, NY. The retrofits developed for these sites would greatly reduce their areas of impervious surface and treat their stormwater runoff on-site, reducing runoff to municipal stormwater systems and local streams, and significantly reducing ecological impacts and flooding.

OAKDALE MALL IN THE VILLAGE OF JOHNSON CITY, NY: GREEN INFRASTRUCTURE RETROFIT

The conceptual plan to retrofit the Oakdale Mall with green infrastructure employs several stormwater management best practices. The mall structure has a large flat roof that could be slightly modified to allow an establishment of a green roof. Green roofs slow and absorb stormwater during rain events, reducing the burden on stormwater infrastructure. At the same time, they decrease heating and cooling costs by acting as added insulation and also absorbing the light energy that is converted to heat on a conventional roof system. The roof might also host a large solar collector installation, which could significantly reduce energy costs for the building and offset some of the cost of the retrofit.

The asphalt parking area surrounding the mall offers another opportunity for reducing the burden on the town's stormwater system. Portions of the parking area surrounding the mall could be reconstructed to direct runoff into rain gardens and bio-swales, improving water quality, reducing runoff, and promoting



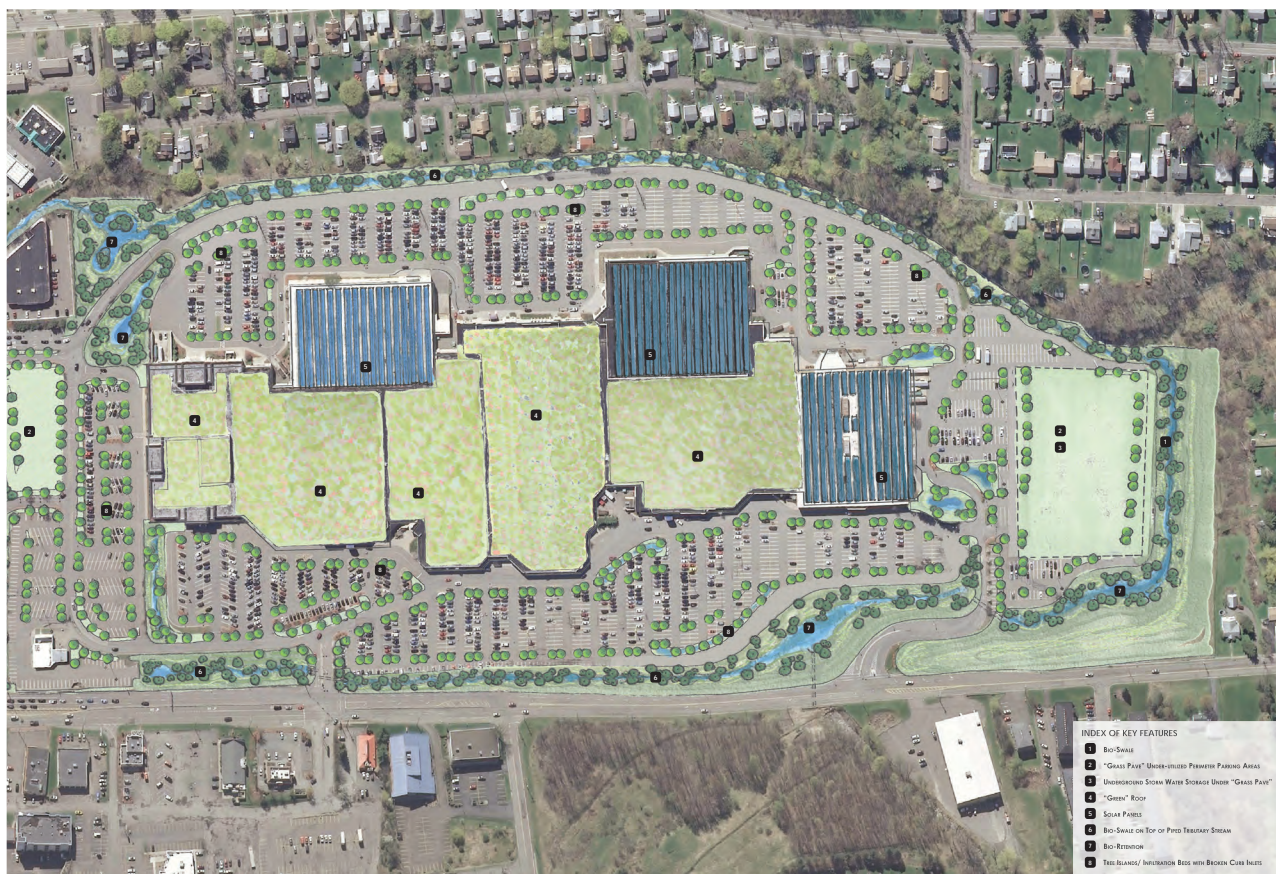
Existing conditions at the Oakdale Mall in the Village of Johnson City.

infiltration to recharge the aquifer. The case study plan proposes removing asphalt in areas that are only utilized for parking on a few days of the year. In such areas, asphalt would be replaced with stabilized grass parking surfaces, allowing for stormwater infiltration and reducing impervious cover. This opportunity exists at most older shopping centers, which were constructed with enough parking to accommodate their busiest days of the year. One-quarter or even one-third of the paved area is unused some 360 days of the year. Imagine the collective benefit to be gained if one-quarter of the paved parking lots at large shopping centers could be transformed into pervious surfaces that absorb runoff, such

as stabilized grass parking areas or pervious pavement.

The case study also proposes an underground storage facility to be activated during high flow events to intercept and detain floodwaters from the creek that enters the site on the northwest corner of the property, reducing downstream flooding.

A stream channel buried in a culvert pipe comes under Reynolds Road from the cemetery and runs south to the intersection of Reynolds Road and Harry L Drive through the mall property. This intersection has historical flooding problems as the underground stream



Green infrastructure retrofit of the Oakdale Mall.

backs up, popping off manhole covers and flooding the intersection. The proposed design would daylight this stream and provide it with a constructed floodplain, incorporating a series of stepped pools that would increase its holding capacity, reduce its velocity, improve water quality and reduce flooding at the intersection.

In addition to the major elements outlined above, the conceptual plan for the Oakdale Mall Green Infrastructure Retrofit would include smaller measures such as rain gardens, infiltration planters and tree boxes, rainwater harvesting for landscape irrigation, and the integration of interconnected tree islands

to capture runoff and convey it through conventional pipe systems to larger bio-swales and bio-retention areas. These areas would also provide shade to the parking areas and reduce the site's heat island effect. Collectively, every opportunity to reclaim impervious surfaces and make them pervious helps turn small modifications into large impacts.

HURON CAMPUS IN THE VILLAGE OF ENDICOTT, NY: GREEN INFRASTRUCTURE RETROFIT AND LONG TERM CONCEPTUAL BUILD-OUT

The HURON Campus is the former IBM complex in the Village of Endicott, NY,



Existing conditions on the HURON Campus in the Village of Endicott.

now owned by a property management company that leases space to office, research and manufacturing tenants. Several large companies have operations there, making the HURON Campus one of the region's largest centers of employment. The approximately 162 acre campus, located in the heart of the village, is bounded to the north by residential neighborhoods and to the south by village mixed use neighborhoods and the village's main downtown area along Washington Avenue. The HURON Campus, like the Oakdale Mall, is almost entirely covered by impervious surfaces. These include large roofs and expanses of paved parking areas, walkways, and plazas. As at the Oakdale Mall, a large

percentage of the parking spaces on the HURON Campus are underutilized. They were created during the peak of IBM employment and the need for parking spaces is now greatly reduced.

The campus has historically been subject to localized flooding, which has been increasing in recent years. It experienced significant flooding in 2011 due to Hurricane Irene and Tropical Storm Lee, but some areas on campus now flood even during "normal" rain events. Some of the flooding has been attributed to problems with existing infrastructure, particularly in the campus's northwestern quadrant. With financial support from this LTCR planning



Industrial site green infrastructure retrofit on the HURON Campus.

initiative, Woitd Engineering & Consulting was tasked with completing a hydrologic and hydraulic investigation of the Lower Brixius Creek Watershed that contributes to sheet flow flooding at the HURON Campus and in the vicinity of North Rogers Street and McKinley Avenue intersections with Pine Street and in the vicinity of Watson Boulevard. Preliminary recommendations from that study under consideration by the Village of Endicott and the Town of Union include:

- Constructing a low wall at the Pucedo Funeral Home parking lot eliminating a low area where overflow flooding begins;
- Reconstruct and regrade North Arthur

Avenue and a small portion of the HURON Campus Parking lot to redirect sheet flow flooding back towards the Brixius Creek. In addition excavate and regrade existing green space on each side of the Creek to provide additional flood storage; and

- Improve sediment management practices including use of sediment traps grade adjustments, use of cross vane structures, and stream bank stabilization along the Brixius Creek.

The proposed HURON Campus Green Infrastructure Retrofit case study will look at the campus's overall impact on the village's stormwater system and the village's overall

sustainability and resiliency. As part of the planning and design process, the NYRCR Program team met with representatives from the HURON Campus and the Village of Endicott to discuss and identify the current flooding problems, potential causes, and the campus's role as a contributor to runoff entering into the village's stormwater system. Also discussed were opportunities for the consolidation of underutilized parking areas by developing strategically located multi-story parking structures, enabling the transformation of several large surface parking areas into greenspace or bio-retention areas, and significantly reducing the campus's stormwater runoff quantity and improving its quality with on-site treatment.

The conceptual plan for the HURON Campus Green Infrastructure Retrofit demonstrates these ideas, and further, illustrates how additional development might be incorporated that meets state and federal requirements for proper management of stormwater runoff through green infrastructure. The team was made aware of a five acre parcel of land bordering the western edge of campus that would potentially be suitable for a large bio-retention area. The conceptual plan illustrates how this land might be used to naturally attenuate runoff and provide additional flood storage for runoff from impervious areas of the campus.

The last component of the conceptual plan for the HURON Campus Green Infrastructure Retrofit not only deals with the reduction of underutilized impervious surfaces, but also looks to restore one of the village's historic neighborhoods and improve the downtown's

resiliency and economic sustainability. The area directly south of the campus between Grant Avenue and Adams Avenue once contained a traditional village neighborhood of pleasant tree-lined streets. Located only a few short blocks from the goods and services along Washington Avenue, this neighborhood provided nearby customers to support the downtown. During the peak of IBM employment, this neighborhood was dismantled home by home, converting a lively community into barren parking lots. At the time, this decision may have seemed justified, but today these large expanses of unmaintained and underutilized pavement contribute little to the community other than enormous amounts of stormwater runoff. The area represents a large gap in the fabric of the downtown, separating it from the neighborhoods that surround it and creating a negative economic impact on downtown businesses.

The schematic plan illustrates the long-term restoration of this neighborhood by the conversion of underutilized parking lots back into residential lots and neighborhood parks. The plan also shows the opportunity for the village to consolidate some surface parking along Garfield Avenue into a parking structure, which would provide opportunities for denser infill development that might include resilient senior housing. Senior housing located directly adjacent to the goods and services along Washington Avenue would not only enrich the quality of life and independence of senior residents, but also provide a boost to local businesses. This neighborhood restoration would not only have a positive impact on the economic vitality of the village, by restoring a



Redevelopment of the former Kmart site in the Village of Endicott.

lost quadrant of the downtown community, but also would reduce future flooding by decreasing stormwater runoff.

The conceptual designs developed for these case studies have one overarching goal - to provide examples of how dated commercial and industrial sites can be retrofitted with green infrastructure methods to reduce negative stormwater effects and bring renewed economic vitality and improved quality of life to the community and the region. The plan offers conceptual options that are both resilient and sustainable, but one question looms. How will these improvements be paid for?

In response, another question should be asked: Who will pay, and how will the long-term ramifications be paid for if stormwater

management and runoff reduction practices are not improved? The burdens being created by obsolete development practices - flooding, infrastructure damage and replacement, erosion, and pollution - are being paid for by all taxpayers, and not only by those whose properties contribute most to the problem. It is highly unlikely that existing businesses will be able and willing to pay for the retrofits to their properties on their own. If taxpayers are footing the bill for the problems resulting from excessive runoff, it makes sense for taxpayers to invest in the retrofits that promise to reduce runoff and save taxpayer money in the long run. Implementation of these ideas will require better public understanding of their benefits, of the costs of inaction, and also the development of creative funding



Conceptual plans organize an anchor commercial establishment and other structures around a central linear green.

solutions. In the case of the HURON Campus, a Hazard Mitigation Grant Program request for \$2,000,000, pending review from Governor Andrew Cuomo’s office, would “transform parking areas into green space or large bio-retention areas to reduce stormwater runoff, restore a historic neighborhood to improve the downtown’s resiliency and economic stability, and provide new opportunities to attract economic growth.”

VILLAGE OF ENDICOTT FORMER K MART SITE REDEVELOPMENT

The former Kmart site in the Village of Endicott, NY is in a similar situation to that of the BAE site by virtue of its prime commercial location and vulnerability to flooding. Prior to the flooding of Hurricane Irene and Tropical Storm

Lee in 2011, the Kmart at this site location was one most successful in the region and an important contributor to the local tax base. As part of the planning and design process for both the NY Long Term Community Recovery Strategy Program and the NYRCR Program, the team explored conceptual alternatives for resilient redevelopment on the valued site that would demonstrate how the site could be redeveloped while substantially reducing the risk of flood damage.

The conceptual plan for the site organizes a larger “anchor” commercial establishment and several out-parcel commercial structures around a central linear green. In addition to providing an attractive entry that controls the site’s vehicular circulation, the central



Cloverleaf mitigation area in the Village of Johnson City.

green reduces the site's impervious surface area and is depressed to provide stormwater storage. The commercial building's finished floor would be elevated above base flood elevation to enhance resiliency, while the parking and landscape areas would remain at-grade enabling the site to occasionally flood. The commercial buildings would be accessed through an integrated system of ramps and stairs that directly connect parking areas to the store entries. The site's resiliency and overall sustainability would be further enhanced by the integration of green infrastructure to handle the site's stormwater runoff on-site, while providing additional storage for occasional flooding. A system of inter-connected bio-swales and bio-retention areas on the perimeter of the site would

naturally store and clean the stormwater runoff, thereby reducing the site's impact on the village's stormwater infrastructure system and its regional impact to the Susquehanna River's Watershed.

The conceptual plan also calls for the future evaluation of an underground stormwater storage system that could be located across Vestal Avenue under the athletic fields at Jennie F. Snapp Middle School. The feasibility of this system largely depends on the groundwater elevation on site, but conceptually this system could handle additional stormwater runoff volumes from the Kmart site and the surrounding neighborhood, further reducing the impacts to the village's stormwater infrastructure system.



Open land areas in the cloverleaf provide the opportunity to create inter-connected bio-retention areas.

The resilient re-use of this underutilized site could restore much needed tax base to the village, while the integration of the green infrastructure makes the site more sustainable and also more attractive by significantly reducing the site's impervious surfaces and corresponding stormwater runoff. This alternative approach to conventional commercial development could become a model for the village and the region to demonstrate responsible, resilient, and sustainable economic development.

CLOVERLEAF MITIGATION AREA: VILLAGE OF JOHNSON CITY

As part of the planning and design process for both the NY Long Term Community Recovery Strategy Program and the NYRCR Program, the town and its villages identified localized flooding areas and then developed schematic plans that could reduce their negative impacts. One of the areas that experienced significant flooding from Tropical Storm Lee was a portion of the Little Choconut Creek that runs between the Rt. 201 and Rt. 17 interchange, or cloverleaf, and the commercial site occupied by Gander



Pathways would allow floodwater to move freely between the four internal and smaller external segments of the cloverleaf.

Mountain, a large retail business specializing in outdoor merchandise and apparel. The flood of 2011 inundated the Gander Mountain site, forcing the large retail operation to close its Village of Johnson City location, negatively impacting the tax base of the local economy. Although the store reopened in 2014 its long-term tenancy is uncertain.

Through the site investigation process, the town saw an opportunity to expand the floodplain of the Little Choconut Creek using existing undeveloped and under-utilized land.

The open land areas within the adjacent “cloverleaf” interchange of Rt. 201 and Rt. 17 provide a perfect opportunity to create a series of inter-connected bio-retention areas that could expand the creek’s floodplain, providing additional flood storage to protect nearby properties.

The land in these “left over” and otherwise unusable areas of the cloverleaf system could simply be excavated, re-graded and planted, and ultimately inter-connected through utilization of directional borings that would create pathways that allow floodwater

to move freely between each of the four internal segments, as well as the many smaller segments on the outside of the cloverleaf.

The concept plan also looked for an opportunity to restore the tax generating capacity of the Gander Mountain site by proposing a new flood resilient building to be constructed on the site. Conceptually, the site could be transformed into a perfect opportunity for Gander Mountain or similar outdoor focused retail operation by developing an elevated building with parking below, allowing the site to flood occasionally without damaging the building or store inventory. The new elevated business could overlook a beautiful bio-retention area and “casting pond” that would become a functional site amenity for the sale of fishing equipment, while also providing flood storage.

The Cloverleaf Mitigation Area would use undevelopable waste land to reduce the impact of flooding in the area, while demonstrating a commitment by the village and town to pursue every opportunity to become more flood resilient. Although the flood storage volumes schematically developed within the conceptual plans discussed above are significant on the neighborhood scale and maximize on-site opportunities, it is important to remember that all of them provide merely a “drop-in-the bucket” impact in the context of regional flooding. They are not the kind of large-scale infrastructure project that could provide impact on a regional scale. They could prevent some of the flood damage in the immediate area and immediately downstream, but cannot protect the Town of Union from the enormous volume of stormwater funneled

down to it from the entire Upper Susquehanna River watershed during a major storm event.

SUMMARY OF CATALYST PROJECTS

By identifying potential mitigation sites and developing conceptual plans to maximize the beneficial impacts to these sites, the Town of Union has accepted responsibility for its own “drop in the bucket” and a commitment to doing what it can to address the increasing flooding challenge.

The projects and case studies included in the Long Term Community Strategy for the Town of Union exemplify a balanced and holistic approach to the problem of increased flooding and severity of events. Potentially available sites demonstrating the ability to reduce negative stormwater impacts to the Susquehanna River and its tributaries have been identified and designed to provide maximum improvements to water quantity and quality while also creating healthy ecosystems that can contribute positively to the health and stability of local hydrologic systems. Existing commercial and industrial sites constructed prior to today’s stormwater regulations, sites that contribute heavily to harmful stormwater runoff, have been identified and designs for potential retrofits demonstrate how these sites could be transformed in a significant and positive way. Designs for new construction and the re-use of flooded sites and neighborhoods propose sustainable and resilient improvements that bring vitality to the community while increasing flood storage and mitigation. A regional river system initiative seeks to establish regional resiliency through watershed modeling, a stream management program, and education



and outreach components. Each and every project incorporates green infrastructure.

In summary, this range of projects, this combination of approaches, this widespread and diverse set of strategies, contributes many “drops in the bucket” and demonstrates the potential for individual projects to collectively have a much larger impact. Given the scale and magnitude of the watershed and climate change predictions for increased flooding, these are the kinds of projects that all of our communities are going to have to tackle if we are to sustainably coexist with our watersheds.

RESILIENCY ACTIONS

Two primary components have been identified by the town as the focus of this LTCR Plan:

- Address flood hazards and make the town residents safer from extreme weather risks.
- Stimulate economic opportunity in floodsafe locations to restore and grow the town tax base.

The implementation section that follows sorts all of the actions, programs, policies and projects by the FEMA recovery support function. Each project narrative provides a description of the action, assigns strategies and management measures, identifies priority, phasing, cost range and level of community support. A more detailed description of high priority projects follows. The description of priority projects is at a higher level of detail. Actions assigned a high priority are catalysts that provide important building blocks for recovery.

Typically, high priority actions will:

- Be a “FEMA critical asset” (fire, police, municipal command center, EMS, water and sewer infrastructure, emergency shelter)
- Fill a post-disaster community need
- Fill a critical economic development need with near term impact
- Leverage resources and create linkages to other projects
- Relate directly to physical damage from the disaster
- Encourage private investment
- Carry wide community support
- Offer realistic outcomes that are feasible
- Use resources wisely



REGIONAL OR MULTI-MUNICIPAL PROJECTS

Regional Project 1: Susquehanna River Regional River Initiative

Summary: This proposed project establishes a regional river system initiative to build resilience. This project is intended to link the Broome Community, Tioga Community, and the Village of Sidney together to comprehensively understand and address flooding issues in the Upper Susquehanna River basin. The intent is to partner and build on the USACE/NYSDEC Upper Susquehanna River Study that is currently under way and create regional resiliency through specific

projects as well as outreach and education. The initiative will include three components: watershed modeling to identify natural infrastructure practices for implementation; an environmentally sensitive stream management program including components of emergency stream intervention with project implementation; and education and outreach to municipal officials, county legislatures, and residents of the NYRCR Tioga and Broome Communities.

Cost: \$3.0 million

Timeframe: 24 months

Partners: NYS Department of Environmental Conservation, U.S. Army Corps of Engineers, Upper Susquehanna Coalition, County Soil and

Water Conservation Districts

Potential Funders: NY Rising Rising to the Top Bonus Competition \$3.0 Million

Status: Pending

Community Benefits: The project will reduce the effects of floodwaters by de-synchronizing flows, infiltrating runoff into the groundwater, spreading flow into the natural floodplain and ensuring streams are correctly shaped to accommodate flood events. There will be indirect benefits will accrue of reduced flooding leads to decreased damage to property and infrastructure. There will also be co-benefits from improved ability to support new opportunities for outdoor recreation and tourism development. Environmental benefits will include wetland creation and restoration with flood attenuation, green infrastructure, natural stream rehabilitation, and floodplain enhancement through berm removal. Co-benefits may include improved habitat and carrying capacity for wildlife, enhanced outdoor recreational opportunities for people, and provision of ecosystem services such as

improved water quality. The collaborative, regional nature of the Susquehanna River Regional River Initiative will improve working relationships amongst political entities and jurisdictions in the Southern Tier. This effort should have a cascading impact on regional health and social issues that need to be addressed. The proposed project would have a net benefit on community safety, health, and economy by potentially reducing the extent and severity of flooding through the aforementioned regional goals. Flood risk will be mitigated through the development of additional capacity for water storage, passive open space, research for contemporary methods for addressing stream repair to reduce the risk of upland contaminants getting into riverine environments, and reducing the risk of pavement failure along creek-side road segments.



Regional Project 2: Regional Emergency Shelter Feasibility Study

Summary: During both Tropical Storm Lee and the 2006 storm event, there was mass evacuation throughout the Broome Community. As noted by representatives of Binghamton University, in each instance the University's Events Center housed more than 2,000 people, including persons with special needs. The shelter was operational for five days after the 2006 flood and 15 days after Tropical Storm Lee. The number of displaced people placed incredible stress on the University's staff and facilities. This project will evaluate

the feasibility of renovating a portion of a former military supply depot located in Fenton, NY to serve as a regional emergency shelter. It will also identify appropriate synergistic uses that can be incorporated into the project, such as a logistics center, first responder shelter, emergency domestic animal co-shelter, and hands-on emergency training facility.

Cost: \$500,000

Timeframe: 24 months

Partners: Broome County, other Broome municipalities, NYS Department of Environmental Conservation consultation,

NYS Department of Health

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project

Community Benefits: This project would reduce the risk of injury or ill health to Broome County residents displaced from their homes due to flooding. The proposed project would have a net positive benefit on community safety and health, since a regional shelter would provide a centralized, safe location for persons with no access to lodging and post-flood assistance. Persons with special needs

would particularly benefit from the shelter designed with them in mind. A centralized regional shelter would allow post-disaster assistance to be administered more efficiently and effectively since specific plans and supplies can be in place prior to need.

Regional Project 3: Targeted Disaster Preparedness Education

Summary: This project provides a disaster preparedness education campaign for vulnerable populations in the Southern Tier. These groups could include low-income residents, renters, persons for whom English is a second language, persons with disabilities, or other identified vulnerable populations. The project would raise individual preparedness levels for these groups through three training

programs: “Preparedness for Individuals and Households”, “Preparing Your Pet”, and “Preparedness for Businesses”. The business training would include planning for continuity of operations after a disaster. Project funds would be used for volunteer recruitment, training, orientation, and program implementation and cover a service area that includes Broome, Chenango, Delaware, and Tioga Counties.

Cost: \$25,000

Timeframe: 9 months

Partners: Broome County Office of Emergency Management

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Featured Project

Community Benefits: Vulnerable populations will be more prepared for future disasters. This educational outreach and flood awareness program has the potential to reduce the burden on health and social services during extreme weather events. The proposed project would have a net benefit on community safety, health and economy by providing educational tools, particularly to segments of the population that are most vulnerable due to economic, mental, and physical constraints. The project would

provide training for individuals and households for handling future storm/emergency events, particularly in the first 72 hours following a disaster. Increased awareness of flood risk, particularly among vulnerable populations, can enhance the efficiency and coordination of response and recovery activities by the Broome municipalities and other governmental entities such as the Broome County Office of Emergency Management, thereby improving resiliency pre- and post-storm.



Regional Project 4: United Way of Broome County Infrastructure Resiliency

Summary: This project would enhance the United Way's 211 call service for emergency use across a five-county area: Broome County, Tioga County, Chenango County, Delaware County, and Otsego County. During storm events, the 211 system provides critical relief to the 911 system that is needed for emergencies. During Tropical Storm Lee, the 911 system serving Broome County received so many calls that its operators could not handle

the volume. United Way contributed staff on a 24-hour basis to assist with call volumes, responding to more than 12,000 flood-related calls. Since the United Way does not have an emergency power generator to rely on in case of power outages, this project would purchase and install an emergency generator at the United Way's facility to keep the 211 system operational.

Cost: \$75,000

Timeframe: 3 months

Partners: The United Way

Potential Funders: NYRCR

Status: NYRCR Proposed Project

Community Benefits: The project will improve emergency response throughout the community by relieving local 911 systems

and diverting less urgent calls to a volunteer organization. The 211 system can help match callers with needed health or social services.

Regional Project 5: Southern Tier Health Link Health Information Exchange

Summary: Provide clinical healthcare information to Broome County Health Department, medical providers, home health agencies, and Susquehanna Regional Emergency Medical Services that coordinate

the regional EMS system. Support the emergency needs of the Broome Community for special needs shelters, ambulance calls, and rapid evacuation processes.

Cost: \$1,714,024

Timeframe: 2 years

Partners: Broome County Health Department, medical providers, home health agencies, and Susquehanna Regional Emergency Medical

Services that coordinate the regional EMS system.

Potential Funders: Hazard Mitigation Grant Program, New York State Health Foundation

Status: NYRCR Additional Project

Community Benefit: Access to safe and reliable shelter, emergency services, and healthcare during emergencies is a critical community need. Ensuring that adequate facilities in accessible and safe locations are available to residents of all ages and abilities

is a critical community challenge. Provision of these services and implementation of a thorough plan to communicate access to them safeguards residents, workers, visitors, and emergency service providers.

Regional Project 6: Debris Removal Volunteer Corp

Summary: Create a debris removal volunteer corps with neighboring communities and regional partners to remove debris, litter and other materials that block or impeded the flow of floodwater in the town's streams, creeks, and river. Reach out to various church

groups, service clubs, youth organizations and nonprofits to organize multiple annual clean up dates. Involve strategic partners like Broome County Soil and Water Conservation District to educate volunteers about health and sustainable floodplain management.

Cost: No Cost – Volunteer Effort

Timeframe: 6 months

Partners: Town, villages, county agencies including Soil and Water Conservation, various

non-profit and volunteer organizations, and service clubs.

Potential Funders: Voluntary Program

Status: Under Consideration

Community Benefit: In addition to increasing the public's awareness of the value of stream maintenance and floodplain restoration this program will remove debris that impeded

the natural flow of stormwater, obstructs mitigation facilities, and causes property damage.



Regional Project 7: Water Supply Interconnection (Village of Endicott with Town of Vestal)

Summary: During Tropical Storm Lee, flooding at the Village of Endicott’s Ranney Well water supply facility knocked out electrical power for 36 hours. The water storage tanks serving the Village of Endicott and the Town of Union were depleted and water mains collapsed when they became depressurized. The lack of a resilient and reliable water supply and distribution system increases health and safety risks for the Village’s residents and other water system customers. This project would create additional access to potable water if

the existing water supply is unavailable due to a power outage or flooding of the well fields. The project would use an existing, pressurized 10-inch transmission line beneath the Susquehanna River. The interconnection would require approximately 250 linear feet of 10-inch ductile iron pipe, several valves, a meter, a blow-off hydrant, two pumps, and two motors. The project would also include construction of a 12-foot by 18-foot concrete vault with an emergency generator installed above the 500-year flood elevation.

Cost: \$600,000

Timeframe: 8 months

Partners: NYS Department of Transportation, NYS Department of Environmental Conservation

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project

Community Benefits: The project will ensure continued availability of potable water for Endicott and Vestal residents. A more reliable water supply system may increase confidence in the business community to continue investments in the Village of Endicott and the Town of Union. All municipal water district users will benefit from the water system’s improved reliability. The project would protect

numerous residential and commercial assets within the Village of Endicott’s water service district. Overall public health and safety benefits would result by having water available for firefighting and general consumption purposes. The continued availability of water in the service lines reduces the risk of depressurization of the lines and subsequent damage through collapse.

JOINT TOWN AND VILLAGE PROJECTS

Town/Village Project 1: Cloverleaf Interchange Bio-Retention/Flood Mitigation ***(Village of Johnson City and Town of Union)***

Summary: In the Town of Union, a portion of Little Choconut Creek flows between the Route 201 and Route 17 cloverleaf interchange and the commercial site occupied by the Gander Mountain sporting goods store. During Tropical Storm Lee, the creek flash flooded. This flooding inundated the Gander Mountain site and caused significant damage to the store's inventory. This project presents a long-term, visionary design for bio-retention

measures that would expand the floodplain of Little Choconut Creek using undeveloped and underutilized land. As shown of Figure 4.6, the pockets of land within the adjacent cloverleaf interchange of Route 201 and Route 17 would provide a series of interconnected bio-retention areas to expand the creek's floodplain and provide additional flood storage.

Cost: \$129,000

Timeframe: 1 year

Partners: NYS Department of Transportation, NYS Department of Environmental

Conservation, U.S. Army Corps of Engineers

Potential Funders: NYRCR CDBG-DR, U.S.

Environmental Protection Agency (EPA)

Status: NYRCR Featured Project

Community Benefits: The increased holding capacity will reduce flood risk to surrounding properties. The project also reduces erosion of commercial properties near the interchange and reduces stormwater runoff into the Susquehanna River watershed. Improving the stormwater management system at the Route 17/Route 201 interchange would provide an additional water storage capacity of approximately 32 acre feet during storm

events. The added water storage capacity would improve system functionality and reduce the potential for localized flooding, erosion, and damage to downstream homes and businesses. Given the information and data analyzed to date, other risk reduction benefits would include decreasing stormwater runoff, protecting riverine ecosystems, limiting contributing to flood waters, and reducing overall exposure to flood waters.



Town /Villages Project 2: Develop a Hazard Alert System

Summary: As part of emergency preparedness the town will evaluate installation of an audible alert system. Given the significant percentage of seniors living in the town there is concern that other notification measures should be augmented by an audible alert, especially if a dangerous flash flood or ice jam hits at night. A variety of systems some with the ability to be used as a voice system for immediate public

address to restore order or direct information to the public in a post-disaster situation and is capable of being heard at over 1 mile. The sirens are solar powered with battery backup allowing it to operate if power is lost. Even if the power grid goes down before the actual emergency reaches the town, the sirens are designed to operate in stand-by mode for up to 30 days on battery power alone.

Cost: Each siren with public address feature costs between \$30,000 and \$40,000.

Timeframe: 1 year

Partners: Town of Union, Village of Endicott, Village of Johnson City, Broome County

Potential Funders: Hazard Mitigation Grant Program

Status: Under Consideration

Community Benefits: The project would increase preparedness, improve the effectiveness of alerts and notifications, improve coordination between first responders and the public, and improve efficiency during

the relief and recovery phases. All these benefits increase the likelihood that residents would survive extreme weather events and recover more quickly.

Town/Village Project 3: Regulatory Review and Update

Summary: The town and villages will develop a resilient land management framework by reviewing the comprehensive plan and zoning ordinance, especially in regard to lands adjacent to the waterways, and consider developing flood hazard zone and stream corridor development overlay districts and other measures to protect the floodplain. Evaluate, develop, and adopt regulatory measures that will enhance resiliency including the creation of a recovery zone for the Westover neighborhood to encourage densification in a flood-safe manner. The Local Flood Damage Prevention law will be reviewed and adopted to New York State Department of Environmental Conservation (NYS DEC)

standards for flood-safe building measures in high and extreme hazard areas as defined in Flood Insurance Rate (FIRM) mapping. Main Street design standards could help deal with the complexities of creating a harmonious streetscape where some buildings remain in their traditional state and others are elevated. The standards should anticipate this reality and offer techniques to integrate buildings of different heights and setbacks with landscape areas, green infrastructure amenities, and deck and stair guidelines. To the degree possible the standards must integrate concerns for building performance during extreme weather events either in the form of recommended guidelines or formally adopted standards.

Cost: \$50,000

Timeframe: 12 months

Partners: Town of Union, Village of Endicott, Village of Johnson City

Potential Funders: NYSEDA Cleaner Greener Community Planning Initiatives

Status: Not Started

Community Benefits: Careful land management is key to creating a safer and more connected community that meets the needs of all residents. Improved regulations would help lessen the impact of storms on homes, businesses, and key assets during future floods. Reduction of sediment loading to streams and the river would pay dividends in water quality improvement and maintaining carrying capacity. Revisions to the zoning code

could enhance economic activity through enhancement of mixed-use districts. Local laws and land use regulations control changes in the community day by day and can have a considerable impact on resiliency in the built and natural environment. The cost to update the village's codes is minor when compared to the level of impact these regulations can have to help make the village flood-safe.



TOWN OF UNION PROJECTS

Town Project 1: Refuse Garage Relocation

Summary: During Tropical Storm Lee, the Town of Union's refuse garage was flooded. During flooding events, the town's employees are unable to access the property and must move the equipment to a safe location before flooding occurs. Relocating this equipment is

labor intensive and disruptive to operations. This project would construct a new refuse garage on a site outside of the floodplain. The proposed site consists of two adjacent parcels, 2900 Wayne Street and 1 North Seward Avenue, which are owned by the town.

Cost: \$2.5 million

Timeframe: 13 months

Partners: U.S. Army Corps of Engineers, NYS

Department of Environmental Conservation

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project

Community Benefit: The flood risk is greatly reduced by relocating the refuse garage outside the floodplain. The Town of Union will not need to expend resources to relocate equipment during severe weather events. This project also ensures availability of refuse collection and services after flooding occurs. Relocating the Refuse Garage facility

would enhance their resiliency and ensure the continuous operational reliability during floods. A new facility would prevent losses associated with inundation of the facility along with the loss of manpower necessary to relocate equipment every time there is a storm event that inundates the facility.

Town Project 2: Scattered Site Stream Bank Stabilization Program

Summary: During Tropical Storm Lee, flash flooding caused the banks of several creeks in the Town of Union to erode. Properties along West Creek and Patterson Creek were particularly affected. This project would protect a 4,500-foot segment of West Creek located north of Day Hollow Road and a 6,400-

foot segment of Patterson Creek located west of Hooper Road. Heavy stacked stone would be placed at selected locations to mitigate soil erosion. "Additional locations for creek/stream/drainage swale erosion repairs are being identified as part of this project."

Cost: \$300,000

Timeframe: 13 months

Partners: U.S. Army Corps of Engineers, NYS Department of Environmental Conservation

Potential Funders: Clean Water State Revolving Fund, NYRCR CDBG-DR, Town of Union CDBG-DR

Status: NYRCR Proposed Project

Community Benefit: Risk Reduction Benefits. Reduce flood risk to residents located along the stream banks. Reduced soil erosion and sediment loads in West Creek and Patterson Creek. The project would stabilize more than 2 miles of stream banks to prevent

further erosion. The project reduces the risk of flooding for residents living along West Creek and Patterson Creek. Stabilized stream banks will also reduce the risk of erosion and sediment deposits downstream.

Town Project 3: Stormwater Outflow Pipe Backflow Prevention

Summary: During storm events, the Susquehanna River backs up into the stormwater outfall system, causing flooding throughout the Town of Union. This project would install flap valves on stormwater outflows and create temporary stormwater storage areas on municipally-owned properties

along Argonne Avenue. The flap valves would reduce the risk of backflow and the stormwater storage areas would reduce flood risk by containing additional stormwater volume. In addition to the flap valves and storage areas, the project would install approximately one mile of 42-inch HDPE pipe with pumps.

Cost: \$950,000

Timeframe: 7 months

Partners: NYS Department of Environmental Conservation

Potential Funders: Clean Water State

Revolving Fund Engineering Planning Grant, Town of Union CDBG-DR, Hazard Mitigation Grant Program

Status: NYRCR Proposed Project

Community Benefits: The flap valves will reduce the risk of backflow. The stormwater storage areas will reduce flood risk by providing additional stormwater storage volume. The Stormwater Outflow Pipe Backflow Prevention project targets locations with low- to moderate-income households. Installing flap valves on stormwater outflows and creating temporary stormwater storage

areas would improve the reliability and capacity of the stormwater system. With increased capacity in the stormwater system, the risk of flooding to adjacent streets, homes, and businesses in their service areas would be reduced. Low-and moderate-income residents of these neighborhoods would benefit from the reduced risk of localized flooding.



Town Project 4: Taft Avenue Sanitary Sewer Basin Flow Metering

Summary: This proposed project addresses inflow and infiltration issues in Taft Avenue area. The area currently experiences sanitary sewer overflows during heavy rain and snowmelt events. This project would install flow meters along the approximate 1.5 mile

Taft Avenue sewer basin to provide the Town of Union with real-time flow data required to isolate sewer line segments and ultimately prevent untreated sanitary sewage from being discharged in to water bodies near the Town of Union.

Cost: \$50,000

Timeframe: 7 months

Partners: NYS Department of Environmental Conservation

Potential Funders: Clean Water State Revolving Fund, Town of Union CDBG-DR

Status: NYRCR Proposed Project

Community Benefits: Ancillary project benefits include that untreated sanitary sewage will no longer be discharged into area water bodies during periods of extreme rainfall (i.e., combined sewer overflow) once metering can isolate problematic segments of the sewer line. Reduced risk of exposure to disease-causing bacteria and viruses contained in combined sewer overflow that is discharged into the water. Installing flow meters along

the approximately 1.5 mile Taft Avenue sewer basin will provide the real-time flow data required to isolate sewer line segments and prevent untreated sanitary sewage from being discharged into water bodies near the Town of Union. The improved control over the sanitary system would provide a health benefit to the community from the reduced risk of exposure to bacteria and viruses contained in untreated sanitary sewage.

Town Project 5: Valleyview Drive Drainage Improvements

Summary: During periods of heavy rainfall, areas within the 196-acre Valleyview Drive neighborhood experience shallow depth flooding. The ponding of stormwater within the travel lanes of public roadways creates a public safety hazard for residents and students accessing the Homer Brink Middle School. This project would upgrade the stormwater drainage system along Valleyview Drive to

mitigate flooding in the Town of Union. The improvements would focus on the main trunk stormwater sewer line by increasing its diameter and replacing sections of corrugated metal pipe with high-density polyethylene pipe or reinforced concrete elliptical pipe. In addition, a debris basin at the inlet of the system would trap and accumulate debris and bed material before it reaches the inlet.

Cost: \$1.2 million

Timeframe: 13 months

Partners: NYS Department of Environmental Conservation

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project

Community Benefits: The project will reduce flooding threats to surrounding residences and Homer Brink Middle School. The project will enhance protection of the middle school to ensure operations can continue unimpeded during severe weather events. Increasing the diameter of the main trunk line, installing more durable materials, and installing a debris trap at the entrance of the main trunk line will improve the reliability and capacity of the Valleyview

Drive drainage system. The improvements made would reduce the potential for localized flooding, erosion, and damage to roughly 350 homes and businesses, including Homer Brink Middle School, located in the approximately 0.33 square mile area surrounding Valleyview Drive. Homer Brink Middle School would also benefit due to school operations remaining unimpeded during periods of heavy rainfall.



Town Project 6: Argonne Neighborhood and South Endwell Riverfront Trail

Summary: Tropical Storm Lee severely damaged the Town of Union's Argonne neighborhood. After the flood, some homes were abandoned and some property owners participated in the FEMA buy-out program. Following the buyouts, many former homes were demolished, leaving vacant parcels throughout the once-established neighborhood. This project illustrates a long-term conceptual plan for flood-safe development in the Argonne neighborhood. The project would incorporate

temporary stormwater and riverine floodwater storage capacity and help strengthen the integrity of the neighborhood. The project would also include initial planning and design of a riverfront trail using properties primarily acquired through FEMA and other buyout programs conducted over the past 20 years. The trail was identified as part of the "Big Loop" trail in the 2011 Intermunicipal Local Waterfront Revitalization Plan.

Cost: \$307,676

Timeframe: 1 year

Partners: NYS Department of Environmental Conservation, NYS Department of Transportation, U.S. Army Corps of Engineers

Potential Funders: Town of Union CDBG-DR, New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP)

Status: NYRCR Featured Project

Community Benefits: The project will increase the holding capacity for stormwater and riverine floodwaters and reduce flood risks to residents and businesses located downstream. There is potential for improved water quality due to settlement of sediments and pollutants in detained stormwater runoff. The trail is part of a larger proposed regional system to enhance recreational opportunities for area residents. An ancillary benefit of a regional trail system is increased tourism at the waterfront. Relocating homes to areas above the base flood elevation and creating a recreational trail with increased stormwater holding capacity would

protect assets and the safety of its citizens plus repair the neighborhood abandonment of the once established neighborhood. Increased stormwater holding capacity created on the recreational site would reduce flood risks to neighboring homes and business downstream as well as create a sustainable and desirable focal point in the community. The reduction of sediment and pollutants captured in the additional stormwater runoff could also improve water quality in the surrounding area. This project directly reduces the risk of flooding by adding 52,700 cubic feet of stormwater storage to the Argonne neighborhood.

Town Project 7: BAE Systems Floodwall Improvement

Summary: The former BAE Systems site in the Town of Union was flooded in 2011 during Tropical Storm Lee when the earthen levee surrounding the site overtopped at its low settling points. Once the levees were overtopped, the site filled with 5 to 6 feet of water until it was pumped out days after the storm. The flooding caused tremendous damage to the BAE Systems facility and forced it to shut down. Subsequently, BAE Systems and its 1,500 employees relocated to the HURON Campus in the neighboring Village of Endicott, NY. The U. S. Air Force owns the property and has agreed to demolish the

existing building, clean up the site, and make it “shovel-ready” for future development. This project would initially survey existing floodwalls at smaller intervals to accurately determine where improvements are required. Based on the survey results, the Town of Union would request permission from the NYS DEC to elevate the floodwall to provide at least two feet of freeboard. These improvements would benefit the Westover section of the town and facilitate redevelopment of the former BAE Systems facility, consistent with plans prepared during the town’s Long Term Community Recovery planning process.

Cost: \$775,000

Timeframe: 8 months

Partners: NYS Department of Environmental Conservation, U.S. Army Corps of Engineers

Potential Funders: NYS ESD for private sector business development support;

NYS HCR CDBG, NYRCR CDBG-DR, and NYS Environmental Facilities Corporation Green Infrastructure Grant Program (for storage facilities); Town of Union CDBG-DR

Status: NYRCR Featured Project

Community Benefits: The project reduces flood risk to a large industrial redevelopment site and may lead to redevelopment of the property, providing jobs and an increased tax base for the Town of Union. Redevelopment of the site may incorporate recreational amenities, such as a multi-purpose trail and fields, which improve health and social interactions of area residents. Elevating the

existing floodwall would further reduce flood risks to a large industrial development site and would allow the creation of a mixed-use, 22.5-acre development that would have a significant economic impact, if developed. The risk of flooding at the former BAE Systems complex will be reduced by upgrading the floodwall to include two feet of freeboard.



Town Project 8: Sanitary Storage Facility at BAE Site

Summary: This project involves the analysis, design, and construction of a 10 million gallon sanitary storage facility at the BAE site. Currently during storm events wastewater being sent to the Binghamton-Johnson City joint sewage treatment plant can overwhelm the system resulting in overflow conditions and direct discharge of waste into the Susquehanna river. The storage facility would be designed to temporarily hold waste water during storm events and send it to the plant

when the volumen can be handled properly. It is not contemplated that it would be necessary duing normal off peak processing periods. The municiaplities owning the system are currently evaluating construction of a floodwall to protect the facility. This option may be a more cost effective augmentation to that project that would be replicable in the Town of Vestal and City of Binghamton, reducing long term capital improvement, operations, and maintenance costs.

Cost: \$6.0 million

Timeframe: 2 years

Partners: Town of Union, Village of Johnson City, City of Binghamton, Town of Vestal, United States Air Force

Potential Funders: Hazard Mitigation Grant Program, Town of Union CDBG-DR, U.S. Environmental Protection Agency, NYS Environmental Facilities Corporation (EFC)

Status: Other Project

Community Benefits: This project would reduce the overflow conditions and release of untreated sewage into the Susquehanna River. As such it improves environmental condidions in the communities by reducing overall exposure to floodwater and post disaster

impacts to properties and improving the health of riverine eco systems. The release of chemicals in the waste material including drug residue can have a significant impact on the impairment of the watershed along the entire Susquehanna Corridor.

Town Project 9: Fairmont Park Protective Measures

Summary: The Fairmont Park Neighborhood was flooded and damaged by Tropical Storm Lee. The neighborhood will soon be only a “shell” of what it was as homes begin to be demolished following closings in the FEMA and CDBG-DR buyout programs. Many of the neighborhood streets, once populated with dozens of houses, will soon have only one or two remaining homes. The vacant properties will become the responsibility of the town and require maintenance (e.g., grass mowing). Streets and infrastructure that serve the few remaining homes must also be maintained.

The NYRCR plan illustrates a long-term, visionary concept for flood-safe redevelopment

of the Fairmont Park neighborhood. The plan would increase density by relocating dwellings to a compact neighborhood footprint. This consolidation would provide a sustainable and resilient neighborhood fabric, since the new homes would be elevated above base flood elevation. It also would reduce the town’s burden of maintaining vacant parcels and underutilized neighborhood streets. The lowest, most flood prone area of the neighborhood would be transformed into a substantial bio-retention area for additional flood mitigation and storage. This area would receive the neighborhood’s stormwater runoff while also providing significant flood storage for future flood events.

Cost: \$369,265

Timeframe: 1 year

Partners: NYS Department of Environmental Conservation

Potential Funders: FEMA, Town of Union CDBG-DR

Status: NYRCR Featured Project

Community Benefits: Added stormwater mitigation will reduce flooding threats to the remaining neighborhood. Flood storage will also protect assets downstream. Elevating newly constructed homes would prevent flooding of critical infrastructure in housing. Consolidation of the housing area will reduce maintenance and infrastructure responsibilities for the Town of Union. Interconnected bio-retention areas would be seeded and planted with native trees and shrubs, creating a natural, low maintenance amenity that stores, cleans, and reduces sediment transfer from neighborhood runoff and occasional floodwater, treating both water quantity and water quality. Increasing neighborhood density through elevated homes

and the repurposing of lower elevations into multiple bio-retention areas would protect assets in the Town of Union and the safety of its citizens, reduce maintenance costs, and repair the neighborhood abandonment and disjointed condition of the once established neighborhood. Furthermore, the reduction of sediment and pollutants captured in the additional stormwater runoff could also improve water quality in the surrounding area. Increased stormwater holding capacity created in each bio-retention area would reduce flood risks to neighboring homes and business downstream as well as create a sustainable and desirable focal point around the relocated homes in the community.



Town Project 10: Rental Housing Replacement

Summary: This featured project would construct 30 units of affordable rental housing to replace rental-housing stock lost

due to flooding during Tropical Storm Lee. This is a long-range project for the Town of Union.

Cost: \$4.5 million

Timeframe: Long-range

Partners: NYS Department of Environmental Conservation

Potential Funders: Town of Union CDBG-DR; reuse of properties being bought out through NYS and USHUD CDBG DR funds

Status: NYRCR Featured Project

Community Benefits: The project would reduce risk to residents since the units would be constructed in flood-safe areas, or be constructed in a flood-safe manner. Replacing rental housing would provide tax base increases to the Town of Union. The project will target low to moderate-income households that lost their living quarters during the 2011 flood. Construction of a 30-

unit affordable rental-housing complex would protect assets, increase safety of residents, and provide an increased tax base for the Town of Union. Low-and moderate-income residents of this neighborhood would benefit from the eliminated risk of localized flooding and the availability of affordable rental housing in the community.

VILLAGE OF ENDICOTT PROJECTS

Village of Endicott Project 1: Backflow Preventer Program

Summary: During Tropical Storm Lee, the infiltration and inflow of stormwater into the Village of Endicott’s sanitary sewer system caused localized backups of sewage into

residential homes. This project would install backflow preventer valves in approximately 45 homes to prevent stormwater and raw sewage from entering area homes.

Cost: \$135,000

Timeframe: 5 months

Partners: NYS Department of Transportation, NYS Department of Health, NYS Department of Environmental Conservation, Broome County

Department of Health

Potential Funders: NYRCR CDBG-DR, DEC Drinking Water Revolving Fund

Status: NYRCR Proposed Project

Community Benefits: The project will reduce sewage backups into homes during extreme weather events. Economic benefits will accrue to Endicott residents since they will avoid paying for the cleanup required when untreated sewage backs up into their homes. Untreated sanitary sewage will not discharge into area water bodies during periods of extreme rainfall. This project will reduce risk

of exposure to disease-causing bacteria and viruses contained in combined sewer overflow discharged into the water. This project would improve public health and safety by eliminating the potential for disease-causing raw sewage to back up into approximately 45 homes located in neighborhoods with low- and moderate-income populations.



Village of Endicott Project 2 - Scatter Site Utility Improvements

Summary: During Tropical Storm Lee, flooding inundated and damaged a number of stormwater pump stations located in the Village of Endicott. When these pump stations failed, stormwater flooded the low-lying portions of the adjacent service areas. This proposed project will rehabilitate and upgrade aged,

under-designed, and vulnerable stormwater pump station components. The work will be performed at three locations: Endwell pump station (State 1106), Loder pump station (State 2325), and River Terrace pump station (State 828). The River Terrace pump station portion is a generator project.

Cost: \$710,000

Timeframe: 15 months

Partners: NYS Department of Environmental Conservation, NYS Department of Health,

Broome County Department of Health

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project

Community Benefits: The project will reduce the risk of flooding to Endwell, Loder, and River Terrace neighborhoods. In addition, some local businesses, low to moderate-income residents, and area schools will benefit from flood mitigation at these pump stations. Businesses protected by the utility improvement will continue contributing to the community's tax base. Each pump station would be able to continuously operate in adverse conditions, which would reduce the

risk of flooded streets, homes, and businesses at the low points within their service areas. With improved pump station functionality and unimpeded operations, the risk of flooding to adjacent streets, homes, and businesses in their service areas would be reduced. Low- and moderate-income residents of these neighborhoods would benefit from the reduced risk of localized flooding and property damage.

Village of Endicott Project 3: Wastewater Treatment Plant Improvements

Summary: During Tropical Storm Lee, flooding inundated the Village of Endicott’s wastewater treatment plant and damaged equipment throughout the facility. This was the second major flood at the plant within a five-year period. The project would construct flood mitigation measures at the Village of Endicott’s wastewater treatment plant. These

measures would include elevating critical equipment above flood level, updating plant equipment, and replacing a redundant power supply. All residents and businesses in the service area, including low to moderate-income neighborhoods (Census tracts 131, 135, 136 and 137), will benefit from improved wastewater treatment.

Cost: \$1,660,000

Timeframe: 1 year

Partners: NYS Department of Environmental Conservation

Potential Funders: Hazard Mitigation Grant

Program (HMGP) application pending for \$1,245,000, Clean Water State Revolving Fund; Appalachian Regional Commission

Status: Proposed Project. HMGP Application pending

Community Benefits: The project will allow for faster recovery from flooding and allow for greater continued treatment during times without normal power supply. All municipal wastewater treatment facility users will benefit from the Waste Water Treatment

Plant’s improved reliability. The river and its’ residents downstream will benefit from the facility treating its’ discharge faster after a disaster and during times without normal power.

Village of Endicott Project 4: HURON Campus Flood Mitigation

Summary: This project presents a long-term, visionary concept for flood mitigation at the 162-acre HURON Campus. The campus is located in the heart of the village and contains significant large areas of impervious surface, including building roofs and at-grade parking lots. Although the campus was significantly flooded in 2011 from Tropical Storm Lee, it has also experienced localized flooding after less

severe storms. Some of the localized flooding can be attributed to problems with existing infrastructure, particularly in the campus’ northwestern quadrant. A recently completed flood mitigation study under review by the Town of Union and the Village of Endicott recommends:

- Constructing a low wall at the Pucedo Funeral Home parking lot eliminating a low area where overflow flooding begins;
- Reconstruct and regrade North Arthur Avenue and a small portion of the HURON Campus Parking lot to redirect sheet flow flooding back towards the Brixius Creek. In addition excavate and regrade existing green space on each side of the Creek to provide additional flood storage; and
- Improve sediment management practices including use of sediment traps grade adjustments, use of cross vane structures and stream bank stabilization along the Brixius Creek.

The conceptual plan for the HURON Campus Flood Mitigation, shown in Figure 4.3, illustrates long-term concepts to restore an historic neighborhood, improve downtown's resiliency, and promote economic sustainability by transforming underutilized expanses of paving into residential lots and neighborhood parks. The concept plan also depicts ways to consolidate underutilized parking areas and develop multi-story parking structures. These would enable the campus to transform several surface parking areas into green space or large bio-retention areas to significantly reduce stormwater runoff and treat it on-site.

Cost: \$1,437,740

Timeframe: 16 months

Partners: NYS Department of Environmental Conservation

Potential Funders: Village of Endicott, NYS Empire State Development (ESD)

Status: NYRCR Featured Project

Community Benefits: The project will alleviate flooding at the HURON Campus. The HURON Campus is home to many jobs, including the recently relocated BAE Systems, and a mitigated campus would provide new opportunities to attract economic growth and generate more tax revenues for the Village of Endicott, Town of Union, and Broome County. Redeveloping underutilized parking areas into green space and bio-retention areas will enhance filtration of stormwater runoff, potentially improving the water quality of the Susquehanna River watershed. Other benefits of this project include addressing the localized flooding that affects the effective reuse of

the facility to continue to attract economic growth and generate tax revenue, economic benefits related to maintaining property values and reduced property damage, and improved connectivity to the adjacent historic neighborhood and downtown commercial area. Given the information and data analyzed to date, risk reduction benefits would include decreasing stormwater runoff, protecting riverine ecosystems, limiting contributions to flood waters, reducing overall exposure to flood waters, and reducing the risk of localized flooding to residents and businesses in the HURON Campus area.

Village of Endicott Project 5: Kmart Site Redevelopment

Summary: This project presents a long-term, visionary concept for redevelopment at the former Kmart site. The conceptual plan illustrates how a larger “anchor” commercial establishment and several out-parcel commercial structures could be organized around a central linear green. In addition to providing an attractive entry that would control the site’s traffic circulation, the recessed central green also would reduce the site’s impervious surfaces and provide additional flood storage. The finished floor elevation of the commercial buildings would be above base flood elevation to enhance the development’s resiliency. Parking and landscape areas would remain at-grade, enabling the site to occasionally flood. The commercial buildings would provide accessibility through an integrated system of ramps and stairs that would directly connect the parking areas to the store entrances. Site resiliency and sustainability would be enhanced by integrating green infrastructure

to handle stormwater runoff generated on-site and provide additional storage for occasional flooding. A system of inter-connected bio-swales and bio-retention areas on the perimeter of the site would naturally store and clean the stormwater runoff, reducing the site’s impact on the village’s stormwater infrastructure system and the Susquehanna River watershed.

The conceptual plan also calls for further evaluation of an underground stormwater storage system, potentially located across Vestal Avenue under the athletic fields at Jennie F. Snapp Middle School. The feasibility of this system would depend on groundwater levels at the site. Conceptually, this system could handle additional stormwater runoff volumes from the Kmart site and the surrounding neighborhood, further reducing the impacts to the village’s stormwater infrastructure system.

Cost: \$2.03 million

Timeframe: 1 year

Partners: NYS Department of Environmental Conservation

Potential Funders: NYS Empire State Development

Status: NYRCR Featured Project

Community Benefits: This project reduces flooding threats to adjacent residential and commercial properties. When implemented, the project may lead to redevelopment of the property, providing jobs and an increased tax base for the Village of Endicott. The project, through stormwater retention and reductions in impervious surface, reduces stormwater runoff into and improves water quality of the Susquehanna River watershed. The benefits include mitigating localized flooding that prevents reuse of the facility, attracting

economic growth, generating tax revenue, maintaining property values, and reducing property damage. Risk reduction benefits would include decreasing stormwater runoff, protecting riverine ecosystems and limiting contributing to flood waters, reducing overall exposure to flood waters, and reduce the risk of post-disaster disruptions to business operations and loss of tax revenue which would help to make the village economy more resilient to fluctuations in the wake of future storm events.



Village of Endicott Project 6: Tri-Cities Airport Stormwater Improvements

Summary: This project presents a long-term, visionary concept for creating large flood storage areas at the municipally-owned Tri-Cities Airport by expanding the river's floodplain. This project demonstrates the Planning Committee's commitment to a regional approach, since these mitigation measures primarily benefit their downstream neighbors. The project would capitalize on the open land resources at the airport. The project would remove the airport's abandoned runway

and associated fill to increase the floodplain's storage capacity. The project would excavate the abandoned runway to a lower elevation, creating approximately 200,000 cubic yards of floodplain storage and protecting adjacent infrastructure at the airport. This project complements the Castle Gardens Buyout Area Stormwater Detention project in the Town of Vestal. Figure 4.11 illustrates the conceptual stormwater improvements associated with both projects.

Cost: \$184,000

Timeframe: 6 months

Partners: NYS Department of Environmental Conservation

Potential Funders: To Be Determined

Status: NYRCR Featured Project

Community Benefits: Reduced stormwater backup threats to downstream communities during severe weather events. Downstream communities will be spared flood damage, which can negatively affect economic vitality and strength of the community. Large flood storage areas may reduce riverbank erosion downstream, due to the decreased velocity of floodwaters. In addition, the reduction of flooding downstream may reduce stormwater runoff into the watershed attributed to those areas. Improving the stormwater management

system would provide an additional water storage capacity of approximately 122 acre-feet. The added water storage capacity would improve system functionality and reduce the potential for localized flooding, erosion, and damage to downstream homes and businesses. Given the information and data analyzed to date, other risk reduction benefits would include decreasing stormwater runoff, protecting riverine ecosystems, and reducing overall exposure to flood waters.

Village of Endicott Project 7: Endicott Inflow and infiltration program

Summary: The Village of Endicott will pursue an on-going program for separating stormwater from the municipal wastewater collection system. Currently dry weather flows average

5 million gallons per day, during heavy storm events approximately 30 million gpd flow to the system overwhelming the ability of the plant to adequately treat.

Cost: \$183,000

Timeframe: 1 year

Partners: NYS Department of Transportation, NYS Department of Environmental Conservation

Funders: NYS DEC, NYS DOT, Clean Water State Revolving Fund (CWSRF) from NYS EFC

Status: NYRCR Additional Project

Community Benefit: This would allow for much greater efficiency at both pump stations and the main facility. Reducing both energy demand and equipment wear. This would

allow for better treatment of wastewater because all flows in excess of 16 MGD bypass secondary treatment.

Village of Endicott Project 8: Endicott Redundant power supply at Ranney Well

Summary: Installation of two natural gas generators for the Ranney Well and booster pump, including installation of electrical

service between the generator and the facility, expansion of natural gas service from Marcella Street.

Cost: \$654,000

Timeframe: 2 years

Partners: Village of Endicott

Potential Funders: FEMA HMGP, NYS Water and Wastewater Treatment Program

Status: NYRCR Additional Project

Community Benefit: This would allow the facility to operate during times without normal power supply. This would allow for

uninterrupted water supply to both businesses and residents.



VILLAGE OF JOHNSON CITY PROJECTS

Village of Johnson City Project 1: Anna Maria Drive Ditch Stormwater Management

Summary: Tropical Storm Lee and other storms have caused erosion along the banks of a drainage ditch that is east of and parallel to Anna Maria Drive. The erosion has undermined an existing concrete-encased sanitary sewer main, which if compromised, could release untreated effluent into the creek and ultimately to the Finch Hollow Stormwater Retention Facility 1, located at the southern end of the ditch. Given the approximate 6% slope of the ditch, this erosion endangers properties that are adjacent to the ditch. In some cases, the erosion is 14 feet deep

and approximately 30 feet from the rear of existing residences. It also has caused increased sediment loads downstream at the Finch Hollow Stormwater Retention Facility 1. The additional sedimentation reduces the capacity of the retention system. The project would rehabilitate approximately 3,500 feet of drainage ditch to eliminate erosion at 50 residential properties and increase holding capacity of Broome County's Finch Hollow Stormwater Retention Facility 1. The required permits from the Army Corps of Engineers have been obtained by the village.

Cost: \$950,000

Timeframe: 10 months

Partners: NYS Department of Environmental Conservation

Potential Funders: NYRCR CDBG-DR

Status: NYRCR Proposed Project. FEMA application pending \$23,803

Community Benefit: The project increases holding capacity at the stormwater retention facility, reducing flood risk to downstream residents and businesses. It reduces erosion of residential properties in proximity to Anna Maria Ditch. The proposed project would have a net benefit on community safety and increased protection for nearly 50 properties from the rehabilitation of 3,500 linear feet of drainage ditch. Additionally, increased stormwater holding capacity at the Finch

Hollow Stormwater Retention Facility No.1 will create resiliency during future flooding for the neighborhood. The stabilization of the drainage structure would reduce the risk of localized flooding to downstream residents and businesses. Given the information and data analyzed to date, other risk reduction benefits include decreasing stormwater runoff, protecting riverine ecosystems and limiting contributing to flood waters, and reducing overall exposure to flood waters.

Village of Johnson City Project 2: DPW Complex Resiliency Improvements

Summary: During Tropical Storm Lee, the Village of Johnson City's DPW complex was inundated, severely damaging equipment and forcing the staff to relocate to inadequate, temporary facilities at Village Hall. During extreme weather events, DPW employees often work long shifts and require use of the facility locker room to rest before going back out. The current space at Village Hall is

inadequate. This project would relocate the DPW's administration offices and employee locker room to a second-story that would be located above the base flood elevation. The project also would construct a new 3,000 square-foot maintenance building and a 13,041 square-foot garage for the village's vehicles.

Cost: \$1.45 million

Timeframe: 13 months

Partners: NYS Department of Environmental Conservation

Potential Funders: NYS CDBG-DR, Clean Water State Revolving Fund

Status: NYRCR Proposed Project

Community Benefits: This project protects the DPW administrative offices and employee locker room by relocating them above base flood elevation. The risk score for the DPW complex would be lowered from 32 to 18 for the 100-year flood. The project ensures uninterrupted public works services that protect residents, businesses, and institutions during severe weather events. Employees will be capable of resting at the employee locker room during severe weather events when they must work long shifts. Improving

the Village's DPW complex by expanding the existing facility, adding a second-story above base flood elevation (BFE), and constructing a new maintenance facility and garage would enhance their resiliency and ensure the continuous operational reliability during floods. This project protects the health and safety of DPW personnel by creating a facility that is more resilient to flooding and also improves DPW response capability during flooding events.



Village of Johnson City Project 3: Sanitary Sewer Pump Station Resiliency Improvements

Summary: During Tropical Storm Lee, the Brown Street sanitary sewer pump station located at Johnson City's Public Works Department complex was inundated by floodwater and damaged. The damage caused the pump to fail, which resulted in the discharge of untreated sewage into an adjacent commercial and residential area that included 19 homes and four businesses. This project would improve the Brown Street pump station to comply with NYS DEC and "10 States Standards" design guidelines. Specific improvements would include upgrades to the pump station's power supply, operational

equipment, and primary structure, as well as improved physical access. The project would be designed in accordance with Chapter 40 of the 10 State Standards. Chapter 40 of the 10 State Standards, Wastewater Pumping Stations, states, *"Wastewater pumping station structures and electrical and mechanical equipment shall be protected from physical damage by the 100-year flood. Wastewater pumping stations should remain operational and accessible during the 25-year flood. Regulations of State, provincial, and Federal agencies regarding flood plain obstructions shall be considered."*

Cost: \$208,000

Timeframe: 16 months

Partners: NYS Department of Environmental Conservation

Potential Funders: Clean Water State Revolving Fund

Status: NYRCR Proposed Project. FEMA grant pending \$208,000

Community Benefits: Protects the sanitary sewer pump station from water inundation. The project reduces the risk of untreated sanitary sewage discharge due to pump station failures. This will lead to reduced risk of exposure to disease-causing bacteria and viruses contained in combined sewer overflow. Improving the village's sanitary sewer pump station would enhance the resiliency and

ensure the continuous operational reliability during floods. The project would improve public health and safety by eliminating the potential for disease-causing raw sewage to be released locally and into the Susquehanna River. Local and regional water quality would also benefit from the likelihood that untreated effluent discharges would be minimized.

Village of Johnson City Project 4: Water Treatment Plant Resiliency Improvements

Summary: During Tropical Storm Lee, the levee system surrounding the Village of Johnson City's water treatment plant overtopped for the first time, leading to structural damage to the water treatment plant and inundation of individual well houses. This project would construct a new water treatment plant

building at a more-elevated location within the existing village-owned site. The project would also flood-proof individual well houses. Crucial office and operational functions necessary to maintain effective water supply service would be located above the 2011 flood level.

Cost: \$980,000

Timeframe: 13 months

Partners: NYS Department of Environmental Conservation, Broome County Department of Health, NYS Department of Health

Potential Funders: State Drinking Water Revolving Fund

Status: NYRCR Proposed Project. FEMA application pending for \$980,000

Community Benefits: The program will reduce the risk of flooding to the water treatment plant, water wells, and pumps. The risk score for the water treatment plant would be lowered from 27 to 9 for the 100-year flood. This project protects the water supply for the Village of Johnson City and some portions of the Town of Union, Town of Dickinson, and Village of Endicott. Critical facilities served by this water treatment plant include the Greater Binghamton Airport, Wilson Hospital,

Susquehanna Nursing and Rehabilitation Center, and United Methodist Homes' James G. Johnston Memorial Nursing Home. Upgrading the village's water treatment plant and flood proofing well houses would enhance their resiliency and ensure the continuous operational reliability during floods. This project also protects the water supply for the Village of Johnson City and three other adjacent areas.



Village of Johnson City Project 5: Oakdale Mall Rehabilitation

Summary: This project presents a long-term, visionary concept of how the Oakdale Mall could be retrofitted with green infrastructure techniques and best management practices for stormwater management (see Figure 4.5). The mall building's flat roof would be modified to a green roof to retain and slow stormwater during rain events, reduce the burden on the stormwater system, and reduce energy costs by absorbing heat. A second alternative would use solar technology on the

roof to reduce energy consumption from the power grid and may offset a percentage of the building's retrofit. Portions of the parking area surrounding the mall would be reconstructed and re-graded to redirect stormwater into rain gardens and bio-swales. These features would promote infiltration, improve water quality, and reduce runoff. Some of the large, underutilized asphalt parking lots would be replaced by with grass parking surface.

Cost: \$1.93 million

Timeframe: 1 year

Partners: NYS Department of Environmental Conservation

Potential Funders: NYSERDA Green Infrastructure Grant Program

Status: NYRCR Featured Project

Community Benefits: This project increases the holding capacity of stormwater retention facility to reduce flood and erosion risks to residents and businesses surrounding Oakdale Mall. Reductions in stormwater runoff will improve the water quality of the Susquehanna River watershed. Reduced erosion of residential and commercial properties near Oakdale Mall. Reduced stormwater runoff into and improved water quality of the Susquehanna River watershed. The benefits include addressing

the localized flooding downstream, attracting economic growth and generate tax revenue, and economic benefits related to maintaining property values and reduced property damage. Given the information and data analyzed to date, risk reduction benefits would include decreasing stormwater runoff, protecting riverine ecosystems and limiting contributing to flood waters, and reducing overall exposure to flood waters.

ADDITIONAL RESILIENCY ACTIONS UNDER REVIEW

Town of Union Projects

- Town Project 11: Install Back-up Power Supply for Flood Wall Pumps
- Town Project 12: Inflow And Infiltration Mitigation Program/Compensation
- Town Project 13: Stream mitigation/restoration program Nanticoke Creek, Brixius Creek, and Patterson Creek
- Town Project 14: Floodsafe Replacement Housing
- Town Project 15: Other Reported Drainage Issues

Village of Endicott Projects

- Village of Endicott Project 9: Endicott Stormwater Management Study at G.W. Johnson and J.F. Snapp Ballfields
- Village of Endicott Project 10: Endicott Overall Stormwater Management Study

Village of Johnson City Projects

- Village of Johnson City Project 6: Grand Avenue stormwater/sewer separation project inflow and infiltration program
- Village of Johnson City Project 7: Helen Drive Stormwater/Sewer Separation Project
- Village of Johnson City Project 8: Johnson City School District Ballfields Adaptation for Stormwater Detention
- Village of Johnson City Project 9: Backflow Preventer Program Installation
- Village of Johnson City Project 10: Finch Hollow County Retention Facility #1 Capacity Enhancement
- Village of Johnson City Project 11: Ivy Place Drainage Improvements



IMPLEMENTATION APPROACH

The Town of Union and the Villages of Endicott and Johnson City have been working for decades to mitigate risks and increase resiliency. They have completed hundreds of property buyouts, elevated several structures, and gradually advanced initiatives to harden municipal infrastructure. Construction of the floodwall at Union-Endicott High School was a major accomplishment and a model project in the region. Development of the system of levees represented a significant effort to protect private property, and ongoing operation and maintenance of these structures remains an important priority in this plan. This history of success will serve the communities well in the face of worsening storm impacts from climate change.

As the plan summarizes, some of the neighborhoods impacted by property buyouts and those that suffered the most severe flooding in 2006 and again by Tropical Storm Lee in 2011 are now approaching a tipping point, poised to become unsustainable and largely vacated clusters. This plan outlines significant strategies to relocate or densify and elevate some structures to make room for green infrastructure improvements. However, ongoing consensus building with neighborhood residents will be required to advance those strategies and assemble both the property and financial resources necessary to accomplish the plans.

The town and villages have used the LTRC planning process and the NYRCR process to evaluate a range of sustainable and model green infrastructure projects town-wide.

These represent important opportunities to redevelop key parcels, especially the former BAE site, in a manner that is both resilient and economically viable thereby restoring lost tax base and stimulating new private sector investment. It will fall to the municipalities to implement infrastructure and local policies to facilitate and incentivize these new developments and collaborate with funding sources at all levels as well as the private sector to ensure success. Leveraging the town's CDBG-DR resources and other local investments against significant state and federal grants is a central priority. Simply put, without these additional financial resources the communities cannot make the progress they need to make in order to protect residents and quality of life.

Flood mitigation and resiliency must be a watershed-wide priority. The region's success in conducting a Regional Resiliency Summit and winning a "Rising to the Top" award for best Regional Collaboration provides an additional \$3.0 million for watershed planning. This process reinforces that Union's actions affect its neighbors, as their actions affect Union in return. This reality demands that all partners become skilled collaborators, keeping an eye on the big picture while refining local efforts. The Town of Union and Villages of Endicott and Johnson City look forward to participating in a leadership role in that process to increase resiliency.



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